

ETLTC & THE ACM CHAPTER ON ELEARNING AND
TECHNICAL COMMUNICATION PRESENTS



THE ACM BOOK OF ABSTRACTS & POSTERS

Based on:

*The 3rd Summer International Mini-
Conference on Careers in Applied Sciences
&
1st Summer Symposium on Smart Health
Spaces, Information Design, and
Communication*

**The University of Aizu - 2022
Volume 4**



EDITED BY DEBOPRIYO ROY

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MESSAGE FROM THE EDITOR



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SUMMARY

A highly specialised conference on careers in applied sciences where mainly students and industry professionals make presentations on how their careers are being shaped and their future industry outlook and experience.

The healthcare communications design symposium is focused on health informatics and how the technological advancement is reshaping the healthcare industry.

ETLTC2022 was held virtually and hosted from the picturesque University of Aizu campus at Aizuwakamatsu city on January 25-26 and July 30, 2022.

The event was highly successful, attended by over 80 participants from partner universities, representing 7 different universities, and companies across the globe.

The event this year showcased many exciting presentations on different domains of computer science and business, mainly discussing the technological applications in smart environments, and how technology is reshaping the business environment. This mini-conference on applied sciences provided exciting opportunities for students to highlight their class or term projects, discuss how they are preparing for a career in the industry and higher education, industry experience, and such discussion also included industry outlook, economic projections, discussions on internships, and many such related topics. The interesting part of this conference was the fact that this isn't a research conference but provides opportunities to highlight student careers and plans, where students and professionals see themselves going, and how they see the industry evolving.

This year we welcomed two new partner universities - Texas A&M from the United States, and Fukushima Medical University. We were very excited to see the level of enthusiasm in students and how they took on the opportunity to connect to their peers from the rest of the world.

Another exciting development this year has been the opportunity to start the 5-week healthcare communications design symposium - a COIL initiative mainly on smart healthcare infrastructure and informatics. This initiative saw collaboration between the University of Monterrey, Mexico, the Fukushima Medical University, and the University of Aizu, Japan. This year we had participation from 8 undergraduate UDEM students, working together with 8 University of Aizu students with intercultural discussions on healthcare culture, communication, and informatics. The symposium also saw the participation of an expert panel of doctors from the Fukushima Medical University, and medical and nursing student groups, with interesting perspectives in presentations, keynotes, and as moderators in the discussion panels. We will look forward to continuing this initiative.

Finally, we would like to take this opportunity to thank all our partner universities and the host faculty members who make this possible. It was truly a pleasure working with them, and we are eager to continue with this initiative in years to come.

We welcome you to Aizuwakamatsu, Japan, at this conference, and to be part of our conference committee in different capacities.

Thank You and Best Regards.

FACULTY HOSTS REPRESENTING PARTNER UNIVERSITIES



Prof. Wolfgang Ziegler
Karlsruhe Univ. of Applied Sciences
Germany



Prof. Hiram Alejandro Cantu Campos
University of Monterrey
Mexico



Prof. Ana Cristina Garcia Luna Romero
University of Monterrey
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Prof. George Fragulis
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THE PUBLICATION

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3rd Summer International Mini-Conference on Careers in Applied Sciences (July 25-26)

In Conjunction with

1st Summer Symposium on Smart Health Spaces, Information Design, and Communication (July 30)

Attended by partner universities including 19 students from FMU, JP, and over 80 students/faculty from Univ. of Aizu, JP., Texas A&M, USA., Christ Univ. India., UDEM, Mexico., HKA, Germany, and UWM, Greece



2022



Preparing Students for the Job Market

PRESENTATION TOPICS INCLUDE:

- 01 JOB INTERVIEWS
- 02 BUILDING RESUMES
- 03 TECHNICAL SKILLSET
- 04 NETWORKING
- 05 INDUSTRY AWARENESS
- 06 MARKET OUTLOOK
- 07 PROJECT EXPERIENCE
- 08 INTERNSHIPS

PUBLICATION:

Presenters submit an extended abstract of 500-600 words approx. and/or a full-page poster in support of their invited presentations.

The abstract, after in-house peer review, is published in the ACM Book of Abstracts and Posters with an ISSN number.

ABOUT THE CONFERENCE:

This conference covers all topics related to careers in computer science, design and architecture, technical communication, information management, and applied health sciences.

We welcome presentations on how students are preparing for job interviews, developing the skill set required in the workplace, their market awareness, project experience etc. We also welcome industry presentations on what employers look for in potential employees.



ABOUT THE PRESENTATION:

Each invited presenter will be asked to make a 20-minutes presentation followed by 10 minutes of Q&A.

AUDIENCE PARTICIPATION:

We welcome all-around audience participation with the publication of short presentation reviews.

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TEXAS A&M UNIVERSITY, USA



The application of virtual humans to explore the psychology of chess players

BY PROFESSOR KHALDOON DHOUB

The subject of virtual humans has attracted much attention in the AI domain. A virtual human is defined as computer software that mimics the behavior of a real human in a particular field. Virtual humans are widely employed in different areas such as business, gaming, and many others. In this abstract, the author focuses on the application of virtual humans to understanding the psychology of competition among chess players. To this end, he presents experiments that explore the competition of virtual grandmasters while competing against less-skilled players. The experiments are designed in a way that examines the chess personalities of various players. A chess personality is defined as the attitude of a chess player while competing against other players in the chess community. The findings reveal that chess players of the same strength can perform differently depending on their personalities and the personalities of their competitors. These outcomes are useful when designing chess programs and can also be used as guidance in chess training.

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TEXAS A&M UNIVERSITY, USA



Recreating Virtual Workspaces: Disruptive Technologies, STEM Majors, and Society

BY HECTOR LIGSAY JR. & OBIE ORANEKWU - COMPUTER SCIENCE

Globally, people in 2020 had no clue what types of disastrous events would come from the COVID-19 outbreak, and the pandemic resulted in countless layoffs while numerous small businesses closed. Companies started to do the unrealistic at the time and allowed employees to work from home. With this added pressure and urgency from the outbreak, businesses worldwide created new ways and systems to allow a remote workplace. One can now think, what is the next best thing that can help companies soar to new levels? A suggested solution is hologram technology and moving from a remote workplace to a virtual one. Hologram technologies are 3D images created by light sources, and with virtual workplaces aided by hologram technology, time and money can be saved without the need to travel. To achieve this, we need more software engineers, full-stack developers, cloud engineers, hardware engineers, and cybersecurity engineers. Hologram technology gained traction in the 1950s but has slowed down recently. To speed up the growth of hologram technology, educators need to motivate STEM students and highlight necessary skillsets and career paths that would fit their interests. Ultimately, this will allow society to optimize hologram technology to its true potential.

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TEXAS A&M UNIVERSITY, USA



Artificial Intelligence in the Video Game Industry

BY CHRISTOPHER M. BOURLAND JR. - COMPUTER INFORMATION SYSTEMS

No doubt one of the largest entertainment markets, due to the development of consumer computer technology, video games have grown into a multi-billion-dollar industry. As a result of new advancements, games are becoming more complex with increased size, texture fidelity, cross-platform capabilities, and other features. One such advancement is Artificial Intelligence and how it can be utilized to increase the market demand for these products; with current examples, such as Nvidia's "Deep Learning Super Sampling" technology and "RTX" ray tracing technology, this market is already benefiting from AI research and development. With innovative concepts, such as games that learn how their players play for improved user experience, to the use of complex computer-operated characters to decrease the need for fully multi-user experiences, there are near-endless possibilities that can increase retention of customers and the size of the market with new users. Whether it be by aiding in the development of games and related software, decreasing the number of computer resources needed for these programs, or improving the user experience overall, the research and development of Artificial Intelligence could, and should, be a major factor in the future of the video game industry.

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TEXAS A&M UNIVERSITY, USA



Careers in Data Science

BY MOUNIKA NADENLA - COMPUTER INFORMATION SYSTEMS

Internet and related technologies have become ubiquitous in the 21st century. It led to the explosion of data available. Due to the abundance of data available and the advent of cloud computing, data science has become one of the most important fields. Data has its own life cycle and during this cycle, data undergoes different changes. Typically, data generated is unstructured saved in the cloud, goes through an Extract-Transform-Load phase, and finally is ready to use for analysis. There are many roles that fall under data science. Some of the most popular roles in data science include data analyst, data engineer, and data scientist. Though the roles sound similar, they have important differences. Data engineers are responsible for laying the data pipelines necessary for collection, cleanup, and storage. Data analysts consume the data and answer specific questions related to the past and present. Data scientists are data consumers similar to Data analysts. Data scientists focus more on answering business questions related to the future using machine learning techniques and other statistical methods. With this presentation, I'd like to explain the duties of the aforementioned roles.

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TEXAS A&M UNIVERSITY, USA



Preparing Students for the Job Market

BY UTOFA SPEROJACK - COMPUTER INFORMATION SYSTEMS

How prepared are students or recent graduates for the job market? This is a question that is hardly addressed while a student is still in school or even when a student is freshly out of school. Students generally assume that getting a degree will get them a “Good Job” as soon as they graduate. However, they fail to understand that it goes beyond just getting a good job. For most recent graduates initially, this becomes a burden because they are taken aback by the demands of employers mostly in applied science careers. This Abstract examines topics on job interviews, building resumes, acquiring technical skillset, networking as a form of investment into career future, industry awareness, market outlook to forecast future job market, etc. How can schools in preparing their students for the job market? For example, Texas A&M University has a career development system. Students are coached on what to prepare for before they graduate. With the increase in the need for technical skills, the job market has become increasingly competitive. Preparing students with this reality helps them to evaluate and enhance their ability to effectively compete in the job market.

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TEXAS A&M UNIVERSITY, USA



Additional Resources to Augment University Education

BY CODI SMITH - COMPUTER INFORMATION SYSTEMS

There are many free resources available to students and those interested in the computer science field. Students are able to supplement their degrees with certificates, trial software, and online resources in order to gain hands-on experience and make their resumes more competitive. Instructors encourage and provide free online resources for students to gain a better understanding of the course objectives. These online resources include free coding camps to sharpen coding skills, tutorials on how to use popular analytical software that's being used by industry leaders, and mock interview sessions to adequately exhibit their skills and knowledge. This knowledge and experience are important during the interview process as well as when it is time to negotiate salary. The United States job market is unpredictable for those just entering. Options for entry-level positions are often slim and when reviewing potential job descriptions, the knowledge needed is not fully covered by college courses alone.

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FUKUSHIMA MEDICAL UNIVERSITY, JAPAN



Popularization of Medical-knowledge Project (POMk Project): The experience of conducting health literacy classes for children as a medical student in Fukushima, Japan

BY NAOKI KANDA - SCHOOL OF MEDICINE

In recent years, the importance of patients understanding their disease and choosing their treatment options is increasing. However, they do not have enough knowledge to make decisions. To improve this situation, The Popularization of Medical-knowledge Project (POMk Project) was established to improve the health literacy of the general public and started hands-on health literacy classes for children in Fukushima, Japan. This project collaborated with medical and nursing students at Fukushima Medical University to provide classes on the human body and health to children. Recently, this project has expanded its activities to include not only elementary and junior high schools in Japan, but also schools in Indonesia. Students have actually visited Indonesia to conduct health classes for children in cooperation with local university students. This project has also continued to work with an online conferencing system after a new coronavirus outbreak. We will show how the children enjoy learning about the human body and health through this project. We expect this new approach will lead to improving the health literacy of the general public.

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FUKUSHIMA MEDICAL UNIVERSITY, JAPAN



How Japanese nurses provide care that respects the values and opinions of patients

TAKEHIRO SAKURAI - SCHOOL OF NURSING

Nurses are active both inside and outside the hospital, not only to assist in medical treatment for illnesses but also to provide vital support to patients and their families. Such support includes reducing patient suffering and lessening the burden on their mental health. Since each patient holds their own unique combination of values and opinions, we believe that knowing and respecting these will lead to the provision of better nursing care. However, one of the current challenges in the field of Japanese nursing is developing skills to communicate effectively with patients to sufficiently understand their values and opinions. This is compounded by cultural factors, such as the spirit of harmony and modesty that is characteristic of Japanese society, which may cause patients to suppress their opinions on seeing nurses in the busy clinical environment; a situation that is further exacerbated by an absence of nurses from the workforce and an uneven geographical distribution of those currently working. In such a situation, 'nursing that respects the values and opinions of patients' cannot be realized. Therefore, we interviewed practicing nurses to learn their insights into the current state of nursing and how to provide care that 'respects the values and opinions of patients'. In this presentation, we present our findings and examine how to shape the skill set of the nursing workforce of the future.

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FUKUSHIMA MEDICAL UNIVERSITY, JAPAN



Exploring Japanese Nurses' impressions of a healthcare system pre- and post-disaster: building a resilient future for nursing in Fukushima

HARUKA SUENAGA - SCHOOL OF NURSING

Our school is based in Fukushima, Japan, an area significantly affected by the Great East Japan Earthquake, tsunami, and nuclear accident eleven years ago. We plan to interview various experts to find out how things have changed since the disaster, examine their role in disaster management, and visit medical centers designed to respond to such situations. Through the interviews, we will explore the collaborative processes and skills necessary to coordinate the recovery and rebuilding of a healthcare system amidst a crisis, examining how a wide variety of professions come together and work beyond the framework of usual medical care. Through the interviews and visits to facilities, we will learn what is currently lacking from a nursing perspective, so that we can improve the medical system to respond to future challenges. In this presentation, we will share our experience of disasters occurring in Japan from our perspective as nurses studying in Fukushima. We will use terms such as 'risk management, a countermeasure for an expected event, and 'crisis management, a countermeasure for the unexpected, and show how these can support problem-solving at the time of a disaster and help build resilience in the healthcare system of the future.

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FUKUSHIMA MEDICAL UNIVERSITY, JAPAN



Becoming a doctor in a technology-assisted- healthcare system: the view from the bedside

YUMIKO DARIA UCHIYAMA - SCHOOL OF MEDICINE

As 4th-6th grade medical students training for work in a healthcare service that is supported by technologies that evolve daily, we must learn medical practice that effectively bridges the space between patients and technology. In this presentation we give an overview of the pathway to becoming a doctor in Japan; covering the skills we learn during bedside teaching where we integrate technical skills, procedures, and knowledge with real-life medical practice and draw awareness to the skills required by doctors today. We will present an example of how AI-enhanced technology can support patients at an individual and health population level, with a focus on the challenges medical students face in gaining expertise about such technologies and in liaising with experts in computer science and medical engineering fields. From our bedside view, we envisage a future of smoother communication between healthcare sectors to support high-quality technology integration for improved care and better patient outcomes.

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FUKUSHIMA MEDICAL UNIVERSITY, JAPAN



The necessity of PCR test for COVID-19 through the experience of testing students' specimens before their practical training and flight attendants' specimens before their flight

KAZUMA TATE - SCHOOL OF MEDICINE

People have been suffering from the widespread COVID-19(SARS-CoV-2). Because of its infectivity and some paths of infection, whole social activities have been sluggish and people couldn't see each other. My senior doctor from FMU has launched a service testing COVID-19 in patients' specimens by mail service. Fortunately, during my student era, I had an opportunity to participate in it and learned the way to detect the part of the RNA in SARS-CoV-2. We also constructed the optimized logistics of the test. We control each specimen with an individual QR code on top of them. We can track a unit composed of some specimens with a photo through PCR test flow. This flow enables us to test one unit of specimens from another very quickly. We will show you how we help them do their face-to-face social activities using our rapid PCR test which logistics are sophisticated. We expect this will play an important part in public health. We will also show you an interesting statistical result in the end.

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FUKUSHIMA MEDICAL UNIVERSITY, JAPAN



A pilot study of mood tracking among university students at Fukushima Medical University

IZUMI KANEKO - SCHOOL OF MEDICINE

Today, mental health is a major concern among all age groups. In Japan, more than 20,000 people die by suicide every year. However, many people find it difficult to confide in others – even others in the caring professions – about private mental health issues. We pilot-tested a tool, “Mood Tracker,” which would help users record, reflect upon, and exercise control of their own emotions. Participants were 20 medical students recruited at Fukushima Medical University. They have given a paper listing 16 different emotions, and a calendar, with instructions to designate a different color for each emotion on the list, and to color each day of a month according to that day’s overall emotion. This “mood tracking” helped students look for associations between mood changes and different circumstances. In addition, participants filled out a questionnaire before, right after, and a month after mood tracking, for self-assessment of mental state and satisfaction with the tool. The proportion of students who were highly satisfied with their school life increased from 25% before the intervention to 42% one month after the intervention, and perceived stress decreased as well. This pilot study used paper and colored pens, but a digital tool incorporating the same functions might lead to wider dissemination of mood tracking with self-assessment.

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CHRIST UNIVERSITY, INDIA



Advancements in Artificial Intelligence for Knowledge Management

DR. D.VENKATA SUBRAMANIAN & CHANDRA. J - SCHOOL OF COMPUTER SCIENCE

In recent years, especially between the years 2012 and 2022, the use of Artificial Intelligence (AI) in the education industry has grown significantly. Some of the key areas are Task Automation, Personalized Learning, Smart Content Creation, Teaching The Teacher, Knowledge Repository, Portals, and Maps. AI has already been applied to many educational systems that help develop skills and facilitate an easier exchange of knowledge. The Internet Of Things (IoT) based smart schools and collaborative e-learning platforms would be the next big thing, which can take the education sector to the next level, parallel to medical, automobile, and other industries. AI can provide many benefits, such as efficiency, and personalization, as well as streamline both automation and admin tasks to allow easier and faster accessibility for knowledge seekers. AI-Based Smart Knowledge Management System (KMS) and portal would provide better searching and mapping capabilities, to find the relevant assets for researchers/students, who would like to learn and leverage their knowledge in any domain. Some of the new AI-based technologies include MLOps, AutoML, ExplainableAI, and Transfer Learning. This research work introduces and explains related literature on these topics to help enable effective, scalable, and automatic Knowledge repositories, Systems, and K-Map populations.

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Voice-based Scene Generator using Artificial Intelligence

ALWIN JOSEPH & CHANDRA. J - SCHOOL OF COMPUTER SCIENCE

With the advancement in technology, the Augmented Reality (AR) and Virtual Reality (VR) systems are gaining popularity and are used in many use cases to enhance user experience. Most often, these systems are designed by the developers and designers, and the users use them for specific applications. The idea of creating an Artificial intelligence (AI) system with the help of AR and VR that will generate visualizations/context/scenes based on voice commands of the user that can generate adaptive visualizations for the user input can revolutionize the AI industry. This kind of advanced technology can be creatively embedded into various use cases. The context generator based on AI technologies takes inputs as voice commands, like how we interact with the AI agents. The system's output will be visually generated based on the user description. The system can also be accommodated with voice-based interactions as well. More voice-based interactions by the user can enhance the scene description and create a story or demonstrate some concepts. This system can be used as an agent that generates and builds visualizations for the user, including stories and designs based on his voice instructions.

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ALL IN ONE: New Learner Backing and Support approach

ADARSH VERMA, RUEBEN MOHAN KURIAN, C SARANYA, & SAGAYA AURELIA -
SCHOOL OF COMPUTER SCIENCE

When a new student arrives in the new city to study for his dream degree, faces many issues. The new environment is not easy, mainly for students who come from different places and cultures, to adapt. The main issues students face when they arrive in a new city are finding the best educational shop, restaurant, PG, shopping and places near to visit. Our aim is to make student life easier and more memorable. Our website is mainly targeted to students in particular locations (near college environment), where they can find the best and nearest educational shop, restaurant, PG, shopping and places near to visit. The most unique objective of our website is where one can sell or buy products. In a city the cost of living is usually high, mainly students who are dependent on their parents most of the time may not be able to buy required things like furniture, electronic gadgets, etc. When a student completes his education and wants to move to another city may not want the furniture or gadgets he has which may be of good quality, our website connects these two users where they can exchange their products in a nominal rate. We wish to help the College students, so furthermore we plan to expand our target from a particular area to a particular city and then the other states. We also plan on including some more features which would help the students. As different states have different environments and different ways of living, hence we will be focusing on Customizing the website for each state and city. Modules that are still in progress are User profiles, User reviews, and sending notifications to users.

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An effectual events management system: NAKSHATRA

TRISHNA SIRVI, MANI BHARATHY V, SANDEEP SUTRADHAR, & SAGAYA AURELIA
- SCHOOL OF COMPUTER SCIENCE

Nowadays organizing events and arranging all the things in a single place has become a challenging task due to a large number of options and data. Nakshatra events are here with the solution. It is a web-based application that mainly focuses on the core problem while any user looks for organizing events such as Birthday parties, Marriage events, Social Events, School / College Events, Corporate Events, Personalized events such as house parties, and Dj parties, etc. It provides a platform to avail all the services in a single place such as decorations, DJ, catering services, lighting, etc. The unique feature which makes it a step further from typical event booking sites is that it provides two options, one for negotiation in which users can ask for some discount in order to organize any events, and the other option is a Sponsorship option in which different organizations can sponsor any event according to their interest, Users can also request sponsorship if they will. Along with this in our future extension, we have found a few new features like a collaborator option in which individuals or organizations can offer services through the application. We will also try to make it happen for destination events, for example, if some user is away from his/her home and they want to give their parents a surprise for their anniversary, etc. So, We will help them to organize our features and services. Nowadays, the traditional Event management system has almost come to an end. It's technology that governs the major part of our life so people prefer tension less, easy ways for every part of their life. This project is designed to meet the requirements of an Event management system. It has been developed in PHP and the database has been built in My SQL server keeping in mind the specifications of the system. "NAKSHATRA" is built keeping the customer ease in mind where customers can book for any kind of event with the services needed with budget and user can also be a collaborator or a sponsor. We believe that we have accomplished our goals and are satisfied with the code we developed.

