Neuro Arm

CALIFORNIA STATE UNIVERSITY BAKERSFIELD

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Intro:

•**BCI Integration:**
- •Uses wireless EEG (Bluetooth/RF) for portable brain signal collection.
- •Improves functionality and supports personalized rehab.

•**Current Design Issues:**
- •Many prosthetics are too complex for users' actual needs.

•**Accessibility Challenge:**
- •Few low-cost, high-performance prosthetics exist for developing regions.

•**Cost-Effective Solution:**
- •Utilizes 3D printing and efficient signal processing to reduce cost.

Expected Benefits:

•**BCI Benefits:**
- •Offers a new EEG-based control system.
- •Builds on non-invasive methods like MEG, MRI, and EMG.

•**Cost-Efficient Goal:**
- •Provides affordable prosthetics and BCIs to increase accessibility.

•**Education & Training:**
- •Promotes skills in DSP, robotics, and wireless communication.

•**Support for Local Innovation:**
- •Encourages community startups and local businesses to develop low-cost assistive tech.

•**Inspiration for Growth:**
- •Aims to inspire small businesses to contribute to innovation in the field.

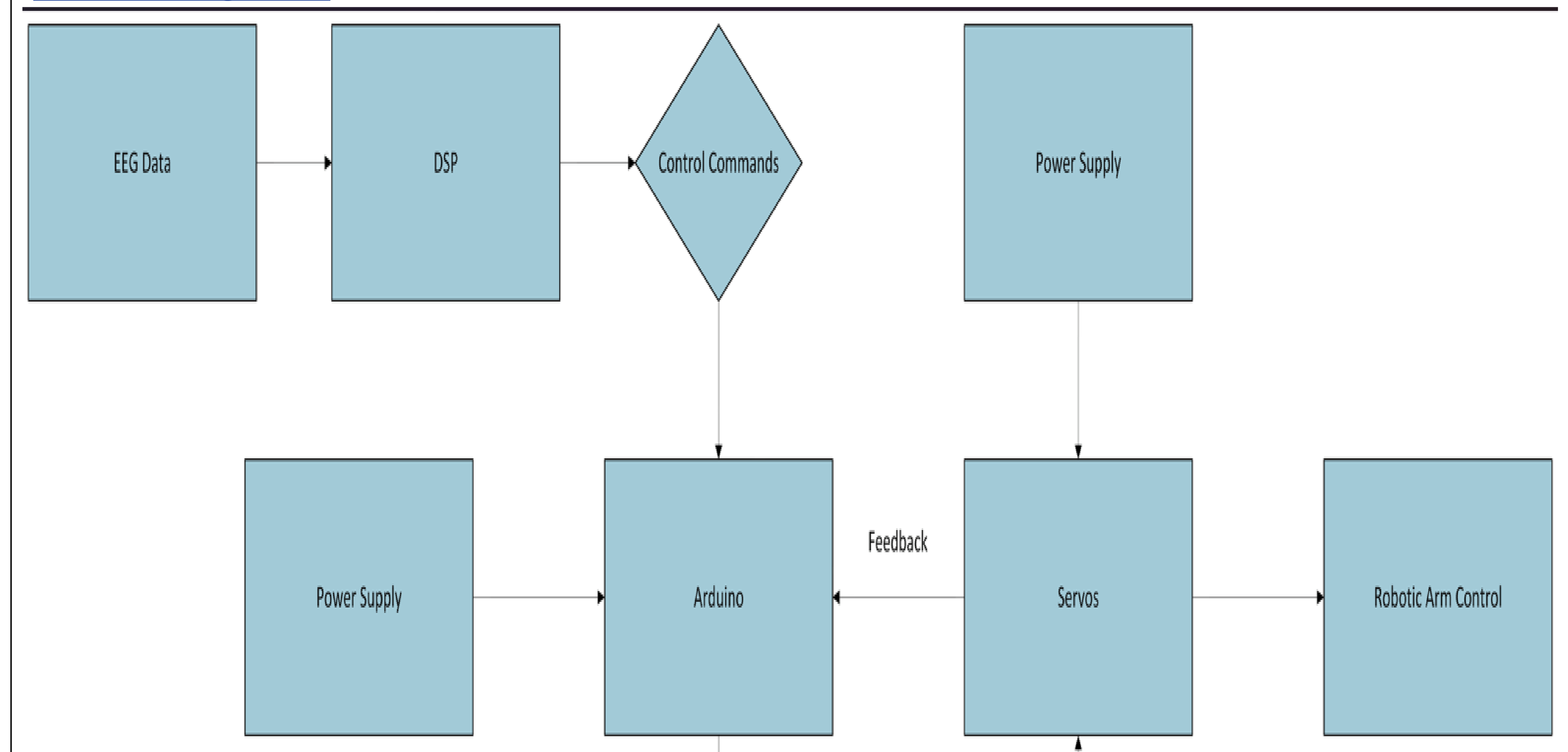
Objectives:

•**Design & Build:**
- •Develop a robotic arm with 2 degrees of freedom (DOF) for EEG-based control.

