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DESIGN AND DEVELOPMENT OF PROSTHETIC LIMB THROUGH CAD

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ABSTRACT

Research Background

The research is concentrated on my work done on the project **"Design and Development of Prosthetic Limb through CAD" in year 2017-2019** in Mobility India at Bangalore. Mobility India promotes and develops innovative and cost effective assistive products and bring together the network of partners to help identify the best innovative solutions to help scale **"ASSISTIVE TECHNOLOGY".**

Development of Prosthetics and Orthotics is one major dimension to scale "ASSISTIVE TECHNOLOGY". I have taken this dimension into consideration and thought to develop the **Transtibial (Below the Knee, BK) Prosthetics** using the present technologies so that artificial limbs are stronger and lighter.

Need for doing the Research

I wish to work on the major Research Finding of my Project done in Transtibial Prosthetics (Below the Knee Prosthetics).On this basis I wish to work on a wider angle of Prosthetics technology i.e. **"A BIONIC LIMB"** in order to optimize the energy necessary to operate the limb.

The need arose because **in India** the **official figure for the disabled is 26.8 million** or 2.21 percent of the total population of 1.3 billion (15% really if we go by WHO estimates). I think that working on this Project will be of great help to mankind as it requires Artificial Intelligence to put the mechanical Limb into action through Powerful source such as mind.

Proposed approach for doing the Research in Prosthetics

Prosthetics is a part of Medical Engineering where we provide a proper fitment of an amputated leg. There are various types of Prostheses such as:

- Below the knee, (BK, Transtibial)
- Above the knee, (AK, Transfemoral)
- Below the elbow, (BE, Transradial)
- Above the elbow(AE, Transhumeral)

"Design and Development of a Prosthetic Limb Using CAD" is a Project where the focus has been made on the materials used and the procedure of Limb Development especially BTKP (Below the knee Prostheses). In addition, the detailed analysis is also carried out for Transtibial Prosthetics. BKTP is one of the major breakthroughs in the field of surgeries done with the Amputees. The amputations are generally considered in two ways

1) The KAFO (Knee and Foot Orthotics).
2) The Prosthetics Limb (BTKP)

The proposed approach for doing the research is to generate objective measures of patient's impairment and therapy outcome, customize therapies based on patient's motor abilities. There were few Fiber Composites that I have considered to be ideal for the Lower Limb Prosthetics. They are light, strong and can store and return energy.

While considering the present scenario of Assistive Technology i.e. **UNCRPD (UN Convention on Right of Person with Disabilities**. The UNCRPD together with the **Incheon strategy** (comprises 10 goals, 27 targets and 62 indicators) and **2030 Agenda** for the **SUSTAINABLE DEVELOPMENT GOALS3** obligate Governments to ensure access for PWDs to information, transportation, enabling physical environment, communication technology and accessibility to services.

Benefit Expected from Research Outcome

There is a huge opportunity knocking at our door steps. In the 20th Century, there was an increased need and demand for quality and cost effective Pharmaceuticals, Biotechnology and Biologicals with majority of countries launching National Health and Universal Vaccination Programs. This opportunity identified by Government and Local Entrepreneurs stepped up the R&D efforts coupled with financial incentives to meet the global demand.

- The growing need of **Assistive Technology and Artificial Intelligence** is a great opportunity to have a maximum possible impact which cannot be missed. India can lead the way to design and develop life changing and innovative **AT,** and scale up the AT Sector.
- Understanding the immediate need for developing an AT ecosystem including policy framework, aligning personnel, product realization and appropriate service delivery approach.
- Creating an AT Alliance to set pathways for network of shareholders for multisector involvement and initiate a roadmap to develop national AT policy including development of a **National Priority Assistive Products List (APL)**
- Bridging the gap between India and rest of the world.

KEYWORDS: Assistive Technology, Incheon Strategy, UNCRPD, 2030 Agenda, SDG, Transtibial Prosthetic Limb, Bionic Limb, APL,BK Keywords: Prosthetics, Below the Knee Prostheses(BKTP), Ergonomics, Transfemoral, Transhumeral

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