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TrustUs – E-commerce for the Elderly

ANKUR SHARMA, GAYATHRI S, NAVIN KONCHERI, & SAGAYA AURELIA -
SCHOOL OF COMPUTER SCIENCE

Many businesses today use the Internet as a primary marketing and sales tool for their products or services. E-commerce Web sites must be useful, easy to use, easy to navigate, and easy to comprehend in order to be successful — measurements of the TAM variables Perceived Usefulness and Perceived Ease of Use. Although the model has been utilised in many studies to better understand e-commerce, the difficulty is that it ignores one extremely crucial external variable: the impact of an ageing population on the usability of the Internet and e-commerce Web sites. As people get older, they start to have issues with their eyesight, hearing, cognitive abilities, and movement. A senior's attitude toward and behavioural intention to use e-commerce Web sites is determined by TAM and its variables of perceived ease of use and perceived usefulness, which are influenced by the product and services offered by the Web site, the usability of the Web site, and the senior's ability to use the Internet. The major goal of the TrustUs project is to support and assist the elderly. Some goods and services may be especially beneficial to people in their sixties and seventies. The notion that elderly people do not use the internet is no longer valid. Social networking and internet commerce are less popular among the elderly. E-Commerce has a lot to offer to older individuals as well. Having items and services delivered to your door makes a lot of sense as your mobility declines. As a result, this project consists of a simple e-commerce website that delivers services and items to the elderly that they may require. There will be a review system for goods and services so that they can decide what to buy.

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Improving Quality of Life for Individuals with Disabilities using Artificial Intelligence

ISHAAN BOSE & CHANDRA. J - SCHOOL OF COMPUTER SCIENCE

One's quality of life plays an essential part in the satisfaction one has with their life. Most technology and infrastructure do not support individuals with disabilities, thus lowering these individuals' overall quality of life. Artificial intelligence and machine learning can improve preexisting technology and infrastructure, and support individuals with disabilities. Computer vision, a field of artificial intelligence, allows for image classification and recognition; this can help visually impaired individuals and individuals with physical disabilities to navigate unfamiliar environments easily. Natural language processing, another field of artificial intelligence, allows computers to process large amounts of natural language data; this can help individuals with hearing impairments to understand spoken language easily. Various technologies have been developed to aid individuals with disabilities perform activities that would otherwise be deemed mundane. This seminar will discuss a few of these technologies and ongoing research on this topic, showing how artificial intelligence and its various sub-fields can be used to improve the quality of life of individuals with disabilities.

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Business Models in Artificial Intelligence & Blockchain

DR. KUMAR CHANDAR S - SCHOOL OF BUSINESS AND MANAGEMENT

This Session will try to study factors that hinder the implementation, profitability, and performance of Artificial Intelligence & Blockchain Technologies in Cost Leaders, Differentiators, and Innovators and examine methods to overcome the failure factors. However, most of the expected results are dependent on how businesses change their behavior due to adopting AI & Blockchain. However, companies can choose from several AI-driven business models; their preference for one model is driven by many industry-level factors such as technical standards, the structure of the technology industry, and the presence of an ethical framework for the use of AI & Blockchain. The Session will summarise the existing literature on business model innovation and AI & Blockchain; it then analyses the industry-level factors that may shape the business-level preference for specific business models.

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Business Models in IoT & IIoT

DR. KUMAR CHANDAR S., & PRASANNA DESHPANDE - SCHOOL OF BUSINESS
AND MANAGEMENT

In Industry 5.0 & Society 5.0, IoT & IIoT will be the main driving forces in the upcoming technological revolution and demonstrate great synergic potential in the Manufacturing Sector. There is an old saying, “In a strong wind even turkeys can fly”. The company that can seize this chance may become the next GAFAs (Google, Amazon, Facebook, and Apple); whereas those who completely ignore it may be rolled out of the market eventually. A business model canvas is a very popular method for startups to align the resources and formulate the strategy, which is also the framework used in the session. The main target of this session is to demonstrate a thinking method to converge these new technologies in the business models and evaluate the most significant elements in the business planning stage. It could help future startups to take advantage of the opportunities and overcome the challenges in the new business environment.

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Text Analytics in Business Applications

DR. KUMAR CHANDAR S., & BHARATHI A - SCHOOL OF BUSINESS AND
MANAGEMENT

Business Analytics can be seen as an area that leverages the value of data, containing important tools for the decision-making process. However, the presence of data in different formats poses a challenge. In this context of variability, text data has attracted the attention of organizations, as thousands of people express themselves daily in this format in many applications and tools available. Although several techniques have been developed by the computer science community, there is ample scope to improve the organizational use of such text data, especially when it comes to decision-making support. However, despite the importance and availability of textual data to support decisions, its use is not common because of the analysis and interpretation challenge that the volume and the unstructured format of text data present. Thus, the aim of this session is to develop and evaluate a framework to contribute to the expansion and development of text analytics in decision-making processes, based on several natural language processing (NLP) techniques.

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BUS ASSIST

RAJESH PV, LOGESH N, JOSHUA STALIN S, SMITH CD, NITHYA S, SWETA KS,
DR. ROHINI V - SCHOOL OF COMPUTER SCIENCE

Buses are always crowded, especially in mega cities. We wait a long time to board the bus (Public buses) at the bus stops, and often we would not get the seats on the bus, or the buses would be overcrowded, or we have to wait for another bus. We do not know the availability of seats on the public buses and the crowdedness in the buses until they reach the bus stop. Similarly, we do not know the live location of the buses while in the service. Think about this, how it would be when we know about the availability of seats in the public buses even before the buses reach the bus stop where we usually board and also the crowdedness stats, the live location of the bus while it is in the service, all in one App. So we have proposed a system (Bus Assist) with AI IP Cameras fixed at the bus's entrance or exit (inside the bus). The number of boarded and deboarded passengers is counted using AI IP Cameras, and that data is linked to (Bus Assist App) to display the number of passengers on and off the bus. The Bus GPS is also linked to the Bus Assist App, which is used for live monitoring bus routes where it will show the live location of the bus, whether it is stationed or moving. Next, the user can input their source and destination bus stops in the Bus Assist App to get the desired route, following stops and bus fares will be generated in the App based on the source and destination bus stops. The App is connected to the designated bus server and displays the count of passengers inside the bus (seated and standing passengers). Based on these statistics (the number of people seated, number of seats available, and number of people standing), the user can decide whether to board the bus or wait for the next bus. Depending on ticket sales record (keeps track of destination), the App counts the number of people who have to get down at which stop, and this will also be displayed in the App and digitally displayed inside the bus. Suppose two people have the same destination and are deboarding; the display on the bus must show (two of them are getting down at this stop, so two seats are accessible now). Now our AI IP cameras will detect if there are two-person left on the bus and prompt it in the App and digital display on the bus. By using this App, users can plan their travel accordingly and save time by avoiding waiting for a long time at the bus stops.

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A Smart Bin Implementation

DIMITRIOS ZIOUZIOS - ROBOTICS

Cleanliness is a crucial matter for modern cities. The bins and the garbage management system must be modernized using the Internet of Things (IoT). The overflow of garbage in public areas creates unhygienic conditions and it may induce numerous diseases in the population. In order to avoid all these negative reasons, in our research work, we proposed a 'Smart Bin Management System'. Using a microcontroller and sensors we can estimate the level of garbage and making use of Lora technology we connect the embedded system with the Information System (IS). All the information is stored in this Information System where the admin users can monitor each bin and be notified of emergency incidents. Using this GUI the users have all the data they need to manage the garbage collection efficiently and when the system collects a sufficient number of data can propose the best route for the garbage trucks to reduce routes, thus reducing fuel consumption and garbage collection time.

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Working in EU/GR ICT sector: A brief outlook

HERACLES MICHAELIDIS - BLOCKCHAIN DATA ANALYSIS

In this presentation, after an introduction of the speaker, his current research as a Ph.D. student at the University of Western Macedonia, along with his experience as an intern and a professional in the ICT sector, we aim to present the current status of the Greek ICT industry sector with an extent to the European one. We will identify the main market directions and the knowledge required from our side as job-seeking professionals and more specifically from the scope of a graduate student or a young professional seeking a position in the ICT sector. Finally, the audience will be presented with a practical example of what it takes to find an internship or a job position and why getting industry experience for someone in the ICT sector is important.

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Career Options and Opportunities in Electrical and Computer Engineering

GEORGE S. MARASLIDIS - AUTOMATED CONTROL SYSTEMS, ROBOTICS, MECHATRONICS, FUZZY LOGIC, MACHINE LEARNING

In this presentation, we will talk about the career possibilities of an Electrical and Computer Engineer in Greece. Starting from undergraduate studies and internships, following Master's and Doctorate studies, as long as careers in the private sector and the industry in general. We will analyze the different scientific fields of an E&C engineer and the possible paths for specialization. What are the future trends of this profession, the requirements, and the best possible steps to have a successful and fulfilling personal development and advancement? We will showcase the advantages of Academic Research and explain ways to gain our confidence in the job market and add value to ourselves. Soft skills that are good to have will be presented, and we will discuss ways to increase your experience by joining and completing various technological projects. In addition, we will highlight some key insights into productivity increment and ways to organize our everyday life. Finally, we will address the matter of collaboration between universities and research institutes and the gains of this procedure for all participants. We will have the opportunity to have a creative discussion and an interesting exchange of opinions about state-of-the-art in electrical and computer engineering.

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Transnational European Programmes

LAZAROS LAZARIDIS - ARTIFICIAL INTELLIGENCE IN THE GAMING SECTOR

Greece and many other European countries, especially ones that belong to the EU region, is a developing country that offers a lot of opportunities in the technology sector. There is a variety of projects that covers not only Greece but every other country within the European Union along with Norway, Switzerland, and the United Kingdom. Interreg Europe is a kind of program that includes projects which are then arranged in predefined priorities and the Information and Communication Technologies (ICT) sector is one of them. The University of West Macedonia participates in several projects of that kind and a relevant one is the SKILLS+ which aims at developing public policies promoting fast networking skills among Small-to-Medium Enterprises in rural areas helping them seize fully the opportunities offered by a digital market. In general, there is a huge variety of cooperating projects and anyone who is participating continuously in them can obtain invaluable experience, a very useful feature throughout Europe. Finally, there are also more straightforward opportunities as various multi-national businesses are expected to be expanded in Greece especially in the cloud-based services sector, such as Microsoft with the Azure platform and the Amazon Web Services.

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Emerging job opportunities in the IoT field

MARIA PAPATSIMOULI - APPLIED IOT

Europe provides plenty of job opportunities both in the industry and service sectors. Also, there are major R&D facilities in which top scientists and interns can be occupied. Greece is a developing country that relies heavily on provided services by investing in multi-national enterprises or cooperative projects. European programs aimed at specific sectors that include hi-tech implementations as well. Region of West Macedonia participates in a REBORN project aiming at almost bankrupt Small-Medium businesses by mentoring them to change their policy or even their activity model. Internet of Things (IoT) is a very promising technology known in many countries around the world and can combine everything into a single body, enhancing the cooperativeness between different devices, e.g., traffic lights and cars, and improving everyday life. This sector offers very useful experience as, in most cases, it demands very good programming skills and deep knowledge of AI practices in general. As a result, many jobs can be applied in Greece, from device developers to technicians in any kind of enterprise.

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Security in IoT: A Midsummer Night's Dream or a challenging possibility?

MINAS DASYGENIS - COMPUTER ARCHITECTURE AND EMBEDDED SYSTEMS

We are living in an interconnected world, which is mostly attributed to an evolutionary phenomenon that brings together a lot of existing technology, from communication protocols up to hardware architectures, from bare metal programming techniques up to state-of-the-art multitasking operating systems. Inarguably, the IoT devices provide comfort, automation, safety, and security to persons and property. This ubiquitous computing living does not come without a price. The increased system complexity, the complicated interconnection of everything, the vast amount of cyber-physical systems with different requirements, the very low time-to-market period, and the proliferation of ingenious easy-to-use hacking tools, have let all the hell break loose in terms of security and enhanced the opportunities of break-ins and mal-use. Every couple of days, stories about hackers abusing IoT appear in the news press, giving the feeling that we are moving towards a dystopian situation where no matter the security advances, malicious people will always find ways to circumvent these measures. In this lecture, we will enumerate all major security issues of IoT devices, explain them in detail and provide useful insight into best practices in designing secured internet of things systems.

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Security in IoT: A Midsummer Night's Dream or a challenging possibility?

KONSTANTINOS-FILIPPOS KOLLIAS - ELECTRICAL AND COMPUTER ENGINEERING

Over the last several decades most of the advances in research and academia have emerged from the collaboration of diverse disciplines, as interdisciplinary research contributes to the integration of information, data, tools, techniques, and concepts, broadens perspectives, blends theories, with an aim to develop solutions to problems, a single discipline or research area could not achieve. Interdisciplinary research is challenging, more flexible, and acquires knowledge from diverse disciplines and collaboration between scientists of different backgrounds to achieve significant scientific results. Thus, interdisciplinary research is becoming considerably significant as it meets societal needs and focuses on real-world issues requiring collaborative and integrative approaches. The developmental disorder of autism is a research area often investigated from multiple perspectives by disciplines like psychology, psychiatry, medicine, special education, informatics, computer engineering, etc. The current presentation focuses on the experiences of a special educator who conducts interdisciplinary Doctoral research concerning autism in the Electrical and Computer Engineering Department of the University of Western Macedonia, Kozani, Greece.

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Software development in the field of technical communication

FLORIAN ROMMEL - COMMUNICATION AND MEDIA MANAGEMENT

I started my career as a web developer in a project management office, developing websites and web applications for our customers and clients. In recent years I have studied communication and media management at the University of Applied Sciences in Karlsruhe. During my studies, I concentrated on information technology topics such as content and information management, information architecture, content delivery, and publication technologies. My theses covered the topics of CSS Paged Media and web services based on semantic information models. I am currently working as an Information Architect for Siemens. My tasks include the creation of software documentation as well as the planning and implementation of ontology-based retrieval mechanisms. The position gives me the opportunity to use my fascination for software development in an exciting area. In technical communication, the amount of information units increases continuously with the increase in product variety and complexity. This poses a major challenge to retrieve the right information for the respective use case. In order to meet the growing challenges, new concepts based on modern information technology are researched, developed and implemented. Making the technical communication area a great place to be for a developer.

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From thrifty to nifty

PATRICK RIFFEL - TECHNICAL WRITING

I started my career as a web developer in a project management office, developing websites and web applications for our customers and clients. In recent years I have studied communication and media management at the University of Applied Sciences in Karlsruhe. During my studies, I concentrated on information technology topics such as content and information management, information architecture, content delivery, and publication technologies. My theses covered the topics of CSS Paged Media and web services based on semantic information models. I am currently working as an Information Architect for Siemens. My tasks include the creation of software documentation as well as the planning and implementation of ontology-based retrieval mechanisms. The position gives me the opportunity to use my fascination for software development in an exciting area. In technical communication, the amount of information units increases continuously with the increase in product variety and complexity. This poses a major challenge to retrieve the right information for the respective use case. In order to meet the growing challenges, new concepts based on modern information technology are researched, developed and implemented. Making the technical communication area a great place to be for a developer.

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My way to and through Technical Communication and beyond

PHILIPP BINDER

CONTENT STRATEGY AND ARCHITECTURE, CORNELSEN VERLAG GMBH,
GERMANY

Against the background of a degree in humanities and a career in radio journalism, I decided late to pursue a career as a technical communicator. I received the training for this in a postgraduate course at the Karlsruhe University of Applied Sciences. I specialized in the areas of information management, Content Management Systems, and XML technologies (XSLT, XSL-FO). As part of my studies, I completed an internship at Endress+Hauser, a process automation full supplier in Switzerland. There I also wrote my diploma thesis. I was taken on by Endress+Hauser in the position of Technical Editor and later Application Manager. In these roles, I was mainly responsible for the support and further development of the system environment for technical communication at five locations of the company. In January 2022, after 17 years in Switzerland, I returned to Berlin, where I work as an "Enterprise Content Architect" at a large German schoolbook publisher. The talk will highlight the main stages of my career and the focal points of my work in Technical Communication that were: Introduction of a new Component Content Management System, Maintenance of the XML environment (DTD, XSLT, and XSL-FO), Conception of interfaces to central IT systems, etc.

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UX mindset as a way of working

AUCH HEIKE

TECHNICAL WRITING, ETAS GMBH, GERMANY

I've been working in the Bosch Group in the area of technical communication since 2016. I completed my bachelor's and master's studies in Karlsruhe at the University of Applied Sciences. At ETAS I take care of the User Information for 2 software products. Besides the pure technical documentation, I give input or impulses for product optimization. In detail, these are hints to shorten click paths or to write UI texts in a comprehensible way for example. On the one hand, I want to support the user already during the usage, on the other hand, it is an efficiency increase in my work. As a result, I don't have to describe and prepare action steps in a complicated way. The holistic view of information from the user's perspective and aesthetics are important to me. Product documentation is part of the product, and therefore part of the user experience (UX). "Make the user happy" and "Writing is designing" are my claim and approach. This is my contribution to a good UX. I am a visual person. And I want to make my information preparation appealing and aesthetic. Additionally, standardization and automation are important to me for an efficient working environment.

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My way to Technical Communication

PATRICK RANNACHER
COMMUNICATION AND MEDIA MANAGEMENT

My career in Technical Communication has started about four years ago. I made experience in the media sector before and because of that, I applied to Karlsruhe for the study program Communication and Media Management. My studies offered me exciting projects and I discovered that I could use another skill in a professional way. Therefore, my interest has shifted toward one topic of my studies. Since my internship in the fifth semester, I have been working at a major household appliance company. In this way, I gathered important job experience, found a topic for my thesis, and trained an important skill. To establish an intercultural collaboration between students from the University of Aizu and the University of Applied Sciences Karlsruhe I can imagine different exchange opportunities. After my Bachelor's degree, I want to dive deeper into future topics of Technical Communication. Where will my way lead me?

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Combining Computer Science in Media with Technical Communication

JEANNETTE DORFHUBER

COMPUTER SCIENCE IN MEDIA (B. SC.) / COMMUNICATION AND MEDIA
MANAGEMENT (M. SC.)

My journey into technical communication already started at school. I always liked logical structures, for example, math and computer science, but I didn't know what I aspired to do at that time. Today I know I want to work in technical communication. My name is Jeannette Dorfhuber and I work as a project manager for Atruvia, an IT supplier in Karlsruhe. We offer innovative ways to deliver and retrieve content to improve the ease of finding information in the product documentation. After focusing on computer science in my bachelor's studies and during my semester abroad, I wanted to pursue an additional field of study for my master's degree. This study gave me insights into technical communication, leading me to choose this field as my profession. Logical structures, so-called knowledge graphs, and the classification of content give technical communication the ability to create and provide information for specific target groups. For me, this combination is the decisive reason why technical communication is indispensable in any company.

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Summarizer Technologies in Technical Communication - Insights and outlook for content delivery

JULIA TELATINSKI
COMMUNICATION AND MEDIA MANAGEMENT

My name is Julia Telatinski and I am 26 years old. I have always been interested in technical topics. For this reason, I decided to study with a technical background after completing my training in finance. I am currently studying Communication and Media Management in my 8th semester at the University of Applied Sciences in Karlsruhe. As a working student, I was able to gain various insights into the field of technical product training. Since I am also interested in topics in the area of content management and content delivery, I decided to write my final thesis in this area. My final thesis is being written in cooperation with Christian Bürkert GmbH & Co. KG and deals with the topic of summarizer technologies in technical communication. It takes a look at the current systems and how they can be used in the near future in TC, more specifically in content delivery. In my presentation, I will give an insight into the basics of the topic and the results of the thesis. Finally, I will give an outlook on the use of summarizer technologies in TC.

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KARLSRUHE UNIVERSITY OF APPLIED SCIENCES (HKA), GERMANY



Insight into the practical Implementation of Semantic Correlation Rules in a Content Delivery Portal

MARIELLE DERWAND
TECHNICAL COMMUNICATION

Recent developments in the field of technical communication show considerable interest in the utilization of semantic technologies. The use of taxonomic structures to represent metadata is already a widespread practice. Building upon this foundation, one can enhance the semantic expressivity of content using the recently introduced semantic correlation rules (SCR). With the help of SCRs, one can realize the concept of microDocs which improve search functionalities within content delivery portals (CDP). In this presentation, a practical implementation of SCRs into a content delivery portal will be presented. The project was carried out during a thesis and in cooperation with the company DOCUFY GmbH, an established software company for technical communication in Germany. Various influences and development efforts that are involved in the implementation of SCRs will be demonstrated. The results of the thesis revealed some potential extensions that should be considered in further developments of the SCR concept. Additionally, the project showed the growing importance of collaboration between technical writers and software engineers.