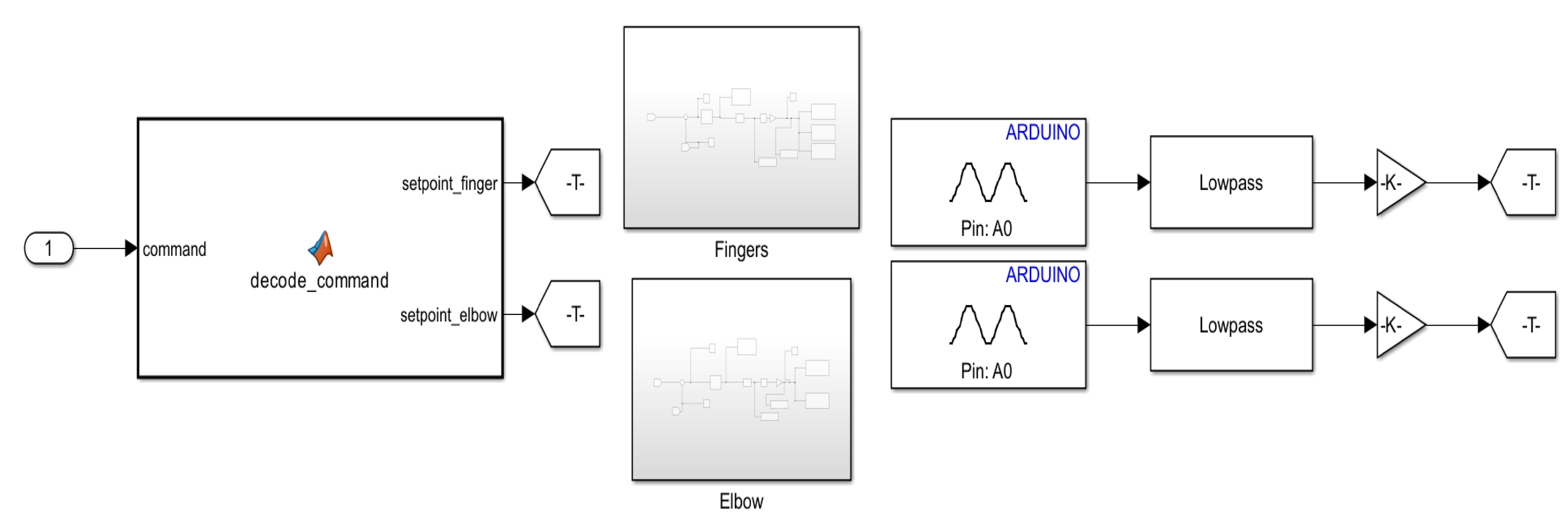
•**Wireless Communication:**
- •Set up an RF communication link between the robotic arm and EEG processor.

•**Signal Processing:**
- •Implement DSP to classify and convert brainwaves into control commands with ~70% accuracy.

