



AI-Enhanced Low Cost Prosthetic Arm

Restoring Independence Through Affordable, Innovative Prosthetics

Rayen Chikhaoui | Yaser Al-Qahtani | Saleh Al-Muzinee | Adel Almutairi | Fdhi Alrashidi
 202045380 - COE | 201924210 - ME | 201924030 - ME | 201971930 - EE | 201929390 - EE



Senior Project Design

Team: 19

Term: 241

Introduction

The Challenge

65 million people worldwide lack access to functional prosthetic arms due to high costs and limited availability. Current prosthetic arms are prohibitively expensive (90,000+ SAR) and often require months of waiting time, making them inaccessible to many users.

Our Solution

An AI-powered prosthetic arm at 4,000 SAR that revolutionizes accessibility through:

- Local 3D printing for rapid manufacturing
- AI-enhanced EMG sensors for precise control
- Modular design for easy maintenance
- Customizable components for perfect fit
- Immediate availability without long wait times

Innovation Highlights



Easy Customization & Maintenance



Problem Statement

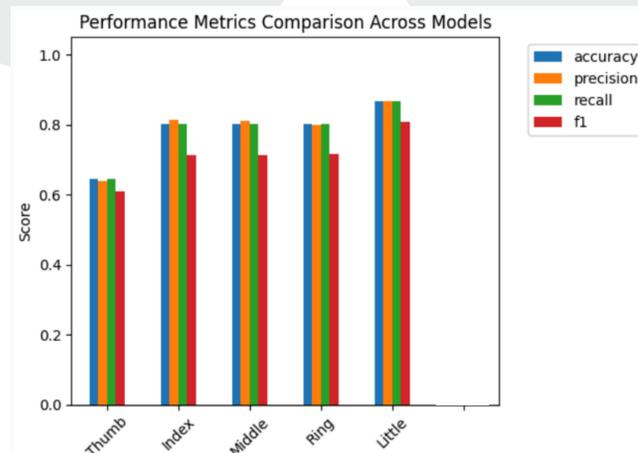
High-cost prosthetic arms limit accessibility, while low-cost alternatives lack precision and functionality. There's a critical need for affordable prosthetics that maintain advanced capabilities.

Constraints

- Weight < 3kg.
- The diameter size < 12cm.
- Cost < 5000 rials.
- Printing < 3 days.

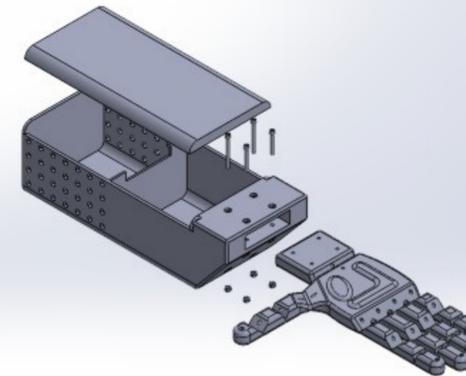
Specifications

- Load Capacity: 3 kg
- Control Accuracy: >90%
- Finger movements: Minimum 3 per finger



Testing & Validation

- EMG signal accuracy: 83% achieved
- Load capacity: 3.5 kg tested
- Printing Time: One day



Conclusion

- Develop affordable prosthetic solution
- AI enhancement provides high accuracy with low-cost components
- Met or exceeded most target specifications
- Demonstrated feasibility of local manufacturing
- Created sustainable, scalable solution