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The Impact of an Optimal Clinical Engineering Department in a Healthcare Center

MIRIAM ECHEVARRÍA LÓPEZ - BIOMEDICAL ENGINEERING

In Mexico today, unfortunately, not every hospital or healthcare center, has a clinical engineering department. It has come to this because the same healthcare system has not given the importance and prioritization to this department that it deserves. The economy may be a factor in this problem since the resources given to public health, nationwide, are not enough to prioritize the management and maintenance of medical equipment as well as optimal hospital management, in general. This lack of importance given to a clinical engineering department may also be due to the lack of knowledge about the department, since biomedical engineering is relatively new in Mexico, also due to the lack of knowledge of the impact that it can have on a hospital, economically and service wisely.

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3D Printing in Healthcare

ARMAS CASTILLO, SERGIO A - BIOMEDICAL ENGINEERING

Industry 4.0 involves various technologies, but I was mainly interested in 3D printing; In biomedical engineering, 3D printing is used for prostheses prototypes, clinical instrumentation, and engineering. Using this technology in the healthcare industry allows us to improve and expand this area. 3D printing in healthcare allows doctors to offer patients a new form of treatment in various ways, and is used to develop new models for surgical cutting and drilling, prosthetics, and to construct specific replicas of patients' bones, organs, and blood vessels. Recent advances in 3D printing in healthcare have resulted in lighter, stronger, and safer products, shorter manufacturing times, and lower costs. Furthermore, this will allow medical staff to better understand the patient and access products specifically tailored to the patient's anatomy, thus improving patient comfort. To conclude, I will talk in more detail in my presentation about various cases where 3D printing is applied in healthcare.

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Virtual Reality in Healthcare

JOSSUÉ ALBERTO RODRÍGUEZ RODRÍGUEZ - BIOMEDICAL ENGINEERING

In recent years, the use of new technologies has been implemented the fourth revolution (4.0) with a transformation process in different areas, however in the health sector a clear example is virtual reality (VR), but do we know what is virtual reality? This technology allows us to add new dimensions to the real world through a device (telephones, tablets, glasses, special viewers) allowing us to associate physical elements of our environment close to the digital era, likewise, to be able to apply different knowledge and strategies in procedures in the health area such as “precision within the blood analysis” perfecting the blood extraction process, “ultrasound” in the use of glasses to dispose of hands-free when using the transducer, having a total image control, or finally the application of mixed reality in 3D models in anatomy to allow students to project, reduce, grow and share information. Additionally, the use of virtual reality technology can directly help patients without the constant intervention of a health professional or recipients with low vision such as people with pigmentary retinitis, implementing a scanning solution in the space where they are and with the virtual reality detect objects, mark them with bright colors so that they can better understand the space in which it is found.

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Artificial intelligence as a technology to improve users' experiences in healthcare and its' future

ANA MARCELA VÁZQUEZ GONZÁLE - BIOMEDICAL ENGINEERING

Industry 4.0 has brought several innovations in diverse professional areas, including healthcare. For example, artificial intelligence (AI) was born thanks to this industrial movement, nowadays is defined as a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. On the other hand, it is well known that hospitals require patients, medical staff, nursing staff, etc. to function as a business; therefore, a good user experience is vital to assure that economical and professional expenses are met. These two topics converge in the implementation of development based on AI to enhance the overall healthcare experience. At this conference, I'll be explaining how the application of artificial intelligence in diverse areas can improve the experience of medical and nursing staff with patients and how as biomedical engineers the research and development of these technologies can open a wide range of solutions and problems.

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The cloud in healthcare systems

LUIS FERNANDO RÍOS GARCÍA - BIOMEDICAL ENGINEERING

In recent days, industry 4.0 has been developing new technologies that help professionals to work more efficiently. This isn't an exception for the medical industry; nowadays, the use of bleeding-edge technology in healthcare systems it's fundamental for improving the patient and the hospital crew experience. One of these technologies that are crucial to help improve the efficiency of any healthcare-related procedure is rapid access to the clinical history of the patient by using the cloud as a storage alternative. I will be focusing on talking about the benefits of using the cloud as a storage unit; also, I will present possible opportunities that the correct implementation of it can reach. In addition, I will be giving a conclusion about the opportunities, challenges, and limitations of using the cloud in the current reality of Mexico's healthcare system. I hope that with this you can understand better how the healthcare systems can be improved with new technologies.

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Is Telemedicine a good alternative for the healthcare industry?

ALEJANDRA MERCEDES JARAMILLO RUIZ - BIOMEDICAL ENGINEERING

In the past few years, the healthcare industry has grown a lot more than expected. The implementation of new technologies and the creation of smart hospitals made a revolutionary change in this field. Thus, with the implementation of the health models such as e-health and with the application of the 4.0 Industry, people can be allowed to have access to quality health, since it implements information and communication technologies in medical environments to meet the needs of patients, health professionals, health care providers, among others. In my conference, I will be addressing one of the branches of e-health such as Telemedicine, which is focused on the provision of medical services at a distance and which it must be taken into consideration that it is just the way, not the end. In this way, I will talk about its benefits, limitations, and possible opportunity areas that a health system in a country like Mexico could face for its application.

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The importance of a decent space in health services

OSCAR CHAPA GARZA - ARCHITECTURE

I believe health services should be good enough for all people, no matter where you are from, health is something we should all demand. Currently, there are several opportunity areas within these services where the comfort and experience of patients have been left aside, harming their stay in hospitals and clinics, as well as in their recovery process. Based on my experience, I can assure you that it is our responsibility as architects and biomedical engineers to propose alternatives that provide solutions to these problems, being empathic with the patient and providing decent spaces. For this reason, it is extremely important to analyze the architectural spaces of hospitals and clinics, seeking the incorporation and standardization of neuroarchitecture and its technologies, to ensure that patients, health professionals, and any visitor can enjoy a space comfortable, stress-free, and functional during your stay.

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Sustainable healthcare designs

JUAN JOSÉ MARTÍNEZ - ARCHITECTURE

I believe health services should be good enough for all people, no matter where you are from, health is something we should all demand. Currently, there are several opportunity areas within these services where the comfort and experience of patients have been left aside, harming their stay in hospitals and clinics, as well as in their recovery process. Based on my experience, I can assure you that it is our responsibility as architects and biomedical engineers to propose alternatives that provide solutions to these problems, being empathic with the patient and providing decent spaces. For this reason, it is extremely important to analyze the architectural spaces of hospitals and clinics, seeking the incorporation and standardization of neuroarchitecture and its technologies, to ensure that patients, health professionals, and any visitor can enjoy a space comfortable, stress-free, and functional during your stay.

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Smart hospital: Digitalization in healthcare

ARMAS CASTILLO, SERGIO A - BIOMEDICAL ENGINEERING

Industry 4.0 in healthcare and the introduction of smart hospitality have resulted in an application system based on the digital environment. This achieves ample use of ingenious technologies to improve the quality of care and patient experience while decreasing costs. In addition, one technology that helps improve this is the 5G network; this technology offers improvements in data speed, latency, reliability, and capacity. That is why this presentation will discuss the importance of the implementation of digitalization in the healthcare sector and will give an example of a smart hospital.

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Industry 4.0 Implemented in the Mexican Healthcare System

MIRIAM ECHEVARRÍA LÓPEZ - BIOMEDICAL ENGINEERING

One of the main technologies included in the Industry 4.0 is digitalization, as it is the Internet of things, big data analytics, and others. Industry 4.0 has come to revolutionize the world in general, but a very clear example can be seen in healthcare. Digitalization has been implemented all around the world in healthcare making smart hospitals that make a user experience more pleasing. Unfortunately, the public healthcare sector in Mexico has always been a little behind, but this is a big opportunity for a change.

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Digitalization of healthcare in Mexico

ALEJANDRA MERCEDES JARAMILLO RUIZ - BIOMEDICAL ENGINEERING

Industry 4.0 implements new technologies and guarantees the personalization of services, optimization of processes, and customer satisfaction. This revolution impacted the health sector, influencing different areas such as education, data analysis, digitalization in healthcare, personalized healthcare, and medicine development. However, implementing this kind of technology comes with different factors that can make this task feasible or not. Therefore in this presentation, some challenges and opportunities that Mexico has faced in the last years with the implementation of these technologies will be discussed.

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Digital and Domotic Technology in Healthcare Spaces

OSCAR CHAPA GARZA - ARCHITECTURE

Industry 4.0 has transformed the Healthcare sector and its whole ecosystem in order to apply automation and digitalization in the way to provide traditional services and products to deliver better outcomes and a more integrated patient experience, and continuously innovate in care delivery. Because of this, in this presentation, we will talk about the importance of digital and domotic technologies to the hospital typology, and the help of architectural principles and the application of home automation, the objective of smart hospitals has become to meet the space necessary to host this new ecosystem of innovation and intelligence.

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Impact of 4.0 Technologies in Dental Clinics

JOSSUÉ ALBERTO RODRÍGUEZ RODRÍGUEZ - BIOMEDICAL ENGINEERING

Industry 4.0 has made it possible to obtain improvements, allowing the health sector to evolve by introducing various technologies, and accessing better care and attention. From the perspective of an intelligent dental clinic, technology 4.0 guarantees a better service to the patient, not only due to the development of this type of tool but also the benefits that they bring, the increase in accessibility, and the best quality of life for the persons. This presentation will review the dominant technologies of industry 4.0 that improve the quality of dental clinic service and learn about the feasibility study according to the implemented technologies.

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Implementation of Smart technologies in healthcare

LUIS FERNANDO RÍOS GARCÍA - BIOMEDICAL ENGINEERING

Nowadays, in the healthcare field, it is primordial to implement such technologies and techniques that help improve the quality of patient care; this is where industry 4.0 takes place. There is a plan to bring this technology to Mexico, but a list of points to consider before starting implementation. Is it feasible? Will it be popular? Are they similar cases of implementation in other countries? These are all questions discussed in the presentation.

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Industry 4.0 and its' impact on Smart Hospitals

ANA MARCELA VÁZQUEZ GONZÁLE - BIOMEDICAL ENGINEERING

The fourth revolution, also known as Industry 4.0, has fused automation and computers in order to apply digitalization to new technologies and devices. These innovations have been used in the healthcare sector, from communication to surgical procedures. On the other hand, a smart hospital is the implementation of new technologies and intelligent architecture with the objective of improving the patients' experience inside the medical facilities. In this presentation, the analysis of its impact and the feasibility of applying these concepts in Mexico is going to be reviewed.

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XR Technology for Industry and Healthcare

SADAFUMI KOKUBUN - SPATIAL MEDIA

Industry 4.0 has changed the way we work and the way we live. Industry 4.0 helps us work more efficiently and safely through machine-to-machine communication called IoT, M2M. This is used by AI, RFID, 3D print, etc. On the other hand, Industry 5.0 is an industry that connects humans and machines. In this industry, we can operate machines more efficiently, have faster working speed, and increase product quality. This industry is also expected to solve the current employment problem. My interest in this area centers on XR technology. XR technology is considered one of the key technologies to advance to Industry 5.0. I like this technology because this technology can expand our lives and gives us new experience. XR technology is also useful in the medical field for study, health improvement, health support, etc. So my presentation at the ETLTC Summer conference will talk about XR technology, Industry, and healthcare. I would like to talk about XR technology and how it is used.

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Industry 4.0 and Healthcare

YUTO KIKUCHI - COMPUTER SCIENCE

Firstly, I will talk about Industry 4.0 and healthcare applications that I find interesting. Secondly, I will explain how this application is useful in health informatics or smart hospital context and how the research is used in this application, and how it contributes to many societal applications including healthcare. Thirdly, I will analyze a smart hospital definition and want to discuss what technologies are required in this area, smart hospital. Based on this discussion, I will introduce a smart device that I find interesting and explain how this contributes to healthcare communication such as a smartwatch. Fourthly, I will try to explain the relationship between the research I am doing in my lab and Industry 4.0. Next, I will introduce a specific company doing a great job of using Industry 4.0 technologies that could be used in smart healthcare communication and explain how I think this technology could be used in health communication. Lastly, I conclude with a description of the future of Industry 4.0 and the barriers that exist.

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How does IT Affect Society?

KYO SATO - SOFTWARE ENGINEERING

The impact of Industry 4.0 will be significant for society. In particular, the widespread use of the Internet has changed the way we live, work, and interact with others. For example, machines and machines communicate with each other to reduce human labor, people play with friends online, and video streaming services have become a hot topic. The one thing they all have in common is that they are all connected to the Internet. Due in part to Corona's influence, people have had to adapt to changes in society. Online classes are a good example. Life, as it used to be, is no longer possible. The IT industry is attracting a lot of attention. It is an industry that is probably growing and has a bright future. My presentation will be about the IT industry. I hope it will give you a better understanding of Industry 4.0 and the future of the IT industry.

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Essential and Frontline Workers

TARUN SREEPADA - COMPUTER SCIENCE

Advances in technology have enabled people to work their jobs remotely, where it is applicable, especially during the COVID-19 pandemic where software such as Zoom allows people to host meetings virtually. However, some jobs were unable to join the wave of remote work such as essential and frontline workers who had to physically show up to work to enable a business to operate. With Industry 4.0 slowly revolutionizing the way companies operate, incorporating various technologies into their chain of operations., it is inevitable that a solution to aid or replace frontline workers crops up eventually. With various improvements in wireless transmission, it is possible to stream high-resolution video from across the world with minimal delay. Modern-day computer applications use this technology to make the experience of using an application smoothly. These types of technologies can be applied to frontline workers where robots stream what the camera sees to a worker at home where the worker can manually simulate their work or send commands to a robot to perform an operation.

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The way to use RFID Technology

DAIKI KOJIMA - SOFTWARE ENGINEERING

Compared to INDUSTRY 4.0 which focuses on the connection of the machine to the machine for a smart factory, INDUSTRY 5.0 is based on refining the interaction between humans and machines. And there are many things in INDUSTRY 4.0, Cloud Computing, RFID, the Internet of Things, and so on. Especially, I am interested in RFID technology because I think it is one of the most useful technologies in INDUSTRY 4.0 and it is a very familiar tech. For example, this is used for anti-theft tags, product tags, IC cards, etc. You must sound familiar with things and you can understand how familiar the tech is. Recently at Google Scholar, I found a very interesting thesis that says the way to use RFID tech in the library. According to the thesis, we can borrow a book easily by RFID tech. I read this and have an interest in the way to use RFID tech. My presentation at the ETLT2022 Summer conference will talk about how used RFID technologies.

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The way to use RFID Technology

COORAY MUTHUTHANTHRI PATABENDIGE SUMUDU HARSHANI
BIOMEDICAL INFORMATION ENGINEERING

Industry 4.0 is a new phase of the industrial revolution, which emphasize digital technologies. Interconnectivity, automation, machine learning, cyber-physical systems, big data, artificial intelligence, the Internet of things (IoT), and real-time data are the focuses of industry 4.0. Internet of medical things is a subterm of IoT that comes with digital health care. Digital health is a broad and multidisciplinary concept that includes concepts from an intersection between technology and healthcare. Digital health applies the digital transformation to the healthcare field, incorporating software, hardware, and services. Digital health includes mobile health apps, electronic health records, electronic medical records, wearable devices, telehealth, and telemedicine, as well as personalized medicine. Stakeholders in the digital health field are patients, practitioners, researchers, application developers, and medical device manufacturers and distributors. Why is Digital health important? Digital health is more than just technologies and tools. It refers to "radically interoperable data, artificial intelligence (AI), and open, secure platforms as central to the promise of more consumer-focused, prevention-oriented care." (Deloitte Insights). Digital health takes the advantage of, big data, robotics, and machine learning in order to improve patient safety by reducing medication errors, reducing adverse drug reactions, and improving compliance to practice guidelines. There should be no doubt that health information technology is an important tool for improving healthcare quality and safety too. In addition, digital healthcare allows continuing developments in ingestible sensors, robotic caregivers, and devices and apps to monitor patients remotely. Deloitte has proved that digital health is more prominent by saying, "AI will enable major scientific breakthroughs, accelerating the creation of new therapies and vaccines to fight diseases. AI-enabled digital therapeutics and personalized recommendations will empower consumers to prevent health issues from developing. AI-generated insights will influence diagnosis and treatment choices, leading to safer and more effective treatments. Additionally, intelligent manufacturing and supply chain solutions will ensure the right treatments and interventions are delivered at the exact moment needed by the patient." Wearable devices and digital health apps such as fitness trackers, smart watches, Step trackers, fall alert products, remote blood pressure monitors, sleep trackers, connected pacemakers, and digital thermometers are having high demand among digital health products. Additionally, digital health has introduced machines and tools specially occupied by hospitals and laboratories.

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Progress for Industry 4.0 in the World

ANDO YUKI - COMPUTER SCIENCE

Industry 4.0 has changed the way we work and live our lives. Some of the major features of industry 4.0 and society 4.0 - 5.0 are technologies such as AI, robotics, and so on. Computers played a major role in these revolutions. My interest in this area revolved around AI. My presentation at the ETCTC summer conference will talk about the progress of industry 4.0 in the world. In the case of Japanese companies, many factories have adopted industry 4.0 to improve efficiency and quality. Industry 4.0 can solve many things in the industry field so I think there is something to apply in the medical field. For example, hospitals can be managed by computers connected to the internet to help patients. By doing so, patients and workers can obtain a comfortable environment. I will talk about this idea from a student in computer science.



Industry 4.0 & Healthcare: An Implementation for Smart Hospitals

IMPLEMENTATION MANUAL

Ana Marcela Vázquez González
Sergio Andrés Armas Castillo
Miriam Echeverría López
Oscar Chapa Garza

GOBIERNO DE
NUEVO LEÓN

INDUSTRY 4.0

The appearance of innovations in digital technology that are modifying the manufacturing and energy sectors is known as the fourth industrial revolution, majorly called Industry 4.0. These changes are caused due to technological advancements and developments which have the objective of doing a job more efficiently (Boone, 2022).

Industry 4.0 brings several innovations where automation and computers are being fused in order to be working with and for humans. Examples of the new developments are cloud computing, artificial intelligence, the internet of things, smartphones, advanced robotics, and digital fabrication like 3D printing, amongst others (Boone, 2022).



**CLOUD
COMPUTING**



**ARTIFICIAL
INTELLIGENCE**



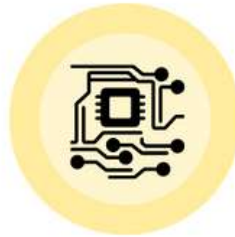
**INTERNET
OF THINGS**



SMARTPHONES



**ADVANCED
ROBOTICS**



**DIGITAL
FABRICATION**

In addition, the four design principles that industry 4.0 follows are interconnection, information transparency, technical assistance, and decentralized decisions. Interconnection refers to the ability of devices, machines, and sensors to communicate and connect. On the other hand, information transparency provides comprehensive information so the operators can make informed decisions. Technical assistance, as it implies, is the ability to facilitate help to humans. Finally, decentralized decisions mean that the technology is as autonomous as possible and is able to make and take its own decisions and make tasks by itself (Paul et al, 2021).

Now, it is relevant in healthcare communication because the innovations that are rising with industry 4.0 enable this sector to be more straightforward (Paul et al, 2021). For example, communication technologies have been used in order to control the spread of the coronavirus outbreak and have brought diverse solutions to problems that arose due to COVID-19, such as identification of infection in early stages, effective supply chain management, and smart manufacturing. The fourth industrial revolution could enhance information exploitation and emerge futuristic health frameworks (Sood et al, 2022).

Some of the most distinguishable advancements that came with industry 4.0 are faster communications, cloud-based record systems, and transfer of data. An example of improved communications is telecommunications which expand the way healthcare has been, now physicians and patients can talk using cellphones, computers, etc. Also, the communication between devices and operators has been enhanced by the implementation of these technologies (Paul et al, 2021).



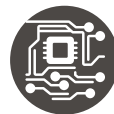
TECHNOLOGICAL DOMAIN OF INDUSTRY 4.0

A technological domain of Industry 4.0 we think is interesting in the context of healthcare communication is artificial intelligence (AI), which is the implementation, design, and use of machines, systems, and programs that show human-like intelligence. AI compasses several important subareas such as image identification, expert systems, voice recognition, natural language processing, planning, intelligent agents, and neural networks. (Whitson et al, 2020).

Artificial intelligence follows the next general steps: understand how multiple facts interconnect in order to form knowledge to then represent it in a machine-understandable form, understand and document a reasoning process for arriving at a conclusion, and add if possible a learning process that enhances the knowledge of a system. (Whitson et al, 2020).

