

Final Year Project Summary

Brain-Controlled Prosthetic Arm for Paralyzed Persons



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Session 2025-26

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1. Project Objective

The main goal of this project is to create an **assistive robotic arm** for people with physical disabilities. Instead of using muscles, the system reads electrical signals from the brain (**EEG**) through a headset and converts them into movement commands to open or close a robotic hand.

2. Our Journey (Success & Failures)

- a. **The Start:** We presented our idea in the **Proposal Defense**, focusing on a non-invasive and low-cost solution.
- b. **Initial Testing:** We first tried using **Arduino and the ADS1256 module**, but the Arduino processor was not powerful enough to handle the brain data.
- c. **Second Attempt:** We switched to the **ESP32**, but we faced a lot of **electrical noise**, making the signals unclear.
- d. **The Solution:** Finally, we used the **TGAM module**, which provided clean and stable signals, allowing us to successfully control the system using brainwaves.

3. Hardware & Software Used

- a. **Hardware:** TGAM Module (EEG Sensor), ESP32 Microcontroller, Dry Electrodes, and Bluetooth for wireless communication.
- b. **Software:** **Arduino IDE** for coding the logic and **CAD Software** for designing the arm's structure.

4. Current Progress

- a. **Headset Ready:** The EEG headset is fully built and tested. It can successfully identify when a user wants to trigger a command.
- b. **3D Design:** We have finalized the **3D CAD Design** of the robotic arm on the computer, including all joints and finger movements.
- c. **Documentation:** All technical reports, UML diagrams, and research papers are completed.

5. Future Plan

The next step is to **3D print** the designed arm and assemble it with motors. We will then connect our working headset to the physical arm to complete the final wearable device.