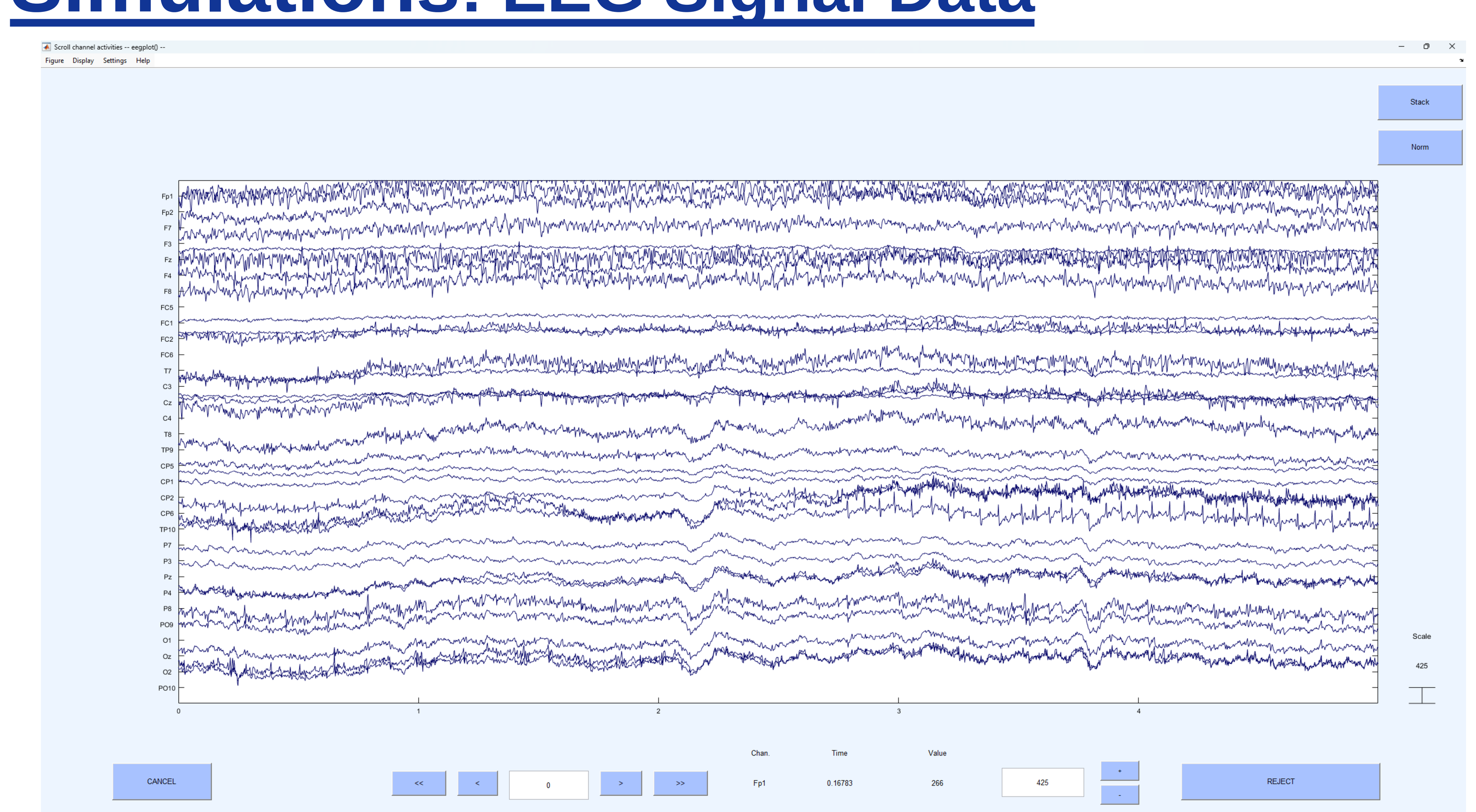
Design:



Control Systems integration



Simulations: EEG Signal Data



Purpose:

Our project proposes an effective, low-cost solution to increase accessibility in less developed countries and innovation within the prosthetics market.

•Improve quality of life with an affordable, user-friendly prosthetic.

•**Robotic Arm:**

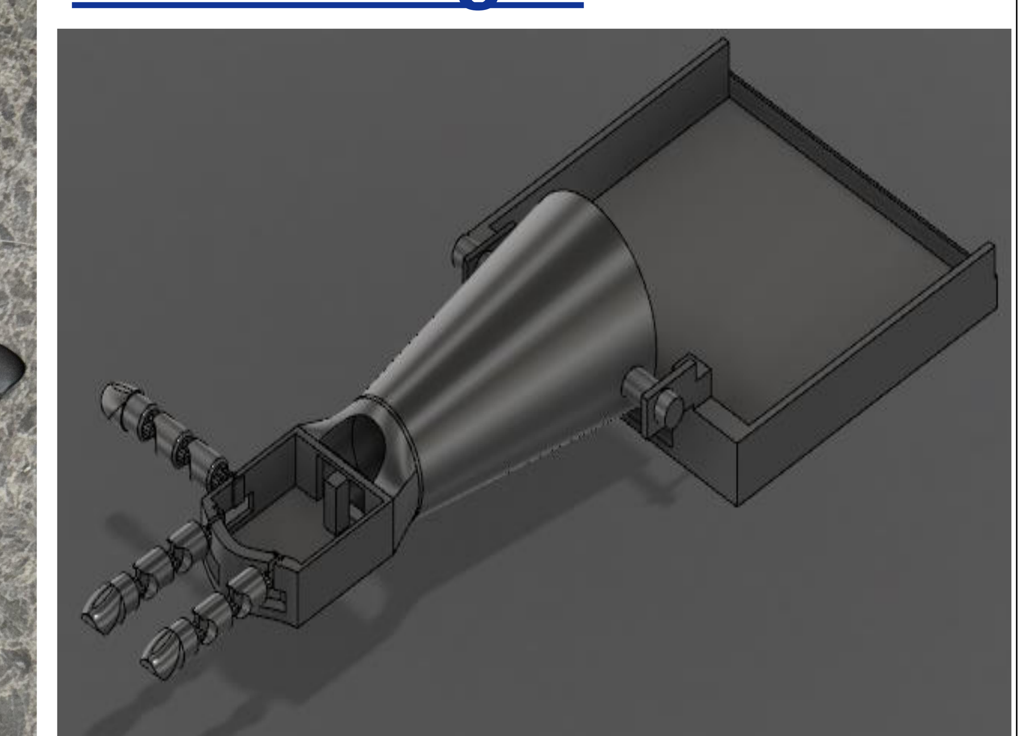
•2 DOF for elbow movement and finger flexion to mimic a fist.