This application is relevant in the healthcare context because by talking about artificial intelligence and users' experience we can use the innovations and technologies of artificial intelligence in order to improve users' experience. This means that we can improve the experience of the medical staff, the nurse staff, the patients, the visitors, and the general hospital workers; which can be achieved by having evolved technology.

We think that the quality of patient care could be sufficiently advanced with such technology; for example, an equipment already being used in surgeries is the robotic surgeries. In addition, robotic surgeries with artificial intelligence technology have brought a collaborative tool that can minimize the variations from case to case thanks to their innovative skills, such as precision and mitigation of the probability of any accidental movement during surgery (O'Sullivan et al, 2020). Another example is precision medicine which focuses on studying the human genome in order to create a medicine that is specialized to that patient, so the medical decision that is going to be made is focused upon individuals' unique characteristics (Johnson et al, 2021).



DIGITALIZED HEALTHCARE

In the public sector of healthcare services in Mexico, technology has proven to be behind. Something as basic as digitalization during a patient's admission is nowhere near. This process in Mexico is still paper-based which makes it inconvenient for the patient and his or her family as well as the medical staff in charge of such a process. It is known that digitalization has made huge improvements in the general industry, as part of Industry 4.0, also implemented in the medical scope.

Digitalization has been one of the first technologies of Industry 4.0 to be implemented in the medical field, but that is not the case in the public sector in Mexico. Said technology can be easily implemented due to the experience of other countries, but Mexico is faced with a problem: the lack of a stable internet band like 5G, corruption, lack of priority, lack of vision for change, and others.

From our point of view, corruption comes at the top of the pyramid of the problems in Mexico. In Mexico, corruption can be seen, in politics, education, families, and even sports.

SMART SPACES AND HOSPITALS

ARCHITECTURAL SMART SPACES

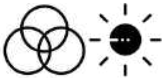
Within the health sector there are different types of patients, with a diversity of medical, psychological conditions and/or preferences. It is well known that in some hospitals there are this type of hospital rooms where sharing space with many other patients can generate the feeling of claustrophobia, in addition to not having privacy, or do not have good ventilation, this causing the generation of bad odors. It is also known that most of these spaces do not have good artificial and natural lighting, in addition to a poor selection of color within the facilities and existing furniture. This type of conditions for patients who are hospitalized for a long period of time can cause a negative impact both emotionally, psychologically and health wise, damaging their recovery or simply causing a bad experience during their hospitalization.

The incorporation of neuroarchitecture within health systems such as hospitals seeks to intervene within these aforementioned factors, addressing the areas of Impact on health, Color and light Impacts, Noise impact, Odor Impact and Impact of Biophily. Therefore, through this neuroscience we decided to generate a proposal that seeks to address these areas of impact, that is, a proposal that responds to the questions of "how can architecture influence the patient/user?" and "how can one have a more pleasant experience during hospitalization?"

Neuroarchitecture Impact areas:



Impact on health



Color and Light Impacts



Noise Impact



Odor Impact



Impact of Biophily

Therefore, we selected the following case for our intervention, a multiple hospitalization room within the University Hospital of Saltillo (Saltillo, Coahuila, Mexico), where the conditions of natural and artificial lighting, ventilation, color palette of the facilities and furniture are not optimal for patients, in addition to the fact that there is no space provided for relatives and visitors.



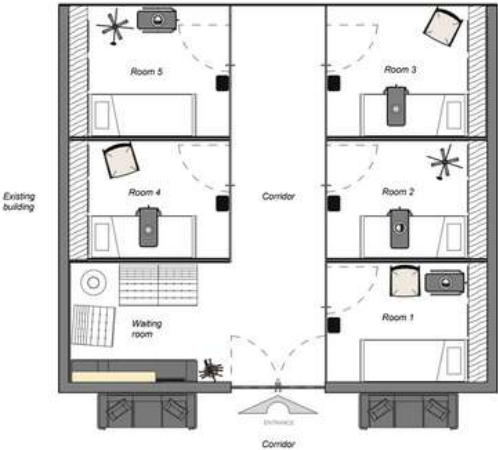
[Current photos of the multiple hospitalization room]



LOCATION: Hospital Universitario de Saltillo, Calz Francisco I. Madero 1291, Zona Centro, 25000 Saltillo, Coah, México



Through our intervention we seek to generate solutions to the above problems, responding to the existing needs, according to the official regulations for hospitals, in addition to seeking the incorporation of Industry 4.0 technology and neuroarchitecture to provide a better experience for the patient. That said, we designed a proposal that includes five patient rooms, a waiting room for family members, and a corridor for circulation. In this architectural plan we can see the division of the rooms, through the use of plaster walls and curtain walls, which contribute to provide privacy to the patients during their hospitalization. We generated a palette of materials with warmer colors, which refer to nature and give the patient the feeling of being in a hotel and not in a hospital room.



ARCHITECTURAL PLAN



HOSPITALATION ROOM TYPOLOGY

This proposal of individual rooms is designed so that the patient can enjoy a comfortable space, remotely controlling the artificial and natural lighting of his room, as well as his privacy and communication with nurses. We also sought to think about the issue of acoustics, so each room has the necessary insulation. We also sought to consider the issue of odors, so each room has its own aromatizer with natural aromas. All this in order to provide the patient a space not only more comfortable but also more humane, with the aim of providing a pleasant experience during hospitalization.



PROPOSAL RENDER 1



PROPOSAL RENDER 2





PROPOSAL
RENDER 3



PROPOSAL
RENDER 4



PROPOSAL
RENDER 5



TECHNOLOGIES IN BIOMEDICAL ENGINEERING

Currently, in the health sector, there is a constant search for the improvement of brain surgeries, where health professionals have the practice and capacity to perform such operations with the least patient risk for the patient. In the year 2021, the Universidad Nacional Autónoma de México (UNAM) made public the "Brain Advanced Computer Surgery Simulator" (BACSIM), a brain microsurgery simulator, created for the preparation and improvement of health professionals. This simulator, located at the General Hospital of Mexico, is considered one of the most realistic of its kind, thanks to the combination of virtual reality and robotics.



Image. Retrieved from: <https://www.reporteindigo.com/piensa/unam-crea-un-simulador-para-practicar-microcirugias-cerebrales-unico-en-su-tipo/>

The investment in preparation and improvement of the practice of health professionals is of utmost importance since in this way it seeks to reduce the risk to patients when performing surgery. For example: the preparation that aviator pilots take when learning the operation of an airplane is through simulation, such as the company FlightSafety International, where several companies and airlines seek to invest in this type of training for their pilots, in order to prepare them intensively and reduce the risk when piloting a real airplane. Therefore, it is necessary to seek the implementation of training through simulators such as BACSIM within the health sector, in order to reduce risks and have more prepared doctors.



Image. Retrieved from: https://img.aeroexpo.online/es/images_ar/photo-g/173296-13358441.webp

In Mexico, many of the companies concerned in the investment of equipment for medical training are the universities, so through an affiliation with hospitals could achieve and afford this type of simulators, where both surgeons and students have the opportunity of such preparation and build confidence for this type of technology.



EXAMPLE OF A SMART HOSPITAL

In our view, Boston Medical Center (BMC) stands as an example of a smart hospital. Firstly, this institution has implemented telehealth; In this way, the hospital can help manage the patient's health and stay connected to their healthcare team securely and conveniently. It is so efficient that a patient can have a telehealth visit through a computer, tablet, or smartphone without any problem. In addition, BMC's video medical consultations allow the doctor to see you in real-time and complete a physical exam. It also incorporates the options to refill medications, order tests, and find out when to see you again. Patients of any age can use virtual healthcare to receive care.

On the other hand, BMC also has a biomedical engineering department and innovative technology such as surgical assistance robots. Some of these robots are used to perform myotomies, prostate surgery, remove tumors, in gynecology and urology areas, etc. In addition, BMC is recognized as one of the best hospitals worldwide; it is in the top 20 of the best smart hospitals internationally. However, it still does not have the 5G network technology, not having this technology causes higher energy consumption, there is no improvement in bandwidth and above all, it would not have support for remote surgeries. Despite the above, BMC has plans to improve and incorporate Industry 4.0 technology in the future.

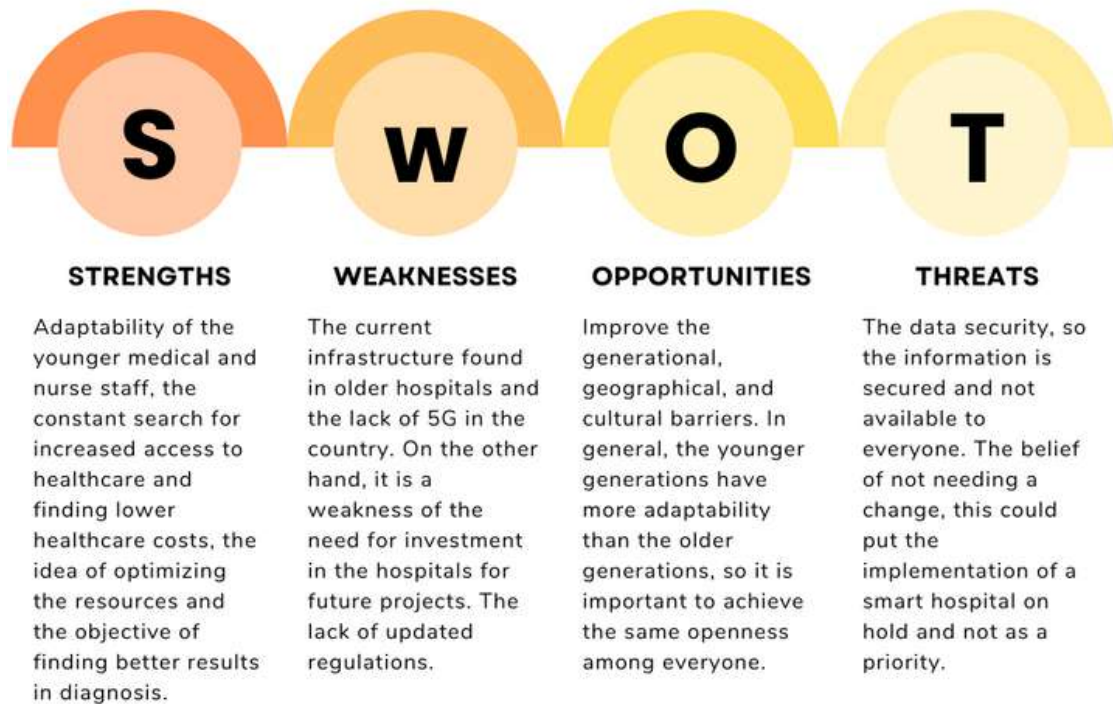
BOSTON MEDICAL CENTER



Image. Retrieved from: https://upload.wikimedia.org/wikipedia/commons/thumb/4/45/Boston_University_Medical_Center.jpg/245px-Boston_University_Medical_Center.jpg

FEASIBILITY OF IMPLEMENTING A SMART HOSPITAL IN MEXICO

The next analysis of strengths, weaknesses, opportunities, and threats (SWOT) it is described the feasibility of implementing a smart hospital in Mexico without making a difference between the public and private healthcare systems.



CONCLUSION

In conclusion, industry 4.0 has brought several innovations that are going to improve how the healthcare industry is nowadays, by implementing new devices and technology that improve the overall experience inside the hospitals. On the other hand, as discussed before, Mexico is technologically backward, and many of the processes such as the admission of a patient are still using paper; in addition, there are also problems such as lack of access to 5G, and corruption, among other things. On the other hand, if digitization technology were to be applied, it could benefit us by streamlining processes where physical documents are used.

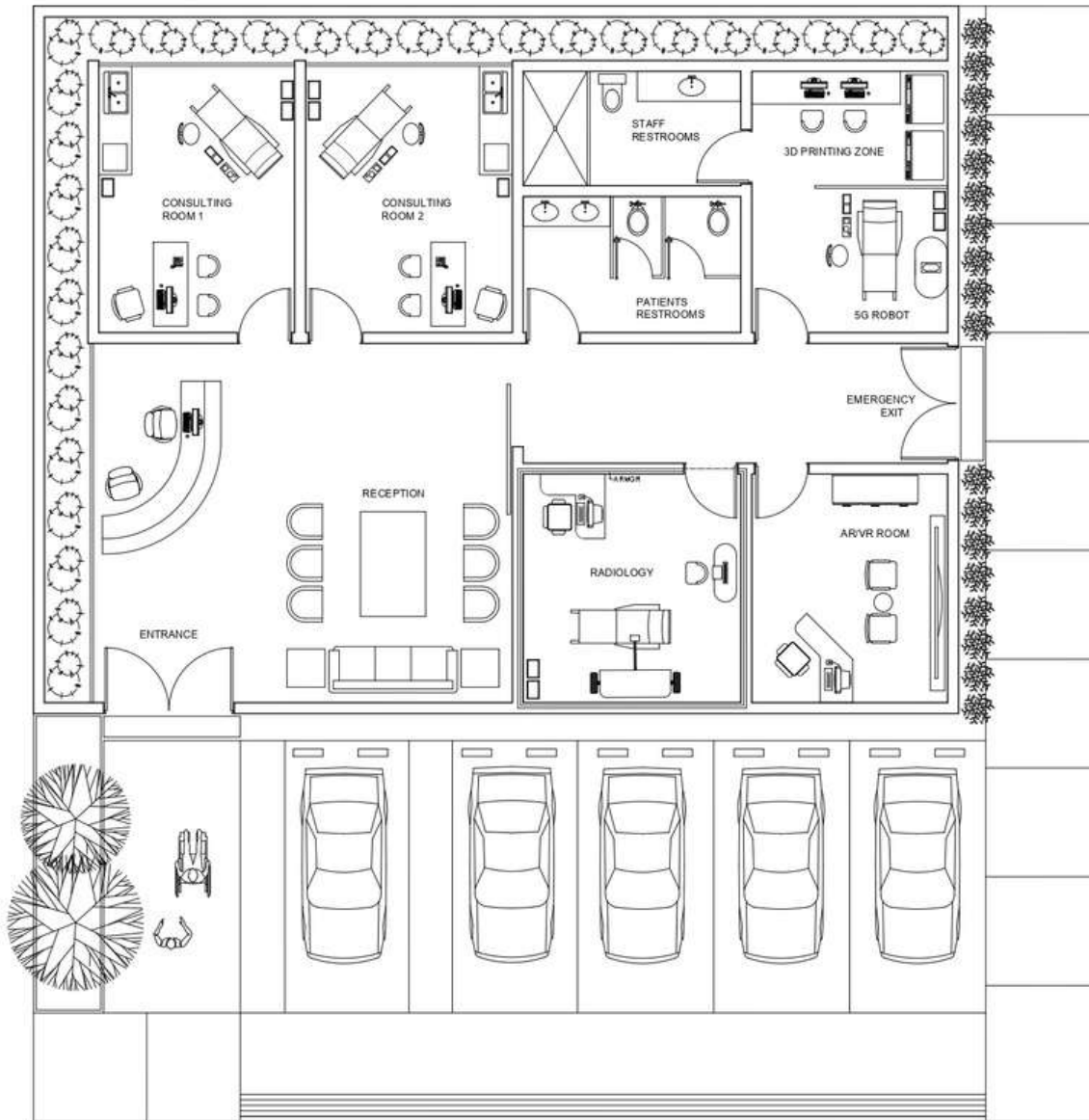
Now redirecting the topic to intelligent technologies, it is important to seek the standardization of the use of intelligent technologies, as well as neuroarchitecture within hospitals, intending to provide a better experience for all users. This itself contributes to improving our health systems, giving greater importance to this sector, to have more optimal and humane hospitals. In addition, standardization of the use of Industry 4.0 technology such as simulators is necessary, as training can help reduce risk when performing brain and other types of surgeries. Investing in this type of technology contributes to having better-trained physicians, in addition to developing a smart and efficient healthcare system.

Finally, today's hospitals are continually looking for ways to improve their efficiency, that's why smart hospitals use innovative technologies to improve the quality of patient experience and care. Also, smart hospitals incorporate resources throughout the environment to access and diagnose data in near real-time, informing, and accelerating patient stays, improving operational efficiency, and optimizing resource utilization for better experiences and outcomes, this is achieved through the 5G network. This technology is the latest standard in wireless networks, offering improvements in data speed, latency, reliability, and capacity, which is why it is so important and is increasingly being implemented in hospitals. And while BMC may not have this latest technology, there are plans to employ it in the future; although it has already been implemented in certain parts of the United States, worldwide deployments are still at a relatively early stage. Even so, this is a smart hospital that ranks among the best in the world and is undoubtedly a great example to follow. Yet, Mexico can implement a smart hospital, but as a country, it needs to take into consideration the current infrastructure and the opportunities and threats that it could face.

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INDUSTRY 4.0 IN SMART DENTAL CLINICS

IMPLEMENTATION MANUAL

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Industry 4.0 and digitalization.

IMPACT OF INDUSTRY 4.0 IN HEALTHCARE

Mexico's National Institute of Statistics and Geography, also known as INEGI, stated in 2020 that Mexico has a population of **126,014,024**, which has kept increasing over the years, requiring the creation of new and advanced healthcare systems. However, implementing this kind of technology comes with different factors that can make this task feasible or not, for example:

- Improving the healthcare system improves the population's quality of life.
- These techniques improve medical procedures' efficiency.
- This technology can help a considerable amount of people.
- Already exist proves that this technology works in other countries

Also, we have some challenges to face, such as:

- It represents a significant investment that few people are willing to make.
- There are not many people with experience implementing this kind of technology.
- Bleeding edge technology often comes late to Mexico.
- Lack of medical personnel due to brain drain.
- Many people have this philosophy: "if it works, why would you bother making it better."

Therefore, in order to face this situation, Industry 4.0 stands for the Fourth Industrial Revolution; it consists of new technologies such as artificial intelligence (AI), cloud computing, robotics, Internet of Things (IoT), 3D printing, big data, augmented reality, simulation & modeling. Industry 4.0 guarantees the personalization of services, optimization of processes, and customer satisfaction. In other words, it focuses on transforming how the industrial sector completes tasks by blurring the boundaries between physical, digital, and biological technologies.

This revolution impacted the health sector by advancing healthcare to unprecedented levels, influencing different areas such as education, data analysis, digitalization in healthcare, personalized healthcare, and medicine development, to name a few. Therefore, the purpose of this manual is to show the implementation of some technologies and digital tools focused on the health sector, specifically in dental clinics, using bleeding edge technology and innovative architectural infrastructure.



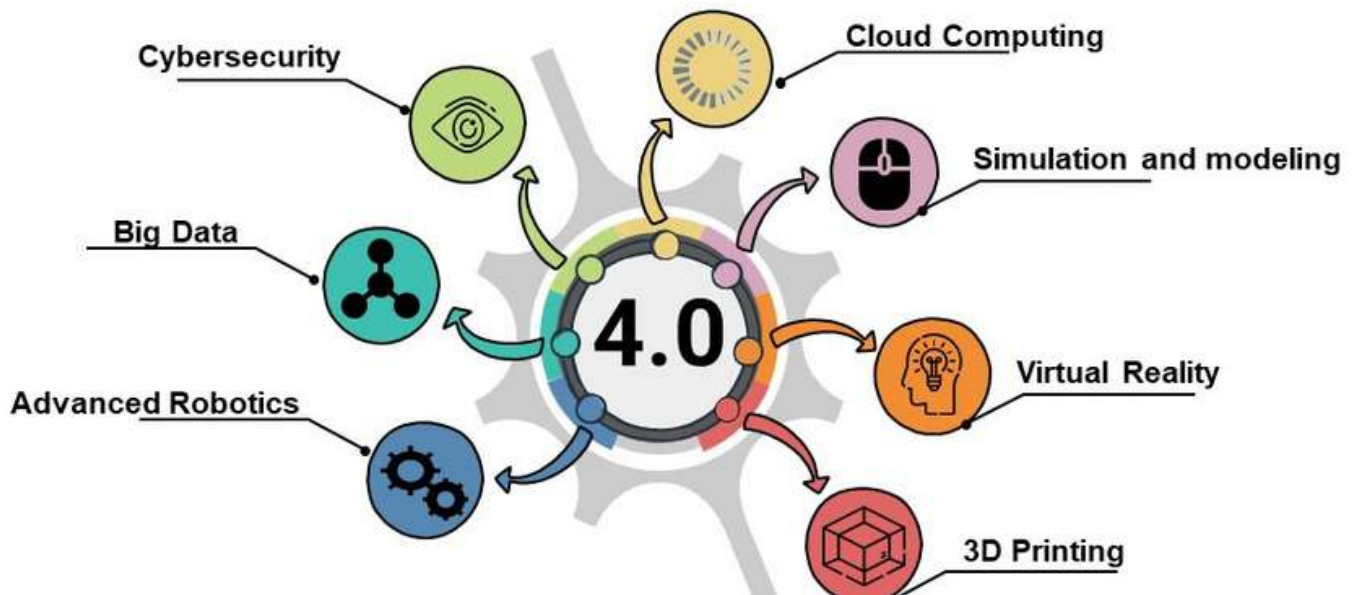


Image 1. Industry 4.0

DOMINANT TECHNOLOGIES OF INDUSTRY 4.0

First of all it is necessary to mention that all of the technology has revolutionized exponentially, allowing new goals to be achieved with less effort, which was complicated or even unimaginable in the past. Within the field of dental medicine, the new technologies that industry 4.0 has brought have benefited industrial development, processes, and customer service, therefore, the technology that dominates our project in the dental area for the remodeling of a dental clinic are:

- **Advanced Robotics**
 - They reduce surgery time, provide greater control within the process, timely detection of errors, improve the quality of customer service, and provide greater flexibility.
- **3D Printing**
 - It offers significant advantages in costs, customization, production, and manufacturing deadlines in any place where the device is available.
- **Simulation and modeling**
 - It helps problem-solving and how a particular operation will be completed in a dental clinic.
- **Virtual Reality (VR)**
 - To entertain patients during the operation.
- **Cloud computing**
 - Cloud computing optimizes professional work by providing agility tools to access patient clinical history anywhere.
- **Cyber-security**
 - To generate defenses against cyberattacks and information leaks.
- **Big Data**
 - To obtain numerical data and calculate different variabilities of the processes. Generates a database, achieving automation and location of errors, reducing the levels of risk and needs within a dental clinic.



