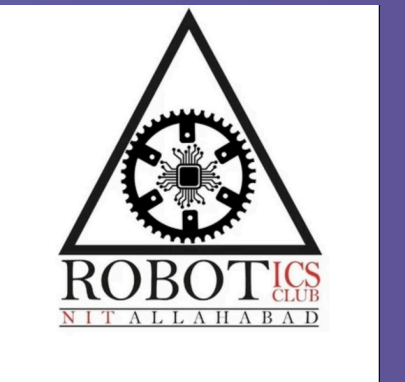




MOTILAL NEHRU NATIONAL INSTITUTE OF TECHNOLOGY ALLAHABAD

Developing Prosthetic Arm Annual project 2024-25



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LOW COST PROSTHETIC ARM WITH WRIST CONTROL USING EMG AND MPU5060 SENSORS

Components used

- Electromyographic sensors
- Electrodes
- MPU6050
- Buck converter
- Arduino-UNO
- Breadboard and jumper wires
- Servo motors (sg90 and mg90s)

Challenges in today's world

- Most prosthetic arms are very expensive and hence are not affordable
- Most of the prosthetics lack fine control movements and hence they have limited functionality and precision
- Users can't feel what they touch making it hard to grip strength.
- Motorized prosthetics drain batteries quickly and require frequent charging

Methodology

1. Collect EMG signals using electrodes and motion data using MPU sensors attached to the hand for initial input readings.

2. Ensure proper sensor placement and calibration for accurate, reliable hand muscle and motion data acquisition through EMG and IMU devices.

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4. Analyze filtered EMG signals to determine muscle activation patterns correlating with specific hand gestures or intended finger movements.

5. Interpret MPU sensor data to detect wrist orientation, rotation, and motion direction for gesture recognition and mapping.

6. Send processed signals to servo motors controlling fingers and wrist to accurately replicate intended hand gestures or movements.



conclusion

Our prosthetic arm powered by EMG sensor and MPU5060 for intuitive control, demonstrates how affordable technology can restore functionality for specially abled person (arm amputees due to accidents or congenital conditions by enabling basic grip, wrist movement and real time responsiveness, these prosthetics offers independence in daily tasks .

Tech stack
Arduino IDE,
Solidworks