•**Wireless Control:**

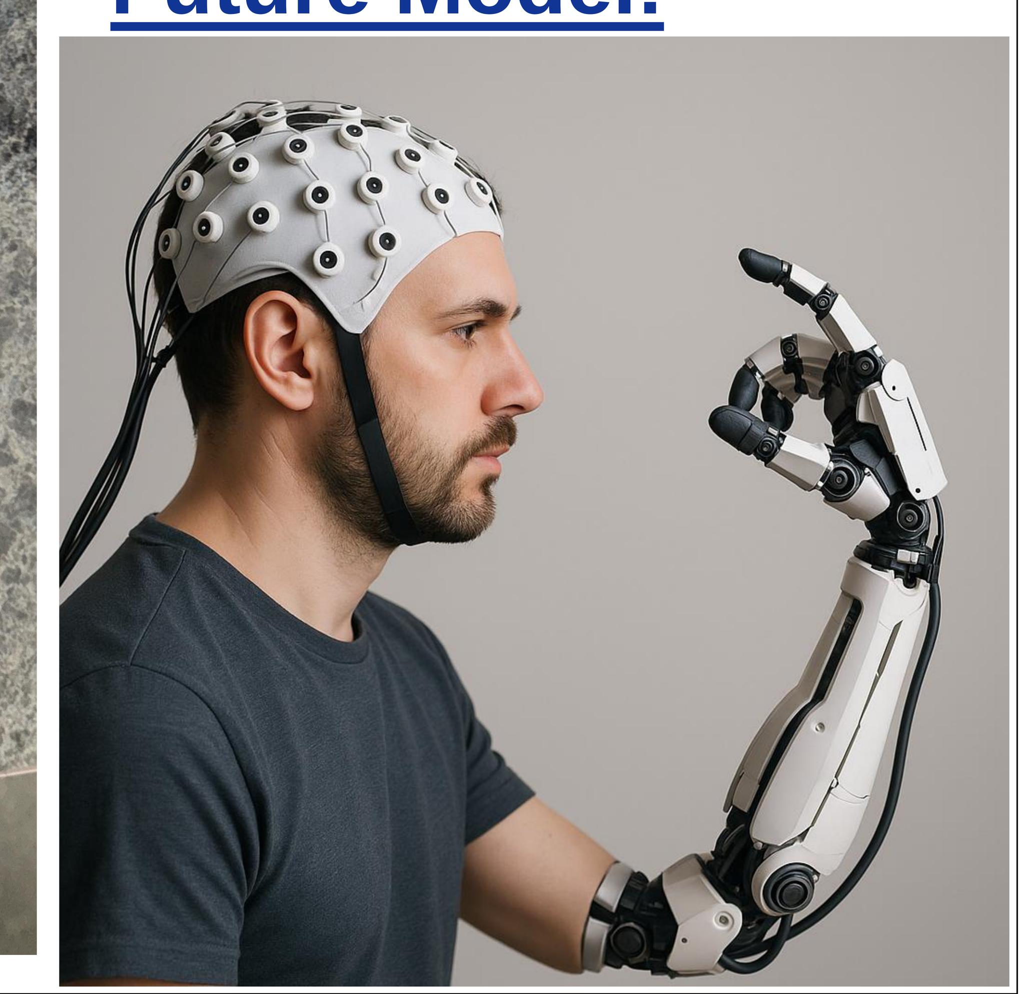
•Uses EEG with RF communication for easy, accessible control.

Final Set-up:

CAD Design:



Future Model:



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