SMART DENTAL CLINIC DESIGN AND ROOM NEW DESIGN CONDITIONS

To have better results in customer service for this project was necessary to consider the following **room conditions**:

- Use colors that have a strong connection with nature.
- Create a neutral place in the room for visits with a direct view for the patients to interact better with the people.
- Implement textures in the room, creating different feelings than a hospital floor or walls.
- Reduce the room noise to calm the patient in case there is an emergency with another patient.
- Maintain the room fresh with quality air circulation.
- Better hospital beds with different colors than the standard white.
- Different floor colors to view the M rooms on the floor with some art or space to reduce the stress between patients and interact between them (extended stay patients floor).
- Locate the room windows that focus on an excellent place in the city to view and calm the patients.
- Implement art in the rooms and zones in the hospital to create an emotional or good feeling in her soul.
- Reduce to the maximum the white hospital color in the rooms that create anxiety.
- Good use of light in the room and focal some good zones in the room and reduce the lights directly to the patient and in case of emergency change the morning to do some medical job.
- Different square forms in the room distribution are tedious, and it is always the same four walls that reduce the patient's imagination to walk or do some activities.
- Introduce some plants to make the place more natural.



Image 3. Render views dental clinic

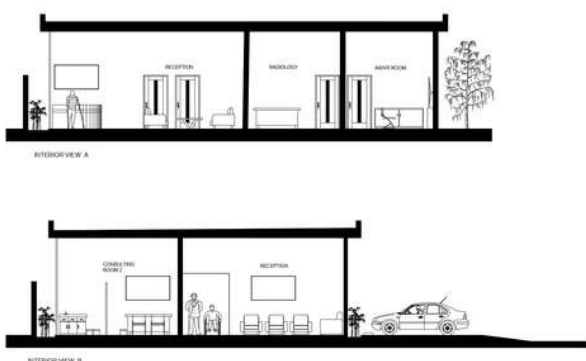


Image 2. Interior views dental clinic

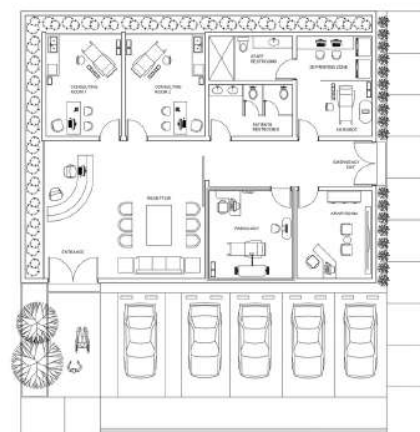
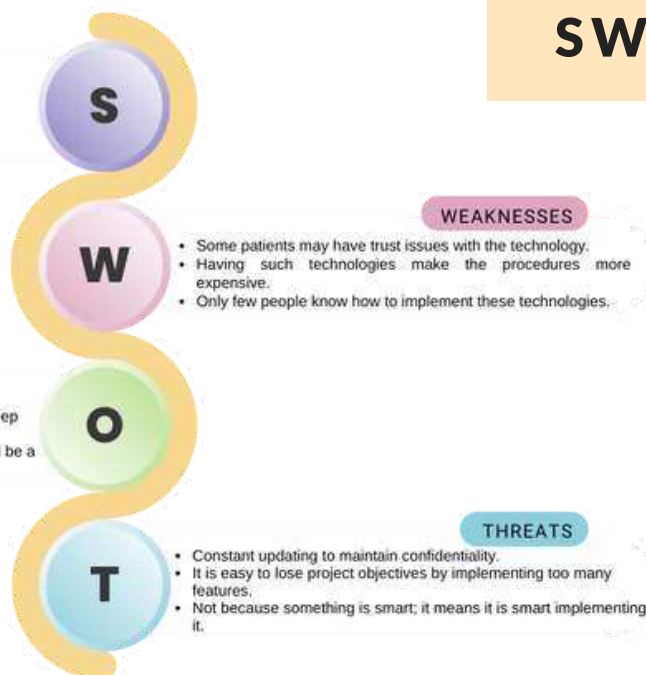


Image 4. Floor plan dental clinic

SWOT ANALYSIS



IS IT FEASIBLE OR NOT?

However, implementing all of the aspects shown before comes with different factors that can make this task feasible or not. This swot analysis reveals the feasibility of setting up a smart clinic.

Image 5. Swot analysis

SIMILAR TECHNOLOGY APPLIED: CASE STUDY

For an example of a hospital implementing new technologies to improve the quality of patient care, we have this case:

CASE STUDY: TREVISO HOSPITAL CENTER

LOCATION: Italy

Total Cost: 267 million EUR

Description: The investment modernizes and replaces an obsolete health estate that is no longer fit to deliver healthcare services according to modern standards. The project also embeds investments aiming to improve the energy efficiency of hospital and healthcare buildings, existing or new, to comply with stricter norms as described in national law.

Also, with the implementation of TeleMed ESCAPE, a project that has developed a completely digital system to sign, transmit, extract/deliver and store clinical documents, preserving the privacy and the security of healthcare data. We can notice an improvement in the quality of care provided to the citizens, eliminating unnecessary access to the health structures. The patient flow to the structure is reduced thanks to the new different delivery channels: usually, 30% of citizens read the test results on the Internet, 14% of citizens receive the reports at home by PEIE mail, and General Practitioners can display their patient reports on their PC and insert them in the Patient EHR. That allows patients to save more than 500.000 and 100.000 hours for avoided travel.

So, as we can see, TeleMed-ESCAPE is producing new and more efficient solutions to management problems within a hospital. All these solutions can be exported to other administrations because the software can be easily integrated with the departmental software already present in every health care service, aiming at becoming an instrument for the Region Administrations to start up innovative technology uses, promoting common initiatives to build new IT infrastructures and applicative cooperation services. The coordinating team is ready to support all the interested administrations, providing guidelines and, if necessary, training on the field with an actual demonstration on how to proceed.



MUST-NEED TECHNOLOGY IN EVERY CLINIC

The technology introduced by the industrial revolution 4.0, in addition to digitizing tasks; has allowed many industries to improve their data processing and error reduction, promoting the efficiency of the industry and the use of resources in a more conscious, intelligent, and economical way, which increases its performance indicator.

In an intelligent dental clinic, having technological and architectural knowledge allows for better results in customer service, focusing on the infrastructure, colors, the use of lights, the dimensions according to the room, and the technologies to be implemented.

Finally, in Mexico, it is one of the most important challenges in the area of Health since it must be observed from an architectural design to implement new equipment in the future, as well as verify compliance with all the regulations dictated by the Mexican government.

CONCLUSION

The technology introduced by the industrial revolution 4.0, in addition to digitizing tasks; has allowed many industries to improve their data processing and error reduction, promoting the efficiency of the industry and the use of resources in a more conscious, intelligent, and economical way, which increases its performance indicator.

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EXTENDED ABSTRACTS

Career Options and Opportunities in Electrical and Computer Engineering

GEORGE S. MARASLIDIS
UNIVERSITY OF WESTERN MACEDONIA, GREECE

In this presentation, we will talk about the career possibilities of an Electrical and Computer Engineer in Greece. Starting from undergraduate studies and internships, following Master's and Doctorate studies, as long as careers in the private sector and the industry in general. In the first part of the presentation, the 7 schools of engineering in Greece are going to be presented along with the 5 study directions an undergraduate student can choose from. Options regarding traineeships/internships will be examined. We will analyze the different scientific fields of an E&C engineer and the possible paths for specialization. Furthermore, the advantages of joining a scientific team will be showcased while presenting all the scientific teams at the University of Western Macedonia. There will be an interesting discussion about programs like Erasmus and various webinars an EC engineer can attend to. Also, career days and other ways to increase the extroversion of the university will be addressed. In the second part of the presentation, we will talk about the future trends of this profession, the requirements, and the best possible steps to have successful and fulfilling personal development and advancement. How to write a C.V. and what information should be included, the advantages and disadvantages of registering in the Technical Chamber in Greece, job interview tips, and the usage of platforms/newsletters for news regarding job positions will be depicted. We will showcase the advantages of Academic Research and explain ways to gain our confidence in the job market and add value to ourselves. In addition, we will highlight some key insights into productivity increment and ways to organize our everyday life. Soft skills that are good to have will be presented, and we will discuss ways to increase your experience by joining and completing various technological projects. In addition, there will be references to useful technical skill-sets and how we can learn them by joining various competitions and creating new startups. We will highlight some key insights into productivity increment and ways to organize our everyday life. Public and private sectors regarding jobs in Greece will be extensively analyzed, presenting both their advantages and disadvantages. Furthermore, we will address the matter of collaboration between universities and research institutes and the gains of this procedure for all participants, while discussing about masters and doctorate degrees. Useful tools and software for networking increment will be presented. Also, there will be a short analysis of the current situation in Greece regarding the job market and the Brain Drain problem. Finally, the most prominent research institutes of Greece will be presented along with their scientific expertise and research interests. This presentation will allow us the opportunity to have a creative discussion and an interesting exchange of opinions about state-of-the-art in electrical and computer engineering.

EXTENDED ABSTRACTS

My way to Technical Communication

PATRICK RANNACHER

KARLSRUHE UNIVERSITY OF APPLIED SCIENCES

My career in Technical Communication was not really planned. Originally, I did a media designer apprenticeship. During this time, I learned a lot about design principles, layout programs, and web technologies. An inspiring project was the creation of a website for a non-profit organization. The whole class designed and developed a WordPress web page for the fire department of which I'm a member. I overtook the role of the project manager and coordinated the requirements between the people of the fire department and the students of the class. After my apprenticeship, I started at Karlsruhe University of Applied Sciences in the course of study 'Communication and Media Management. What fascinated me about that was the mix of lectures in the fields of design, linguistics, engineering, and computer science, which really suited to my diverse interests. One of the most useful courses of the first semester was the Microsoft® Word course because I was able to apply this knowledge in almost every lecture that followed. In the second half of the studies, there was a wide variety of projects e. g. in the areas of Content Management, Terminology, or User Experience. I discovered that I could use my sense of structures in the domain of Technical Communication. Furthermore, additional courses from the university like Spanish lectures helped me to broaden my horizon. While I worked in marketing and sales for the first semesters, of studies my attention shifted to Technical Communication. For the internship semester, I wanted to gain my first experience in this field. I started at a major home appliances company in the Technical Writing department for cooker hoods. The main project of the internship was to migrate the user information of an appliance to the Content Management System Schema ST4, which was recently introduced in the company. Moreover, through the practical semester, I also learned a lot about how to set the right priorities and how to manage my time in an efficient way. As a working student, I created then information products or worked on a project for online delivery of user manual content. In my Bachelor thesis, I analyzed the processes within the department and the Content Management System. As a result, I optimized the variant management of pictograms, proposed new processes for the review of content, and compared methods of project creation. As a collaboration idea between the University of Applied Sciences Karlsruhe and the University of Aizu, I propose a web platform for student exchanges. The wiki would be planned and created by the students while their exchange phase. Later, the wiki could be maintained remotely for example via Web meetings. In this way, the students would be able to get in touch with each other by doing a project outside of university requirements. This would strengthen intercultural communication. Also, other students would profit from the documentation of knowledge for their own student exchange. In autumn, I'll start a Master's degree at Karlsruhe University of Applied Sciences to dive deeper into future topics of Technical Communication. Besides my studies, I'll work as a service provider for technical communication. We will see, where my way will lead me.

EXTENDED ABSTRACTS

My way to and through Technical Communication & beyond

PHILIPP BINDER

CORNELSEN VERLAG GMBH

My way into Technical Communication was not too straightforward: After a university degree in humanities, I firstly pursued a career as an editor, author, and presenter, at a Berlin radio station for some years before I decided to change into the field of Technical Communication. This does not seem the most logical decision at first glance, but the way was paved: With my humanities studies I became an expert in researching and writing and as a radio journalist I learned a lot in terms of using the German language in a way that is similar to its usage in Technical Communication. Also, I had intensive contact with digital media material and applications at the radio station because it was one of the first in Germany that broadcasted fully digital. At the Karlsruhe University of Applied Sciences, I completed my postgraduate studies with a diploma as a “Technical Editor”. I specialized in the areas of Information Management, Content Management systems and strategies, and XML technologies (XSLT, XSL-FO). Other topics were Technical Documentation development, Typography, Graphical Design, legal aspects, etc. As part of these studies, I completed an internship at Endress+Hauser, a full supplier for Process Automation in Switzerland. After my graduation, I worked there as a Technical Editor and later as an Application Manager. In these positions, I was mainly responsible for the implementation and further development of the Component Content Management System COSIMA (provided by DOCUFY GmbH, Bamberg). This CCMS acts as the central component in an environment for modular documentation with variant management and sophisticated translation functionalities. It has deep integrations with some of the company’s central IT systems. With the system PDF documents for the manufactured devices are generated. Also, digital content is provided for the creation of Online Help and to OEM manufacturers who use parts of the content for their own documentation. The generated PDFs are stored in a Media Asset Management system, that again shares classifying metadata with the CCMS for consistency and provides images for the documentation. Interfaces with other systems and databases support document management processes and supply external content like dynamic software texts. In addition to tasks regarding the standardization of the mentioned interfaces, I was responsible for the development of document structures and layouts via XML, XSLT, and XSL-FO. Although this work was often exciting there were also challenges: I was not part of a team of Application Managers and therefore sparring partners for developing new ideas was rare. One highlight at the end of my time at Endress+Hauser was helping with the preparation of the transition from a predominantly documentation-oriented Technical Communication to a dynamic Content Delivery process. In December 2021, after 17 years in Switzerland, I returned to Berlin. I work currently as "An enterprise Content Architect" in a team of five for a large German schoolbook publisher. My team supports business units in matters that relate to semantic data structures and metadata, we develop strategies for Single Source and Cross Media Publishing and accompany all publishing processes. Although it is a new territory the challenges are like those in Technical Communication: Educational media is different because most of the contents are still printed and very layout oriented for didactical reasons. Nevertheless, the content must be made available on a more individual level for digital applications. And in this regard, the rules follow the general principles of Single Source and Cross Media Publishing: among other things, this includes a topic-oriented approach, reuse strategies, the usage of semantic structures, and the classification with metadata.

EXTENDED ABSTRACTS

Transnational European Programmes

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European Programmes offer a unified experience. There are many kinds of them and each one is aimed at a special territory, field, or specific body. Their main goal is to promote research and innovation in difficult and unusual situations as well as the experience exchange between partners which is very important for any project to achieve the maximum effect. In other words, each country can adopt and adapt, if necessary, a best practice from another country to its region. Then, the final results must be submitted on a common platform to indicate if the chosen best practice was successfully been applied. Depending on the program, there are priorities where a project must belong such as Urban Transports, Sustainable Tourism, etc. while Information and Communication Technologies (ICT) consist a major part. Program examples are Interreg Europe, Horizon which fits perfectly in universities, Erasmus+, and Eureka among others. All the programs aim for European Unification, a concept that brings even closer to all European Union citizens. In the technology sector, this target has already been achieved decades ago. Any project consists of a predefined number of partners while multiple partners can come from the same country, even from the same region. To participate, a candidate partner must first submit their own proposal for the project and then this proposal is scored. The higher the score, the higher the possibility to participate. Both public and private bodies can participate. Public bodies usually are municipalities, managing authorities, universities, etc. while private bodies can be enterprises, no matter the size, Non-Governmental-Organizations, and Research & Development facilities. In fact, in every scheme, a public body must be present as it can form its local policy easier than a private one. As for projects, each one consists of two resources, the Steering Committee, and the External Experts or staff. Steering Committee is responsible for the project coordination, where upcoming meetings will take place, payments, and the bureaucratic work in general while experts of staff do the real project work according to its subject. In every project, several digital tools are being used and graphics consist of one of them. Unity graphics engine could be one of them and although its primary purpose is to create games, it is not unusual to be occupied in other works as well, becoming a multi-tool. Gaming engines excel at simulating environments and some European projects demand any of the proposed solutions to be simulated in a 2D or 3D environment. Yet, where Unity is really useful is in the communication part of every project as it usually demands the creation of a 3D animation or info-graphics video for dissemination purposes. The community offers a really vast variety of ready-to-use assets either free or by paying a small price. In most cases though, free assets are proved more than enough. Besides, it is known that Unity is a very good software for creating animation videos. Another useful feature of Unity is that everything, no matter how complex it is, can be displayed online and viewed by a common browser. There is no need of installing extra software or making your own executable file each time you would like to show your progress work. Overall, participating in European programs by using any graphics engine software can lead to a double experience. In particular, the gained experience for the programs themselves in terms of procedure and execution and secondly, learning any graphics engine you could establish experience in plenty of other fields, for instance on how graphics work in the huge entertaining sector.

EXTENDED ABSTRACTS

Emerging job opportunities in the IoT field

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Internet of Things (IoT) is a technology in which objects are embedded with sensors, software, and other technologies to connect and exchange data with other devices and systems over the Internet. The main goal of the Internet of things is the real-time operation of devices; as a result, daily life improvement and data collection without human intervention. IoT applications are numerous and are used practically in everyday life. The IoT application covers “smart” environments such as Smart Cities and Applications, Smart Homes, Smart Education, Smart Health, Smart Transport Systems, etc. According to Analysis Mason, 2019 the current situation worldwide is: • The Asia Pacific is more interested in IoT technologies with 36%. • Europe, the Middle East, and Africa are interested in IoT technologies with 26%. • Western Europe is interested in IoT technologies with 17% and • The USA is interested in IoT technologies, with 17% Moreover, Avast, in collaboration with Stanford University, found that homes in North America have the highest density of IoT devices of any region in the world. Remarkably, 66 % of homes in the area have at least one IoT device. The average household in the area will have an average of 9 devices by 2022, and almost half (48 %) of the total devices and connections will belong to the category of IoT. In contrast, in Greece, this technology became known recently, and some of the smart cities in Greece are Trikala, Halkida, Kozani, Heraklion, and others. The smart technologies that are used today are Smart Parking: Citizens can easily find parking spaces. Citizens are informed in real-time about available parking spaces. A sensor is matched with a parking space, and corresponding signals are sent when the space is held. IoT-based monitoring of environmental conditions: Air quality and the potential impact on public health are assessed. Sensors collect and analyze environmental data and will predict disasters. Smart traffic lights: A vehicle traffic control system that combines traditional traffic lights, sensors, and artificial intelligence to route vehicles and pedestrian traffic. Smart Bins: Consists of bin management sensors that monitor bin capacity, tilt, and temperature to provide timely alerts. In this way, the authorities only empty the full bins, return the bins to an upright position or intervene in case of fire. The European Union's development plan is based on three central axes smart, sustainable, and inclusive development. Within this context, more and more cities and not only in Europe naturally adopt the combination of "smart" populations, "smart" institutions, and "smart" technology for cities to evolve and develop sustainably. IoT is a global trend that offers many investment opportunities. The main application areas are Economy, Education, Employment, Environment and energy, Health, Security, Social integration, Tourism, Civilization, Transportation, and Communications. Greece's ministry of digital governance has started implementing a program to modernize the cities until 2030. The program aims to develop and use new technological facilities to improve the management of the urban environment and Greek cities. The priority areas are Smart Cities Control rooms, Info Points, Data collection via sensors, and interaction with citizens. So, shortly Greek citizens will use autonomous vehicles, smart parcel delivery, crime mapping, smart disaster notification systems, integrated systems in health care, smart monitoring energy systems, smart crowd monitoring systems, Smart irrigation, Smart water consumption monitoring systems, Smart waste management, and other technologies. These new fields create new job opportunities in our country, so the market needs Software engineering in IoT systems, Technical project managers in IoT systems, and IoT Developers.

