”Prioritizing Patient-Centric Care: Resolving Long Queues in African Healthcare Systems by Use of Artificial Intelligence.”

Using AI and Technology to solve issues in Healthcare

Audry Ashleen Chivanga
African Leadership University, Software Engineering
a.chivanga@alustudent.com — +250 792403016

Abstract

Long patient waiting times in African healthcare systems pose significant challenges, impacting patient health and well-being while straining healthcare resources. This poster explores the potential of Artificial Intelligence (AI) in addressing this critical issue. AI offers a transformative approach by predicting patient demand, optimizing resource allocation, and prioritizing high-risk patients. By leveraging AI-powered models, healthcare providers can enhance system efficiency, reduce waiting times, and ensure timely access to care. This poster highlights successful AI implementations in healthcare, showcases potential applications in African hospitals, and emphasizes the importance of patient-centric care in fostering improved healthcare outcomes in the region.

Introduction

Long patient waiting times are a severe problem in Africa. For example, in Ethiopia, patients are forced to wait an average of 4.5 hours to receive service in the outpatient department (Outpatient Department of Jimma University Specialized Hospital, 2019). This can have a devastating impact on a patient’s health and well-being. Patients may delay or forgo care, which can lead to worse health outcomes. Long waiting times can also be a financial burden for patients, who may have to take time off work or school to travel to the hospital. In this technology-oriented world, Artificial Intelligence (AI) has the potential to be a powerful tool for addressing this problem. AI can be used to predict patient demand, allocate resources more efficiently, and identify patients who are at risk of waiting too long. By using AI, healthcare providers can improve the efficiency of their systems and ensure that patients receive the care they need as quickly as possible

Main Objectives

1. Identify the severity and impact of long patient waiting times in African healthcare systems, with a focus on the adverse effects on patient health, well-being, and healthcare resource management.
2. Explore the potential of Artificial Intelligence (AI) as a powerful tool to address the problem of long patient waiting times in African hospitals.
3. Discuss the challenges and opportunities of integrating AI into healthcare systems in Africa to optimize patient care and improve overall efficiency.
4. Provide recommendations for the implementation of AI-powered solutions to predict patient demand, allocate resources efficiently, and prioritize patients based on their medical needs, thereby reducing waiting times and enhancing patient-centric care.
5. Present successful AI implementations in healthcare, both within Africa and in other regions, as potential models for adoption and adaptation in African healthcare systems.
6. Emphasize the importance of patient-centric care and its positive impact on patient outcomes and healthcare service delivery in African hospitals.

Materials and Methods

1. Study Designed to Gather further information on this issue. 2. App Designing tools to enhance the Doctor’s Availability and Hospital Scheduling app designed by Audry Ashleen Chivanga. 3. Data Collection-Collecting accurate data on Hospitals in a certain region, Departments available, and Patient waiting times. 4. Data Analysis

Mathematical Section

Moving Average (MA) Method:

The Moving Average method involves calculating the average of a fixed number of consecutive data points within the time series to create a moving average value. This value represents the expected value for a particular time period, considering the recent history of observations.

Moving Average (MA) = (Sum of ”n” most recent data points) / ”n”

Where:

”n” is the number of consecutive time periods (window size) used to calculate the moving average. The Moving Average (MA) represents the average value for a specific time period, considering the most recent ”n” data points.

Results

For example, if we have the following waiting times data for the past 5 days: Day 1: 10 minutes Day 2: 12 minutes Day 3: 15 minutes Day 4: 8 minutes Day 5: 11 minutes

Let’s say we want to calculate the 3-day moving average for Day 5: Moving Average (MA) = (15 + 8 + 11) / 3 = 34 / 3 = 11.33 minutes

So, the 3-day moving average for Day 5 is approximately 11.33 minutes. This will help in Predictive Analysis to improve efficiency in Scheduling to meet the needs of every different hospital.

Treatments	Response 1	Response 2
Treatment 1	17	13
Treatment 2	9	7
Treatment 3	11	11

These results will help train the AI scheduling app to predict waiting times and whether the hospital will be free from the data sets it has of people who managed to register that day.

Patient’s Health First

Treatments	Hospital1	Hospital 2
Hospital 1	25	32
Hospital 2	95	45
Hospital 3	60	35

This method can also be used to compare waiting times for patients to get a recommendation from the hospital where they are likely going to be served quickly. It is very helpful in case of emergencies and when patients are in a hurry.

Conclusions

- The ARIMA model can be used to make predictions for future time points based on the historical data, making it suitable for forecasting patient waiting times in healthcare settings.
  For example, if you have historical data on patient waiting times, you can apply the ARIMA model to understand the underlying patterns, trends, and seasonality in the data. Once the model is trained, you can use it to forecast waiting times for future time periods, helping healthcare providers to optimize resource allocation and improve patient scheduling.
- AshleTech by Audry Ashleen is currently in the process of collecting helpful data which will help in developing this App and Automate scheduling.

Forthcoming Research

AshleTech is an ongoing solutions provider. Contact Audry Ashleen Chivanga (a.chivanga@alustudent.com)for forthcoming research.

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