EXTENDED ABSTRACTS

Working in EU/GR ICT sector : a brief outlook

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Information and Communication Technology refers to the use of technology for communication and processing information. In the employment sector, ICT enables organizations to operate more efficiently. ICT is formed of several different domains such as IT services, Software, and Hardware engineering. Digitalization and automation generate new business opportunities through the development of new production processes, products, and markets. The impact of ICT within the workplace has generally resulted in increased productivity and efficiency, as well as a range of possibilities for more flexible working practices. While these changes have generated a wide range of new jobs, the introduction of ICTs has also led to job losses in other sectors, for example, as a result of automation. The ICT sector is among the drivers of employment growth in the EU nowadays because of the new consumption habits and business models but also because it allows remote working or telecommuting contracts. In this context, employers are increasingly demanding professionals with knowledge in big data, data analysis, artificial intelligence and machine learning, e-commerce, and digital transformation. As technology keeps expanding and the advent of new scopes, tools, hardware, and methodologies, analysis of job requirements suggests that employers are more interested in candidates with an understanding of a broad scope of technical skills. Employers require experience in multiple domains, for example, several programming languages, knowledge of cybersecurity, at least one cloud platform, and familiarity with DevOps processes. Business and soft skills are considered equally important as technical skills. Regarding the level of experience, while most tech employers now hire based on expertise, skills, and performance, years of experience remain a decisive criterion in tech job postings with employers seeking more entry-level professionals than experienced ones. When compared to the salaries in the US, European salaries are often lower, sometimes even twice as low. Yet, European countries offer better social benefits, health care, etc. Compared to periods before the pandemic, salary for some tech roles has significantly increased post-pandemic. Across the EU, salary typically ranges from 36.000€ to 100.000€ per year, according to CompTIA. In Greece, salaries are considerably lower than the EU average, ranging between 10.000€ per year for lower-level roles to 100.000€ for high-level positions, according to data provided by Randstad Greece. To land an entry-level job or internship a well-written and APS-optimized CV is required. A profile on LinkedIn, a personal page, and depending on the exact field a portfolio page and/or a profile on GitHub, Dribbble, etc. English is a requirement. The local language is not needed most of the time unless specifically stated. Internships are not always paid, so some funding might be required. In the field of software or web development, a popular programming language like JavaScript or Python can be good to learn. Some IT internships or apprenticeships may not require past experience. But generally, full-time entry-level positions will require some relevant skills and experience. Having even a basic understanding and industry experience in ICT is important because it can open up a lot more opportunities, whether working in a shop, an office, or elsewhere in the industry. Most employers today expect their staff to be able to use a computer and, used well, technology is a tool that can empower you and help you succeed. Along with English and math, ICT qualifications are arguably the most important to be able to offer an employer.

EXTENDED ABSTRACTS

Interdisciplinarity in Autism Research: The case of a PhD candidate

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Over the last several decades most of the advances in research and academia have emerged from the collaboration of diverse disciplines. Interdisciplinary research contributes to the integration of information, data, tools, techniques, and concepts, broadens perspectives, blends theories, with an aim to develop solutions to problems, a single discipline or research area could not achieve. Interdisciplinarity entails challenges, flexibility, acquisition of knowledge from various disciplines and collaboration between scientists of different backgrounds to achieve significant scientific results. Thus, interdisciplinary research is becoming considerably significant as it meets societal needs and focuses on real-world-issues requiring collaborative and integrative approaches. The current presentation focuses on the experiences of a special educator who conducts interdisciplinary Doctoral research concerning Eye-tracking technology and Machine Learning for autism detection in the Electrical and Computer Engineering Department of the University of Western Macedonia, Kozani, Greece. The developmental disorder of autism is a research area often investigated from multiple perspectives by disciplines like psychology, psychiatry, medicine, special education, informatics, computer engineering etc. Autism Spectrum Disorder (ASD) is a developmental disorder concerning mainly social communication/interaction difficulties and repetitive behaviours/interests and deficits in eye gaze related both to social and non-social stimuli. There are no well-established biophysiological diagnostic tests for autism and diagnosis is mainly based on behavioural assessments, utilising standardised tools, such as the ADOS and ADI-R. Nevertheless, their time-consuming, costly, and difficult administration and the need of experienced and trained interviewers can lead to a delayed diagnosis and intervention. In other words, literature shows that when interventions start before ASD children reach age 5, a significantly increased success rate is shown. Concerning the contribution of Electrical and Computer Engineering to autism research, eye-tracking studies relating to autism have been increased during the last decade. Additionally, since the causes of autism are still unknown and reliable assessment tools are not easy to be constructed, eye-tracking technology offers the ability to reliably detect autism. Eye-tracking instruments are often combined with Machine Learning technology. This combination can contribute to autism research by providing a less biased and reproducible second opinion. For example, it can enhance autism screening and diagnosis as well as different behaviours and brain activity observation. Machine learning was also applied in Internet of Things (IoT) systems aiming at autism assessment. Therefore, our interdisciplinary research can bring valuable results as it concerns autism classification based on eye-tracking data and machine learning and it is less expensive, easier, and less obtrusive than conventional autism assessment methods. Moreover, it can contribute to earlier autism diagnosis, resulting in earlier intervention and increased success rate. Apart from the advantages of interdisciplinarity, some constraints encountered during our research should be mentioned as well. For instance, the author's educational background, i.e., Special Education and Psychology, has urged him to acquire up-to-date skills concerning programming to meet his research requirements. Furthermore, it is challenging but also difficult to cooperate with scientists from different scientific backgrounds to find a common ground for communication. Finally, conducting advanced interdisciplinary research is always a demanding process requiring expensive equipment and funding as well. All things considered, interdisciplinarity in autism research promises new approaches to explore areas a single discipline could not achieve.

Voice-based Scene Generation using Artificial Intelligence

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ABSTRACT

With the advancement in technology, Augmented Reality (AR) and Virtual Reality (VR) systems are gaining popularity. They are used in many use cases to enhance user experience and generate fascinating solutions. The developers and designers design these systems, and the users use them for specific applications. The idea of creating an Artificial intelligence (AI) system with the help of AR and VR that will generate visualisations with context or scenes based on voice commands of the user, which will create adaptive visualisations for the user input, can revolutionise the AI industry. This system will work with AI-ML-AR-VR technologies hand-in-hand and will be adapted for various use cases. The scene/context generator is based on advanced AI technologies that take inputs as voice commands, like how we interact with the AI agents. The system's output will be visuals/sequences generated based on the user description of an item/anything with physical existence. The system can also accommodate voice-based interactions wherever required for the scene/context. The system can take further information from the user to understand more descriptions of the user input if the command is unclear. More additional voice-based interactions by the user can enhance the scene or a context description and create a story or flow for some ideas. This system can be used as an agent that generates and builds visualisations for the user, including stories and designs based on his voice instructions.

KEYWORDS

Artificial Intelligence, Augmented Reality, Virtual Reality, Intelligent Systems.

1 Introduction

The advancements of technology do wonders and bring changes in each and everything we interact and connect with. Augmented Reality (AR) and Virtual Reality (VR) have enabled human interactions with computers to a different form. Combined with Artificial intelligence (AI), the systems generated with AR and VR can do wonders in creativity, entertainment, development and many other segments. Constant research and development are required to discover the wonders yet to be found. Such intelligent systems are generated with the support of systems with extensive computational capabilities and high network bandwidth to connect with the central processor to gather the required information to serve the customers. Clubbing up multiple resources, options, and

computational engines is required to achieve the final goal of having an intelligent system.

The attempt to develop such intelligent systems requires a lot of research and development. The ideas for each unit that constitute a system that can be fully automated require a considerable amount of resources. A small part of the work that has a significant relationship with the proposed idea can be identified in building a voice-based image caption generator (Deep Learning) DL, where the researchers focused on developing a model that could generate captions for images [1]. Researchers are concentrating on developing systems that can generate voice-based outcomes with the help of AI and ML; such systems are discussed in [2-4]. These intelligent systems are highly similar to virtual humans or humanoids, who can mimic human behaviours [5-7]. But the system we propose has less similarity with virtual humans and humanoids; our system is an intelligent agent/application that will work according to humans' commands.

2 Proposed Methodology

Combining the power of AI with the help of Virtual Reality, the idea is to propose an AI system with the ability and potential to generate visualisations/context/scenes based on voice commands and visually demonstrate them over a screen. The system will function by studying the voice commands by the user. Then extracting the command's features generates and regenerates visuals and creates a visual flow. The system can also be equipped with intelligence to create voice-based interactions for the user. This system can be used as an agent that generates and builds visualisations for the user, including stories and designs based on his voice instructions.

Figure 1 demonstrates the proposed framework for generating scenes and contexts based on user interaction. The central part of the system starts from an engine that captures the user inputs, that is, the voice commands and instructions passed to the system on which the system should generate the visuals. The captured inputs are then given to understand the information. At this stage of the framework, the system will be able to process and understand the voice commands and instructions by the user; the system will be able to extract the attributes from the command. The stage should also understand the user's sound, identify and calculate the noise in the captured voice phrase, and act accordingly.

After extracting features from the intended sound segment, the system will then process the inputs; during this stage, the system should be able to calculate the changes/the things that are to be

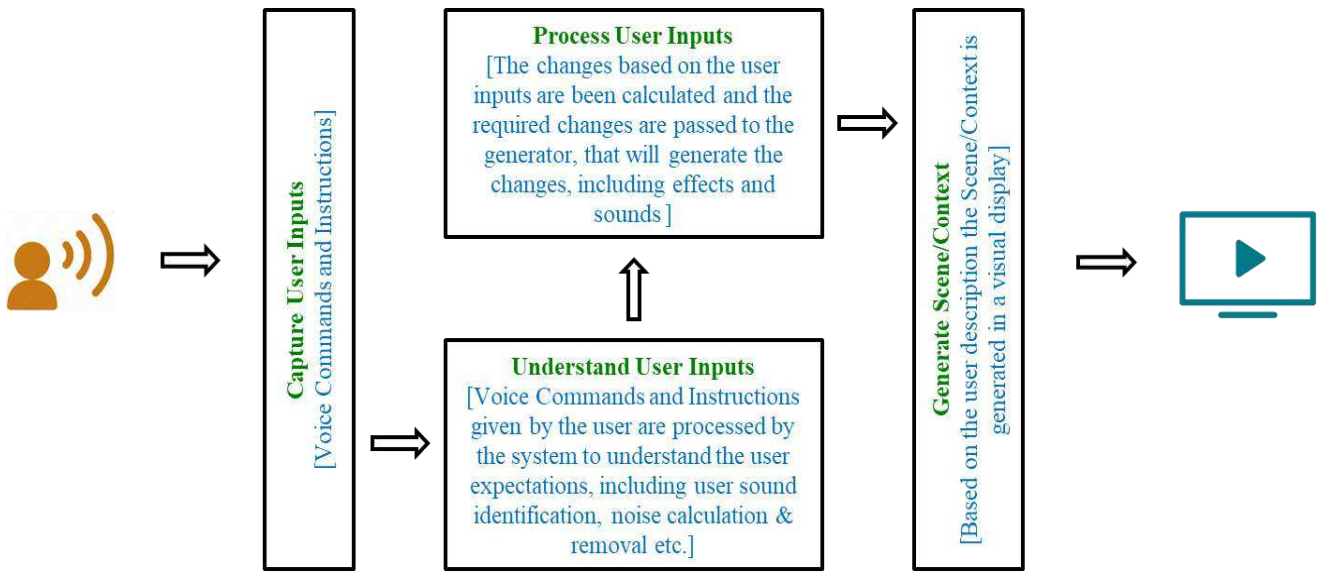


Figure 1: Proposed Framework

included in the scene and add more information to the description provided by the user. The input will then be passed to the generator engine. The processor unit will be able to compute the changes, adding and determining the effects to be included in the visualisation and the sound effects to be added if required to the final output. The generator phase is the final stage in the system, where the outcome is generated and computed for the user in the form of visual animation. The final output will be processed from the user input and the system intelligence and enhancements from the user usage statistics and generation logic. The complex system can be further subdivided into different individual systems or units for easy understanding and functioning; this includes Voice Processor Unit (VPU), Command Processor Unit (CPU),

Intelligence Processor Unit (IPU) and Output Generator Unit (OGU).

2.1 Voice Processor Unit

The Voice Processor Unit (VPU) is designed to process the voice input captured by the system. The information is collected in voice, which can be captured via a microphone. The captured sound is then processed to extract the user's voice and clean and eliminate the other noises from the background. The complex and intelligent filter system can be engaged to track the configured user voice from the noise and gather the required details of the description provided to the system. Thus, errors and unwanted instructions can be eliminated. The preprocessed and optimised

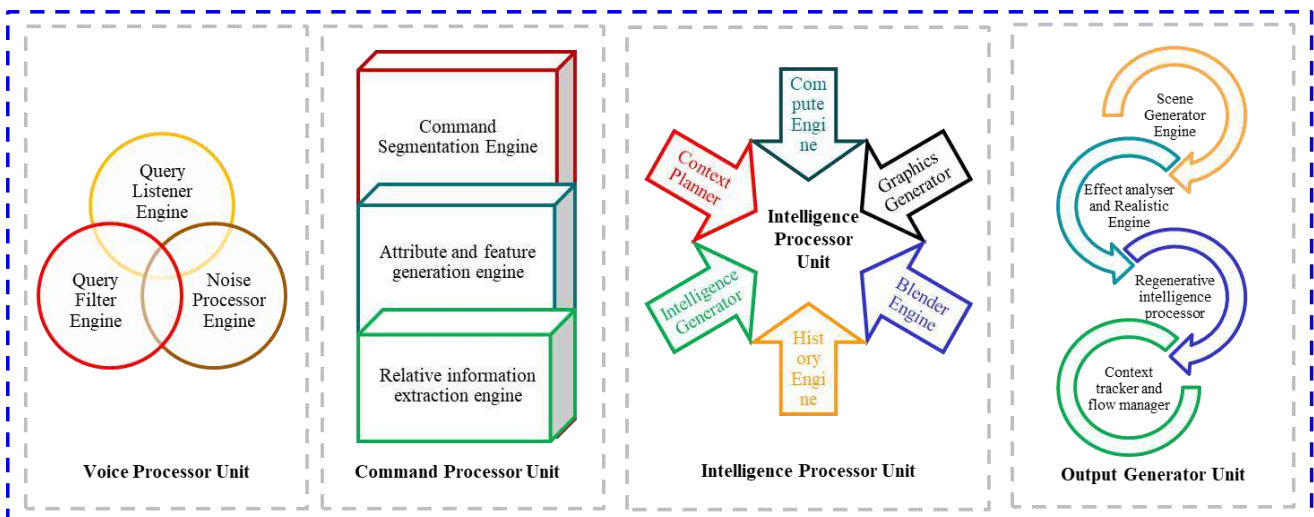


Figure 1: Proposed Architectural Design

input voice can be converted into textual form and then passed to the next system. The system will also ask the user if any clarifications or additional input is required to process.

2.2 Command Processor Unit

The Command Processor Unit (CPU) is designed to process the cleaned input from the VPC and detect and determine the commands from the user input. The primary functions of the CPC include identifying and understanding the grammar and input segments from the user commands. Applies segmentation and logical analysis to identify and determine the attributes of the context/scene and then consolidate the details related to the user description from the past interactions with the user through commands and then make it ready to be processed by the intelligence engine.

2.3 Intelligence Processor Unit

The Intelligence Processor Unit (IPU) works as the system's brain, where the user inputs and the listed attributes are combined with the past knowledge and context the user opted for. The system also computes and identifies the graphics, and other components are selected and blended based on experience and intelligence. Here, the system determines if the system requires any effects to be integrated and other computational intelligence with the help of AI and users use case understanding and suggest the changes and enhancements. The IPU is a computationally extensive part of the complete system, where all the calculations and computations are taken care of.

2.4 Output Generator Unit

The Output Processor Unit (OPU) is the intelligent engine that generates interactive scenes based on the intelligence processor unit's requirements. The IPU provides the descriptions and details that the OPU needs to process to develop the graphics and combines the voice interactions, if any, specified by the user. The OPU is responsible for applying the effects and sounds to make the scene more realistic. The OPU also, with the help of IPU, generates and regenerates the visual sequences as required and based on the user commands.

Each of these (VPU, CPU, IPU, OGU) units has a unique and well-defined function to perform in the complete system, which is further made with small modules or components, as shown in Figure 2. VPU contains Query Listener Engine, Noise Processor Engine and Query Filter Engine. CPU has Command Segmentation Engine, Attribute and Feature Generation Engine, and Relative Information Extraction Engine. IPU consists of Compute Engine, Graphics Generator, Blender Engine, History Engine, Intelligence Engine, and Context Planner. And OGU consists of Scene Generator Engine, Effect Analyser and Realistic Engine, Regenerative Intelligence Processor, Context Tracker and Flow Manager. The complete system is set up with the modules and units, and effective communication among these units will deliver the full user experience of the final system that visualises the instructions given.

Conclusion

This proposed system for generating visualisations based on voice narration has considerable potential and applications. The system proposed is equipped with the knowledge to create and regenerate visualisations. The system can be used to explain and demonstrate concepts, theories, prototypes etc. Implementing such a system is a new era of virtual reality and artificial intelligence, where user imagination is visually generated on the screen based on voice-based interactions. The major challenge of such a system is that the amount of computation is tremendous. The system requires sophisticated computing standards and resources to meet the user's expectations. Apart from the computation resources challenge, the user's voice and data-noise classification will be a tedious task. The cost involved in developing such a system is a challenge which will restrict the system's reach in society. The proposed system can serve as a medium for Entrainment, Creative content, Design & Prototyping, Intelligent Assistant and Productivity Assistant. The system requires intelligence and should be able to learn from past experiences to keep evolving into a better system.

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EXTENDED ABSTRACTS

Insight into the practical Implementation of Semantic Correlation Rules in a Content Delivery Portal

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Recent developments in the field of technical communication show considerable interest in the utilization of semantic technologies. The use of taxonomic structures to represent metadata is already a widespread practice. Building upon this foundation, one can enhance the semantic expressivity of content using the recently introduced semantic correlation rules (SCR). With the help of SCRs, one can realize the concept of microDocs which improve search functionalities within content delivery portals (CDP). During my bachelor thesis, I researched the theoretical groundwork of SCRs and various concepts on how SCRs can be implemented into a CDP to enhance the user experience. The project was carried out in cooperation with the company DOCUFY GmbH, an established software company for technical communication in Germany. In comparison to traditional print documents, CDPs are already offering a broader selection of search functionalities to guide users to their desired Information. However, search functionalities like full-text search or keyword search cannot always satisfy the user's needs. Typically, the information provided in CDPs is modular, meaning it is either presented as a singular topic or within a whole document that is similar to its printed counterpart. For one thing, singular topics might lack crucial context. On the other hand, a whole document might overwhelm users with an abundance of content. To counter this issue, SCRs and therefore microDocs create the possibility to actively help users to find precise and sufficient content. To put it simply: SCRs represent correlations of topics by connecting their intrinsic metadata. The correlations are derived from real use cases. SCRs are therefore individually configured depending on a company's clientele and their needs. In my specific case, no real use cases were used because my research was built upon provided demo data of DOCUFY. Nevertheless, with use cases as a basis, one can start preparing the modeling process of SCRs. Within SCRs a primary object can correlate with several secondary objects. The so-called InRule is the starting point and connects to an indefinite number of OutRules. To be able to connect intrinsic metadata and depicture a correlation, one must model the used metadata taxonomy as a class hierarchy. This can easily be done by using an ontology editor like Protégé. The resulting class hierarchy contains the metadata and later the SCRs build a lightweight ontology. Furthermore, a query method is needed to actively make use of the SCRs. For my thesis, an API was utilized as the middleman between the CDP and the SCRs. This way, a big chunk of the workload was lifted from the CDP and the implementation process was more efficient. By opening a topic, users trigger the query process and possible SCRs will be showcased as link buttons beneath the content of the topic. In conclusion, SCRs provide a functioning solution to utilize semantic technologies without the need to completely change or add to the already established metadata. The results of the thesis revealed some potential extensions that should be considered in further developments of the SCR concept. Moreover, the project showed the growing importance of collaboration between technical writers and software engineers.

"Exploring Japanese nurses' impressions of a healthcare system pre- and post-disaster: building a resilient future for nursing in Fukushima"

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ABSTRACT

Our school is located in Fukushima prefecture, Japan, where we experienced the Great East Japan Earthquake 11 years ago. The great damage sustained from these disasters has had a lasting impact on the healthcare system, which we aim to explore in detail. With current efforts still focused on disaster recovery, we plan to interview various experts to find out how things have changed since the disaster, examine their role in disaster management and visit medical centers designed to respond to such situations. Through the interviews, we believe that it will be necessary to collaborate with a wide variety of professions beyond the framework of medical care. Through the interviews and visits to facilities, we will learn what is currently lacking, mainly from the perspective of nursing, so that we can improve the medical system in the future. Furthermore, we have decided to utilize "risk management" and "crisis management" to solve problems at the time of a disaster. Risk management is a countermeasure for what can be expected. Crisis management is the countermeasure for the unexpected. From the standpoint of students studying nursing in Fukushima, we would like to discuss how our experiences of disasters that have occurred in Japan will be utilized in the future of healthcare.

KEYWORDS

Nursing in disaster area, Crisis management, Risk management

ACM Reference format:

Mari Kumagai, Haruka Suenaga, Risa Munakata, Haruka Yamashita, Masanobu Konno, and Nanami Ichikawa. 2022. Future prospects from Japanese nursing students regarding risk management and crisis management to people's healthcare related to disasters.

1 Background

The Great East Japan Earthquake occurred on March 11, 2011, triggering a magnitude 9.0 earthquake with a maximum intensity of 7, a tsunami with a maximum height of 14.8 meters, and a hydrogen explosion at a nuclear power plant. [1] Those of us who were in the first and second grades at elementary school at the time also

experienced this disaster and suffered. Today, we are studying to become nurses and decided to pursue our research because we wanted to consider what the situation was like in the field of life-supporting medical care at the time of the disaster from a nursing perspective, and what challenges there were in Fukushima. We also wanted to consider what we can do as nurses in disaster medical care in the future, and what we should do to put this into practice. In this paper, we define multidisciplinary cooperation as collaboration among various professionals, not only in the medical field, but also in other fields, utilizing their respective expertise and sharing their knowledge and wisdom.[2] In addition, "risk management" is defined as the scientific management of risk related to an organization in order to prevent loss of trust in the organization and to ensure sound management, [3]and "crisis management" is defined as activities to prevent the spread of losses and recovery activities after a crisis has occurred, with the main focus being on post-occurrence handling of crisis situations. [4]

2 Objective

The objective was to examine what nurses can do to prepare for future disasters from various perspectives through interviews with healthcare professionals who have experience of providing healthcare during disasters, including facility tours.

3 Methods

3.1 Target: Healthcare professionals across multiple disciplines were included in the study in order to examine the issue from the perspective of multidisciplinary collaboration. Healthcare professionals in the fields of nursing, psychology, and radiology were selected.

3.2 Research method: Interviews were conducted with multiple subjects regarding "disaster situations and the role of each profession" with one subject. The location and date of the interviews were determined according to convenience of the subjects, and each interview lasted no longer than 90 minutes. Depending on the location of the interview, a tour of the facility was conducted while the interviews were conducted. The content of what was said was recorded on the spot with the subject's consent.

3.3 Analysis Method

3.3.1 The content recorded in 3.2 was summarized for each subject, and the main points were read and described.

3.3.2 The results of 3.3.1 were examined in light of the purpose of the study.

4 Results

There were five interviewees. They included one nurse who worked at an emergency medical center, one disaster support nurse, one nurse who worked at Hospital A and belonged to the DMAT which is defined as "a mobile, trained medical team capable of operating in the acute phase of a disaster.[5] one clinical psychologist, and one radiology technician at a nuclear disaster base hospital. The results of the interviews, which included a tour of the facility, were as follows:

4.1 The nurse who worked at the emergency medical center, which is primarily responsible for disaster response, stated that it is necessary to clarify who will give instructions and who will consolidate information even before a disaster occurs, because it is often unclear who to ask for instructions in an emergency situation such as a disaster.

4.2 Disaster support nurses mentioned the importance of multidisciplinary cooperation. They also stated that it is necessary to build relationships with companies and public institutions that provide lifelines that are indispensable for daily life, as well as with companies located in the area, so that they can cooperate with each other in times of emergency. They also stated that it is precisely when a disaster occurs that one's basic skills are put to the test. The nurses' daily tasks include monitoring patient conditions, checking medical records, changing bed sheets, assisting with patient personal hygiene, preparing for examinations, and notifying families, even in times of disaster.

4.3 A nurse at Hospital A mentioned that the educational status of disaster nursing varied depending on the frequency of disasters and the extent of damage.

4.4 When asked by a clinical psychologist what tone of voice is appropriate from a psychological perspective to reduce hospital confusion and patient agitation during a disaster, they stated that it is necessary to convey information without hiding it. They said that people are often thought to be confused in times of disaster, but the results show that people are surprisingly calm, and this has been

shown to be true not only in Japan but also in other countries around the world.

4.5 A radiology technician stated that the nuclear disaster base hospital facilities are prepared for nuclear accidents by having nurses and radiology technicians on duty at all times. They stated that the facility was established in June 2012 in response to the Great East Japan Earthquake and subsequent nuclear accident, and provides treatment for workers in the nuclear power plant in the event of trauma or epidemics involving radiation exposure or radiation material contamination.[6] This facility is located at the far end of the hospital to reduce the mental burden of nuclear power plant workers being exposed to the media and other people and to protect their privacy, etc. They stated that the patients' lives as well as their mental suffering were taken into consideration.

5 Discussion

In relation to result 4.3, we checked the curriculum of Japanese nursing universities via their websites. It was calculated that in areas that have experienced major disasters in the past and were particularly hard hit, 54 out of 62 universities or 87.1% of the universities have studied disaster nursing in their nursing departments. In contrast, in less disaster-prone areas, only 14 out of 26 universities, or 53.8%, offer disaster nursing education. It was also found that about half of the universities do not provide education in disaster nursing. Therefore, the prevalence of disaster nursing education is still low in areas where disasters do not occur as often compared to areas where disasters usually occur. From this, it was thought that the establishment of disaster nursing knowledge as a profession during disasters should be made mandatory.

Based on 4.2, we considered that it would be effective to conduct simultaneous training once a year in each prefecture or municipality to enable multidisciplinary professionals to work together in the event of a disaster. By inviting not only medical professionals but also general companies and educational institutions to participate in the multidisciplinary training, it was considered possible to confirm how to coordinate with each organization in the event of a disaster and to raise awareness of risk management among the training participants.

Based on 4.4, we believe that nurses need to respond calmly during post-disaster care and provide appropriate information. Patients and their families often look at the atmosphere and facial expressions of nurses, and what patients and their families consider to be "good nurses" are "smiling", "gentle", "calm" and "energetic"; that is not their professional abilities, but the atmosphere they possess as individuals. [7] Based on this, we thought that nurses need to respond calmly even when a disaster occurs, give appropriate information to patients and their families, and leave the decision-making authority to patients.

From 4.2, we considered it important to continue to provide the same medical care as under normal circumstances in the hospital wards even in the midst of a disaster. Compared to healthy people, some patients are unable to protect themselves and are exposed to life-threatening situations when the normal provision of medical care is interrupted. For such patients, nurses need to continue to provide medical care in the event of a disaster.

Finally, as for the future of nursing care during disasters, from the results 4.1, 4.2, and 4.5, it was considered important to be able to deliver appropriate information to the appropriate institutions, taking privacy protection into consideration in order to consolidate information, check patients' electronic medical records, and contact their families in the event of a disaster. The team considered that it was important to be able to deliver the appropriate information to the appropriate agencies, taking into account privacy protection. Through these results, we thought that a device that could share patient information even without Wi-Fi could save more victims. There are several conditions that must be met in order to create this machine: first, security to protect patient privacy; second, a device that can be used anywhere, even in offline situations; third, a certain number of units; fourth, strength to withstand disasters; and fifth, the ability to be used in a disaster. Fourth, the machine must be strong enough to withstand disasters. We would like to be involved in the development of a machine that meets these requirements, incorporating a nursing perspective. We thought that the first place to install the devices should be in the central location of each prefecture. This would facilitate the consolidation of information in the event of a disaster.

6 Conclusion

In order to continue to provide the same medical care in hospital wards as in normal times, even in the midst of a disaster, it is necessary to collaborate with multiple professions, applying the nursing perspective as well. Even if nurses have experienced a disaster, their awareness of the crisis will fade with the passage of time, so it is necessary to pass on to the next generation how nurses should think and act as professionals. We believe nurses must not lose their composure even in times of disaster and must continue to provide medical care. The future of nursing includes the establishment of a system that can share information that can be used in the event of a disaster to consolidate information.

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How can we provide nursing that respecting the values and opinions of patients

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ABSTRACT

Objective: This study, through interviews with nurses, reveals how nurses know the values of patients and make use of them in nursing practice in the clinical field, and along with the problems in the current situation, more The purpose is to consider what we can do in the future to provide nursing that respects values.

Methods: Multiple interviews of 30 to 60 minutes per person were conducted for nurses who have worked in medical fields in Japan for more than 5 years and nurses who have worked in overseas medical fields. The questions were summarized into six items, and the answers were recorded or recorded on the spot with the confirmation of the subject. The analysis transcribed and reproduced the contents of the interview, and considered the future prospects while aggregating common content.

Results: The cooperation of 6 Japanese nurses and 2 overseas nurses was obtained. All Japanese nurses learned about the patient's thoughts at that time through communication with the patient and connected them to the grasp of their values. Nurses in China and Vietnam understood the patient's values by asking their families accompanying the hospitalized patients.

Discussion: In order to provide nursing in response to the increasing diversity of patients in the medical field, by considering the introduction of advanced technologies in other fields such as AI, we will organize the current business and learn about overseas cultures and nursing. I think it is necessary to increase the opportunity to broaden the individual's horizons.

KEYWORDS

Nursing, Sense of value, communication with patients

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1 Background

Values vary from person to person, and depending on the difference in values, what the person cares about and how they perceive things varies. Values are also deeply related to the view of life, and it is also a way of thinking that affects the person's way of life, such as the criteria for judging good and evil, and being the basis of priority. People who are subject to nursing in the medical field are forced to make decisions that affect their lives as they experience diseases and injuries. At that time, the treatment policy and care required for treating the same disease or injury depending on what the person values is different for each person. In a busy medical field, if nurses are only interested in their work, they neglect the provision of individualized care for each patient. Nurses need to aim not only for safety and efficient working, but also need to foster a trusting relationship with patients. (1) From the above, it can be said that it is an important role for nurses is to pay attention to, know, and respect each patient's values in order to provide the patient's desired medical care. In addition, in recent years, there has been a movement towards diversity, and it is thought that respect for individuality and personality is required even in the medical field. These are all related to respect for individual values, so we wanted to consider the future of nursing from the viewpoint of "how to provide nursing that respects the values of patients."

2 PURPOSE

We aim to clarify how nurses know and respect the values of patients through interviews with nurses. From there, we

will consider the current problems and consider what to do as a nurse in the future in order to provide nursing that respects patient values.

3 Methods

3.1 Subjects

3.1.1 Nurses who have been involved in nursing for a long time and work in a medical department that treats a wide range of generations. The selection criteria are as follows: nurses who have worked for more than 5 years, and worked in the emergency room, operating room, cardiovascular medicine, otolaryngology, pediatrics, or neurosurgery.

3.1.2 For nurses with overseas nursing experience to learn about overseas values. The selection criteria are as follows: nurses who have worked in either China, Vietnam, or the United States.

3.2. Research method

In consideration of the new coronavirus infection, we conducted a remote interview with those who work in the hospital face-to-face and live abroad and are in other prefectures. Considering the burden on the audience, we refined questions about values so that the questionnaire could be completed in about 30 minutes to an hour per person and summarized them into the following six questions. In addition, we informed the subject of the purpose of the research and question items in advance and set up a schedule and interview venue according to the target's wishes. The questions are as follows:

- 1: How do you communicate to understand patient values?
- 2: How do you deal with patients who can't speak or can't express their feelings
- 3: What do you think about the time to interact with patients while you are busy, and how do you spend that time?
- 4: As a nurse, what do you want to be from the patient's point of view?
- 5: Based on the current situation, what do you want nursing to do in the future?
- 6: How to respond to the values of patients who interfere with medical practice, i.e., conflict with the advice of medical practitioners.

The content of the interview was recorded with the consent of the subject and recorded on the spot as specifically as possible.

3.3 Analysis method

- 1) The recording or recording obtained from the interview was shared, transcribed, and reproduced.
- 2) We examined the contents of the interview in light of the purpose of the research as a group.

4. Results

1) The interviewees were six nurses working at Hospital A and two nurses who have nursing experience in China and Vietnam.

2) The results of summarizing what the nurses working in the hospital said by question were as follows.

1: Ingenuity to know the patient's values

Many people answered that daily conversations with patients and reasons for choosing treatment are a big clue to know the patient's values, and that the patient's values are greatly related to the treatment policy. Also, at conferences with people from other occupations, some people tried to get the whole picture of the patient.

2: How to deal with people who can't speak or can't convey their feelings.

Even if they can't communicate in words, they are trying to communicate by other means. Specifically, there is writing, sign language, nodding, etc. However, since writing is often a burden on patients, some people found using a board described in advance reduced the burden.

3: Thinking about the time you spend with patients while you are busy, and how do you spend that time.

There was no need to take a cohesive time, and many people answered that they would have communication in a short time period, such as during treatment and the movement of patients, or to make time to be alone with the patient even if it was short.

4: As a nurse, what do you want to be from the patient's point of view?

They said that nurses in every department want to be relied on by patients, and for that reason, they are nursing with an emphasis on honing their knowledge and skills and stay close to the patient's feelings.

5: Based on the current situation, what do you want nursing to do in the future?

There were a lot of nurse jobs, especially many people who said that the proportion of office work such as records is large, and there are also tasks that can be done even if you are not a nurse, so many people answered that it is difficult to nurse patients effectively in this situation.

6: How to respond to the values of patients who interfere with medical practices (conflict with the idea of the medical practitioner)

They would respect the values of patients and discuss whether there is anything that can be treated, even if it interferes with medical practice. For example, in the case of patients having surgery who could not undergo a blood transfusion, they may be able to undergo a procedure that does not contain blood cell components such as serum or plasma.

3) The comments of a person who has worked as a nurse abroad was as follows. In China, nurses were asking their families when they couldn't talk because their families were always by the inpatient's side. In the medical field, the number of patients is so large that it is barely possible to take physical care of the patient, and the role of the nurse is

to ask about the painful parts and physical condition of the patient's body rather than touching the values and personality of the patient. In Vietnam, when a patient is hospitalized, the family stays in the hospital room together to support the patient's daily life, so nurses' main job was to assist in treatment. The patient's values are understood by the family, and when necessary, nurses asked the family questions, and said that the nurse doesn't have much to think about it.

5 Discussion

From results 2 and 3, it was shown that all the nurses who were interviewed valued communication with patients and tried to provide nursing that respects the values of patients. However, from the result 5, it was shown that it was difficult to know the patient's values by having a lot of additional work and not having time to communicate with patients. In Japan, there has been a custom of prioritizing the spirit of harmony and modesty since ancient times, and due to that spirit, patients do not convey their opinions by sensing the busy situation in the ward. This can be said to be one of the characteristics of the Japanese medical field where the patient's own feelings and thoughts are difficult to convey to nurses. In order to provide nursing that respects the values of patients in this culture, we think it is necessary to spend more time to actively communicate with patients from the nurse's side than ever before. To this end, it is necessary to review the priority of the nursing workload and work content. (2)

In particular, from the result 5, many people said that the amount of nursing records that must be completed takes time, so it is necessary to consider how to reduce the burden of the record work. For example, we need an AI robot that can listen to the conversation between the patient and the nurse and write it. By using an AI robot, you can omit the work of selecting what to record from the conversation between the nurse and the patient, memorize it, and write it on the computer. However, there are multiple challenges in the introduction of AI. The first is not to record all the conversations between the patient and the nurse, so you need the ability to record the necessary parts. Secondly, some patients speak in a dialect, so the AI requires training to hear and interpret dialects. Thirdly, in order to prevent others from viewing the contents of the conversation, it is necessary to have the ability to keep the contents secure. In this way, in order to introduce AI in the medical field, while there are multiple challenges, the working population is decreasing, in order to reduce the burden of recording work by nurses and increase the time between patients and nurses, AI innovation is necessary. Also, from the result 2), differences were shown in overseas nursing and Japanese nursing. Specifically, in Japan, there is no need for families to accompany patients at all times, and in addition to assisting with treatment, the work of nurses is diverse, such as improving the environment related to medical care, maintaining cleanliness, and conferences. Since the number of foreign workers working

in Japan has increased in recent years (3), it is thought that the number of opportunities for foreigners assuming their own medical field will also increase. By knowing about overseas nursing culture, we can convey the characteristics of Japanese nursing to foreign patients in an easy-to-understand manner, and in addition, it will be easier to understand the values of the patient and practice nursing that respects individuality. I think I can accompany you. According to the rules regarding the curriculum of Japanese nurse training facilities, there are few opportunities to learn about nursing abroad. Based on the background of diversifying patients, in order to provide nursing that respects the values of each patient, it is necessary to increase the opportunity to learn about overseas nursing and culture from students and make a personal effort.

6 Conclusion

Japanese nurses working in clinical settings made an effort to know the values of the patient by communicating with patients and grasping the patient's way of thinking about treatment methods. In addition, even if it was contrary to the treatment policy, Japanese nurses were looking for ways to respect the patient's values and minimize hindrances to treatment. One of the problems in the medical field in Japan was the large amount of work for nurses, and it was difficult to secure time to communicate with patients. As a way to organize the workload of nurses, it is necessary to consider the introduction of advanced technologies in other fields such as AI. As a Japanese nurse, it is necessary to increase the opportunity to learn about overseas culture and nursing in order to provide nursing based on the diversity of patients in the medical field.

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BUS ASSIST

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Abstract—Buses are always crowded, especially in megacities. We will have to wait a long time to board the bus (Public buses) at the bus stops, and often we would not get the seats on the bus, or the buses would be overcrowded, or we had to wait for another bus. We do not know the availability of seats on the public buses and the crowdedness in the buses until they reach the bus stop. Similarly, we do not know the live location of the buses while in service. Think about this, how it would be when we know about the availability of seats in the public buses even before the buses reach the bus stop where we usually board and also the crowdedness stats, the live location of the bus while it is in the service, all in one App.Counting the number of passengers who board/deboard a bus in each station is challenging in the Transportation field. We present a method of automated people counting for a bus based on Ticket Sales Data to solve the problem. An AI camera in the bus door capturing the passenger's flow is set, and the camera can get depth Images and analyze ticket sales data simultaneously. We proposed a method combining sales of ticket data and depth images to detect the head of the passengers. Then a novel tracking strategy is proposed.

Index Terms—component, formatting, style, styling, insert

I. INTRODUCTION

Passenger counting and discovery are essential for business monitoring and utilizing coffers for a public transport system. It's critical to cover general business efficiently for a well-organized and cost-effective public transport system. Public transport companies give information on the connecting routes, which is essential to the business monitoring system. The allocation of public vehicles to the colorful connection routes during regular and busy hours is essential for the operation of a transport system. These connecting routes vary from time to time in different places. Statistical tests may allow a better estimation of the average number of vehicles demanded in a particular way. Business load is more significant during the day as compared to night. Other public vehicles are needed on a route during busy hours. The correct distribution of public coffers or cars in different ways is essential for better optimization and operation of a transport network. This requires constant monitoring of the transport system, similar to counting the passengers during getting off and on public transport. The analysis of this data to measure the passengers can be carried out using

a computer vision-grounded approach to avoid mortal trouble. With the development of artificial intelligence and the Internet, the public has an adding demand for intelligent machines as a part of the smart megacity. In an innovative machine system, real-time machine passenger inflow information is essential on the one hand; passengers can optimize their route for going out with the news; Bus companies, on the other hand, can be flexible with machine scheduling. With large quantities of business data, machine companies can optimize their machine line arrangement. Counting the number of people getting in/ out of every station is essential. Still, there's no mature system to get the data. Currently, videotape image processing technology is used for working the problem with the help of a videotape installed on the ceiling of the machine door. Still, the videotape data is explosively told by light and rainfall due to the stir of the vehicle. Thus, it's still a challenge for accurate counting.

II. OVERVIEW OF THE PROPOSED SYSTEM

Firstly, a dedicated camera is mounted on top of bus doors to detect the number of people onboarding / deboarding the bus at each destination along the route. A digital display fitted inside the bus shows the names of the destination as the bus moves, along with a count of the number of people that must be deboarded at that particular stop. This detail about how many peoples have to get down at a specific stop is calculated lively using Ticket sales data from the ticket vending machine used by the conductor. When a passenger comes to the bus stop, use our BUS ASSIST Application while waiting for the bus. This Application will display all details of the number of people who has to get down at that particular stop, live alert of whether the bus is overcrowded or not, alert like whether the passenger can avail seat at the next destination based on ticket sales, and live location of bus as the bus is embedded with the live GPS tracking system, along with these details, we can get to know the reason for the delayed arrival of a bus (Bus driver can send a notification to Application stating the grounds, which all application users can see). The camera detects whether the number of people deboarding the bus matches

the number on a digital display that tells the number of people who has to get down at that stop. This information (number of seats available, crowdedness, live GPS, number of people that has to get down) keeps on changing dynamically as it moves through different stops and is updated simultaneously in the Application. Based on insights presented in our Application, passengers waiting at the bus stop can decide whether to board this bus or to wait for the next arrival of the bus

III. DETECTION OF PASSENGERS

An IP camera gathers and transmits video data over an IP network. IP cameras do not require local recording hardware and only need a local network. IP cameras connect to a network using the same technology as smartphones and PCs. the IP cameras are fixed at the entrance of each bus So that it captures the images of passengers boarding in and out of the bus. Then a WiFi connection is used by an IP camera to connect to a network. A manufactured Ethernet switch, also known as a power over ethernet(PoE) switch, delivers electrical power and data transmission capability to connected network bias. Finally, IP cameras are connected to the onboard embedded computer and the PoE switch and are mounted on the overhead compartment above the driver's seat. The box mounted on the bus automatically powers the computer. It transmits a signal to activate the PoE (Power over Ethernet) switch to power on the IP cameras within around 30 seconds after beginning the bus. Ethernet cable is utilized for power and data connectivity since the IP cameras receive power directly from the PoE switch. The embedded PC box records the video feeds received from the IP cameras. The system uses wireless transmission to transfer video data to the control center as the bus is docking at the station. More than just providing live camera viewing and video recording for monitoring and backup purposes, an intelligent vehicle surveillance system equipped with GPS, WLAN, and advanced computing technology can do anything like vehicle tracking and route navigation, passenger counting, bus fare reading, as well as sending alerts to drivers and first responders based on roadside and vehicle conditions. We can access video images and remotely monitor the bus from a control center once the IP cameras transmit video to the onboard embedded computer, sending the live video over a secure cellular connection. When the bus arrives at the destination terminal stop, the computer wirelessly uploads any previously recorded video to the database at the control center using WiFi, 3G/4G LTE, or any other available communication networks.

IV. FUTURE PREDICTION BASED ON THE TICKET SALES DATA

Accurate short-term soothsaying of public transport demand is essential for the operation of on-demand public transport. Knowing where and when unborn requests for the trip are anticipated allows drivers to acclimate calendars snappily, which helps alleviate service quality and trustability and attract further passengers to public transport. We address this need by developing AI-based deep learning models for predicting

bus passenger demands based on actual data obtained from the ticketing system camera data. The origin-destination of bus passengers plays a significant role in the planning and operation of buses. However, in most places, only boarding information is recorded, with no destination of each passenger information available. We proposed a method for estimating bus passengers' destinations based on a global positioning system (GPS) and smartcard/ticket sales data that has been collected. We will maintain a dataset of all routes available for a bus traveling on its designated path from its source and destination. We will have an Electronic Display that will show the current destination name and next destination stop along with the exact number of passengers that must get down at that particular stop based on / her ticket.

A. WORKING OF THIS MODULE

As soon as a passenger is aboard the bus, he/she will be asked to buy a ticket. The conductor will issue a ticket with details of the destination and fare. So when the bus starts to move, the destination will be displayed on the screen, and the exact number of passengers to get down at that stop will be displayed. The Camera, which is AI Enabled t is embedded on the door panel and will monitor whether or not the number of passengers deboarded the bus. The count of the number of passengers will be decremented when the People count matches the number of passengers deboarded at that particular destination. The count of passengers at that particular instance of time and at that specific destination can be calculated based on a ticket, and this data can be used to calculate the number of passengers who will be getting down to the next station and based on that number we can predict the number of seats that will be free or available.

B. USE CASE

Suppose there are 30 seats available on the bus for sitting, Twenty people can stand on the bus, which equals 50, which means that it is considered that the bus is full. Suppose more than 50 people are on that bus at any time. It is considered 'OVERCROWDED,' which will be displayed on the digital display and as an alert on the user application. This data about how many seats are occupied, how many people will deboard at the next immediate destination stop, and after their deboarding, how many hearts will be available now, and how many people who are standing can occupy those seats will be analyzed and will be calculated in real-time and sent to all people using the BUS ASSIST application so that users will get to know if they can get a seat, and prediction of occupying those seats early, or how crowded the bus is. So now the user waiting at the bus stop gets to know whether he gets a chance to occupy seats or how soon he can get a seat once he boards the bus and how crowded the bus is using these ticket sales data and cameras. Now he can choose whether he can board or wait for the subsequent arrival of the bus on the same route by tracking the bus using our application.

V. FRAUD DETECTION OF BUS TICKET SALES

Cheating in the sale of bus tickets is common among transportation service providers who still use the conductor as a bus ticket seller. The high cost of supervision, lack of honesty, and unification of the conductor's sales and ticket control functions make this fraudulent practice a problem that businesses must deal with.

A. based on ticket sales and distance between two stop of the bus.

PASSENGER FRAUD DETECTION There will be a display to show the count of the exact number of people that have to get down at a particular stop. So the bus conductor has a handheld RFID ticket generator device which is a cloud-edge computer integrated. As soon as the ticket is generated, its destination and the count of an exact number of people who have the same destination stop are calculated. This detailed data is displayed in digital, which is inside the bus. This Digital display is placed so that it is easily visible to all the passages and conductors inside the bus. Our AI and ML-enabled Camera embedded in the top of bus door tracks analyzes whether the exact number of people who have the same destination gets down or not. Whenever there is a match between the display counter and the Track count of the camera, we can say that there is no fraud. Else system detects and predicts the scam. As a result, it gives a scam alert by alarming the bus speaker and notifying the conductor by providing a heavy haptic vibration in the ticket device. The conductor must also scrutinize and monitor; it's the job camera to track the number of people getting down and alert likewise.

VI. CROWD AND BUS MANAGEMENT

We are automating the allocation and de-allocation of buses by calculating the crowd from the past data received from the camera and ticket module for a particular route at a specific time. Time is taken from the tracking module.

A. Scenario-1 Buses getting overcrowded at specific stops along the route at peak times.

Consider buses A and B with a crowd capacity of 40 allocated to a particular route. Buses A and B arrive at the specific bus stop along the way at 9:00 and 9:30, and Both busses arriving at that stop get overcrowded. Bus A gets overcrowded with 12 people, that is, the total number of people inside the bus will be 52 and bus B gets overcrowded with 10 people, that is, the total number of people inside the bus will be 50, here we see that between 9:00 to 9:30 22 people are overcrowding the bus, by looking at the issue we can assign a new bus to that route such that the bus added will reach that particular stop at 9:15 timing which manages the crowding of the bus at that stop, identifying the above-described problem and providing an optimum solution is completely automated by our software, the software analyses the data from ticket and tracking module, alerts the admin if this problem anomaly found, that is, buses getting overcrowded at specific stops along the route at peak times and also provides the solution

by predicting an optimal time and number of buses to allocate to solve the problem.

B. Scenario-2 Buses getting undercrowded, which leads to resource wastage.

The problem statement is vice versa of scenario one. Consider buses A and B with a crowd capacity of 40 allocated to a particular route. Buses A and B arrive at the specific bus stop along the way at 9:00 and 9:30, and Both busses arriving at that stop get undercrowded, which leads to resource wastage. Let us consider that bus A has 20 vacant seats and bus B has 22 vacant seats on leaving that particular bus stop. Looking at this issue carefully, we can determine that there are 42 vacant seats and just 38 seats occupied considering both buses. Therefore, we can remove one of the buses along the route and adjust the other bus's timing so that undercrowded ness and overcrowding are optimized. This process of identifying such problem anomaly, that is, Buses getting undercrowded, and providing an optimal solution is automated by our software, as mentioned the same in scenario one, the software considers the data from ticket and tracking module analysis and alerts the admin if mentioned problem found and also predicts optimum solution, that is, it tells to reduce the buses allocated and adjust the other buses with respect to time to optimize the resources, which in turn reduces carbon footprints.

C. Scenario-3 Buses getting overcrowded or undercrowded at specific stops arriving from the different routes..

We consider buses getting overcrowded and undercrowded at specific bus stops along the same route, and we saw how our software was providing an optimized solution. Now we might think about the buses arriving from different routes and getting overcrowded and undercrowded at particular stops. Our software also optimizes this scenario; the software considers the data and analyses it, takes the average crowding or undercrowded ness along both routes, and predicts which route to take into consideration to remove or add busses to optimize resources and decrease carbon footprint.

BUS ASSIST APPLICATION FEATURES

The Bus Assist application was initiated in response to the inconvenience of traditional transportation alternatives and the difficulty in finding the bus availability between the routes and to efficiently track the status of the bus. The insanity of a 20-minute wait for a 10-minute travel on the a bus, as well as the difficulties of predicting the crowd in a bus and tracking the live location of the vehicle served as the foundation of the Bus Assist application

Bus Assist is on a mission to be the pioneer of a smart, cashless commute by: Providing actionable information on the best available public transport options. Offering easy and flexible contactless ticketing options. Integrating all MaaS (Mobility as a Service) providers to render a centralized and intelligent application Creating employment opportunities for last-mile partners while ensuring the healthy growth of the organization and investors alike

Features of the application are follows:

1. User Registration and Login: a new user can register themselves with the application and can login into the application using their credentials.

3.Real time tracking: user can track the track the live location of the buses that are deployed along a desired route. Alongside, user can also view vehicle fleet information as well as the status of the bus whether the vehicle is over-crowded or partially crowded.

4.Passes and tickets: users can buy bus passes and tickets on the go providing contactless and cashless ticketing.

5.Support and Assist: user can report any queries and issues regarding the vehicle, driver, and co-passenger.

6.Redeem coins: The app provides for the redemption of the coins to avail offers and discounts on their Tickets or Pass purchases.

7. User Summary: users can view the entire summary of their travel history such as last visited bus station, most visited bus stations, the overall expenses on tickets and pass purchases, total coins redeemed and spent.

VII. CONCLUSION

Using this structured way of lifestyle for the public transport system will make the process more efficient and keep the civilians away from the daily hush and rush, It is because of the lack of information regarding the arriving public transport where the public push themselves to transport whichever is available even if there is another vehicle that's is coming, but by using the BusAssist system each and every single passenger can be dependent on the live data that is been cast on the screen. This will not only help the current public transport users but also motivate all other youngsters and working professionals to take public transport, due which a drastic change can be brought to the environment

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EXTENDED ABSTRACTS

Machine Learning and A.I. applications to Healthcare & Computer game Industry

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Use Cases for AI in Healthcare Artificial intelligence (AI) is rebuilding healthcare. With the use of AI, machine learning (ML), natural language processing (NLP), and deep learning (DL) healthcare professionals can use data patterns. AI can analyze large amounts of data stored by healthcare organizations in the form of images, clinical research trials, and medical claims, and can identify patterns and insights often undetectable by manual human skill sets. AI algorithms are "taught" to identify and label data patterns, while NLP allows these algorithms to isolate relevant data. With DL, the data is analyzed and interpreted AI supports medical imaging analysis AI is used as a tool. It supports a doctor reviewing images and scans. This enables radiologists or cardiologists to identify essential insights for prioritizing critical cases, avoid potential errors in reading electronic health records (EHRs), and establish more precise diagnoses. AI supports medical imaging analysis. A clinical study can result in huge amounts of data and images AI algorithms can analyze these datasets and compare them to other studies to identify patterns The process enables medical imaging professionals to track crucial information quickly AI analyzes unstructured data. Clinicians often struggle to stay updated with the latest medical advances while providing quality patient-centered care Health data and medical records of patients are stored as complicated unstructured data, which makes it difficult to interpret and access. AI can seek, collect, store and standardize medical data regardless of the format. AI uses data collected for predictive analytics NLP and ML can read the entire medical history of a patient in real-time, and connect it with symptoms, chronic affections, or an illness that affects other members of the family. They can turn the result into a predictive analytics tool that can catch and treat a disease before it becomes life-threatening.

Applications for Machine Learning and Artificial Intelligence in Healthcare

Machine Learning in Healthcare algorithms is mostly Artificial Neural Networks. CNN (convolutional neural networks) perform image identification, detection, and recognition. These are a complicated system of artificial neuron layers linked to each other and pre-trained on a dataset of damaged cell pictures to "memorize" the appearances of harmful cells. Machine Learning in oncology searches for the cells affected by cancer at an accuracy level comparable to that of an experienced doctor. Human sight equipped with a microscope is not even half as fast in its analysis as compared to an automated model. That is why hospitals and research centers can benefit from implementing CNN-based patient diagnostic applications.

EXTENDED ABSTRACTS

AI Innovations Changing The Future of Gaming

AI in gaming is not just about games that focus on AI characters. Creating more responsive, adaptive, and challenging games. Academics argue that game AI is not true AI, the hype around the technology has been continuously growing for quite a while.

How is AI used in games?

NPCs or non-player characters are where Game AI is used the most. Using techniques like pattern learning and reinforcement learning, the NPCs in the games evolve by self-learning from their actions. The games also become rather realistic. Pathfinding involves getting from one point to another. The whole gaming landscape is the most important part of pathfinding. Player experience modeling AI can help dramatically reduce the time taken to build a game and save a lot of resources that would be spent on developing the game. Makes it easier for the user to play. Using AI in games helps make the games more intuitive. Eliminates the predictability of the game. The game becomes unpredictable when nondeterministic behavior is used.

Unity as a game development engine has been gaining attention for a long now and has given rise to many game development companies and freelance game developers. At present times, it is termed the most powerful and user-friendly cross-platform game development engine. More than 40% of the games available on Android, iOS, and other mobile platforms are supporting Unity 3D. Unity Graphics Engine uses Advanced Graphics Engine for graphic applications. It is used mainly for creating games and training software and Natively supports C# as a scripting language. Unity supports many automated functions, e.g. action state flow diagrams. It has a friendly development environment and fully supports physics rules such as gravity, mass, and light reflection. It has extensive mod support and extensions for several uses, e.g. Cinema Director adds a timeline editor suitable for making movies; has excellent support and a very large and helpful community; delivers free lessons for beginners building actual projects. Imagination is the limit.

Unity in Gaming - Many games are created in Unity: Oddworld soul storms and subnautica: below zero; a preferred choice for indie developers; not complex licenses for professional use. A fun way to make games.

Unity in Media and Entertainment - Able to be used in the film and animation industry for creating passive content. Creators save valuable time as they can view their creations come to life in real time. No pre-render actions are needed. Simulate actual film camera lenses to pre-visualize the final content as best as possible. Again no pre-render actions are required; simulate a scene film result before it is even shot.

Unity in Engineering and Construction - Unity as an engine can handle huge amounts of complex geometry; rendering realistic lighting and surfaces. Newly designed buildings and rooms in realistic detail can be displayed before they are even built. Different designs can be applied in real-time for decoration issues; replaces blueprints, something that clients cannot understand.

Unity in Automotive and Transportation - Lead the way in how automotive products are designed, manufactured, and sold; augmented Reality support for the final product to be fully inspected and operated. Simulation of autonomous vehicle models in a high-fidelity environment.

EXTENDED ABSTRACTS

RECREATING VIRTUAL WORKSPACES: DISRUPTIVE TECHNOLOGIES, STEM MAJORS, AND SOCIETY

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Before the pandemic shut the world down in 2020, most companies and organizations barely considered adopting remote work for several reasons, chiefly because they reckoned it would be neither productive nor effectively possible. Unsurprisingly, unemployment rates were at a 14.8% peak in April of 2020, the highest rate ever recorded since 1948. Ultimately, forward-leaning disruptive technology has proven essential for the continuity of abounding enterprises. Thus, it is quite astonishing, yet not uncommon that adversity speeds up technological innovation. For instance, World War II led to the creation of digital computing, jet engines led to mass air travel, and nuclear technology has the potential of becoming a source of renewable energy. Additionally, the stock market crash in 2008 led to the widespread adoption of cloud computing. Most recently, Covid has led to the necessity of virtual workspaces that kept employees safe and businesses running. Moving forward, the world is forced to adopt virtual workspaces. Other various technologies have been created over time to meet the needs of our modern society — artificial intelligence, electric vehicles, biotechnologies, robotics, the internet of things, augmented reality, virtual reality, etc. As we shift our focus and your attention to hologram technology integrated into virtual workspaces, mind you, this is only a small part of the modern disruptive tech previously listed.

In 1947 a Hungarian physicist named Dennis Gabor invented holograms which are three-dimensional images formed by the interference of light beams from a laser or light source. Holography is a method used to record patterns of light that can be projected and reproduced as 3D hologram images. While AR/VR has a more solitary experience, holograms, on the other hand, can provide a more inclusive experience, especially in virtual workspaces.

Hence, our cost-effective idea seeks to recreate and reinvent how various day-to-day workspace applications are used since real-time holograms can provide that sense of social connectivity that exists when we're sharing the same space. Also, this technology enables you to trade viewpoints and makes it possible to literally "put yourself in someone else's shoes", something that even face-to-face interaction fails to offer.

Remote workplaces may have experienced a lack of social connectivity through virtual meetings after the pandemic. The solution is the implementation of real-time hologram projections. These may be used for daily zoom meetings and agile interfaces. Some advantages include cost and time efficiency for traveling and easier integration with other technologies.

Currently, companies with existing technology are assisting with hologram usage in the workplace like ARHT, PROTO, Microsoft Mesh, and IKIN. They have created devices ranging from hologram portals to holographic headsets, allowing users to become immersed in work training environments or for enhanced virtual interaction.

EXTENDED ABSTRACTS

It is becoming difficult for start-ups to rise due to the heavy influences of big tech companies. A suggestion for them is to invest more time advocating for STEM majors. By having educators, stakeholders, and society become more involved in creating an enabling environment, the rate of innovation is sure to increase. Along with the help of existing grants, scholarships, and internship opportunities, creating an increase in local grassroots sensitization and empowerment can encourage the younger generation and existing STEM majors.

The market outlook for digital holography has increased in value. Starting at \$2.7 billion in 2020, the estimated valuation is \$5.4 billion by 2024. The possibilities of recreating workspaces with hologram technology may extend its reach to hologram movie theaters, advertisements, and many more fields. Why must we wait for war or adversity to happen when we can move with urgency to push for innovation and technovation for all fields of the workplace?

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Improving Quality of Life of Individuals with Disabilities using Artificial Intelligence

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The World Health Organisation (WHO) defines "quality of life" as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns." [1]. Simply put, one's quality of life plays a significant role in the satisfaction one experiences with life. We can infer that the quality of life of individuals with disabilities is lower than those without such disabilities. According to the WHO, at least 2.2 billion individuals suffer from some form of visual impairment [2]. Most technology and infrastructure do not support individuals with disabilities, thus lowering these individuals' overall quality of life. Individuals with disabilities also have limited opportunities for education and employment [3]. Through the use of artificial intelligence and its various sub-fields, we can develop technologies that can significantly improve the quality of life of such individuals. Computer vision, a subfield of artificial intelligence, is of particular interest when developing technologies to help individuals with visual and motor disabilities. It allows for image classification and recognition; this can help visually impaired individuals and individuals with physical disabilities to navigate unfamiliar environments effortlessly. Various assistive technologies already exist to help individuals with disabilities perform day-to-day tasks with relative ease. One such technology is Microsoft's Seeing AI, an application available on Apple's App Store. It uses the phone's camera to perform various tasks. It can read a short text and speak it using text-to-speech. It can also recognise people's faces and emotions and relay such information to the user, recognise

currency bills, describe colors, read a handwritten text and even the user's surroundings [4]. Another such assistive technology engineered to aid individuals with visual disabilities is OrCam MyEye. OrCam MyEye is a voice-activated device that attaches to most spectacles. It can read text from newspapers, books, menus, signs, product labels and screens, identify faces in real-time, identify products and barcodes, and recognise currency bills [5]. Microsoft Soundscape is a unique addition to the previous list of assistive technologies, focusing mainly on aiding people in navigating unfamiliar areas. Soundscape uses 3D audio cues to provide users with a new way to explore their surroundings. It allows users to set up audio beacons in local areas to help direct users to the location. While exploring new areas, Soundscape will call out intersections and landmarks as the user approaches them, allowing them to navigate safely through these areas. It also allows users to set up routes to specific locations [6]. Some other notable assistive technologies include eSight, a device which gives individuals with low vision 20/20 acuity [7], and Parrots Inc.'s Polly, a device which assists individuals with physical or neurological disabilities [8]. While many assistive technologies exist, many other areas of interest still require further research. One such research topic is real-time navigation of indoor environments. Traditional GPS-based technologies do not work very well indoors [9], so using computer vision to recognise and classify obstacles becomes necessary. Apart from indoor navigation, a technology that automatically generates highly descriptive and accurate captions for images on the Internet would be helpful to visually impaired individuals. Using artificial

intelligence, we can develop technologies to improve the lives of those less fortunate. It also creates more job opportunities [10] for these individuals, improving their socio-economic status and improving society at large.

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INVITED ABSTRACT

Students' perspectives of an online course implemented from a model that integrates gamification in a constructivist learning environment for the promotion of creative skills

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Creativity is a relevant metacompetence to propose solutions to problems involving the use of technology. Its development is part of the educational needs to be considered in the professional training of students in careers related to Information and Communication Technologies. To this end, a model was created that integrates gamification in a constructivist learning environment oriented to the development of creative skills implemented through an online course organized in levels that included surveys with closed questions to retrieve students' opinions regarding the content of the activities, sources of information and support material presented. This article presents the conclusions obtained from the opinions expressed by students through the survey regarding the components of the online course to encourage the development of creative skills. The results suggest that the gamified structure in a constructivist learning environment of the course makes tangible to the student the achievement of the objectives set which has a positive impact on the perception of achievement that favors their motivation. It also shows that the difficulty of the activities does not affect the level of motivation or pleasure, but the usefulness of the information sources and support material does. Finally, these results provide elements for the improvement of the course content and will complement the information related to the effectiveness of the proposed model with respect to the promotion of creative skills

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