

Allan Marcio Frederick

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EDUCATION

Bachelor of Science, Electrical Engineering

December/2021

Technical Core: Data Science and Information Processing

The University of Texas at Austin

Pursuing Master of Science, BioElectrical Engineering

August/2022 – Present

[Clinical Neuroprosthetics and Brain Interaction Lab \(CNBI Lab\)](#)

The University of Texas at Austin

PROJECTS

In-Ear EEG Device, CNBI Lab at The University of Texas Austin

February/2022 – Present

- Developing a novel in-ear EEG device using a conductive hydrogel to record EEG signals inside the ear
- Established both hardware and software optimization protocols to streamline device fabrication, recording, signal processing, and decoding
- Designed and fabricated hydrogel sponge electrodes in the lab to integrate with earpiece
- Created specialized 3D earpiece models for printing, using SLA technology to interface with hydrogel
- Designed experimental protocols for recording neural signals, including visual interfaces for subjects
- Built and optimized subject-dependent decoders for offline and online brain-computer-interface

Automated Laboratory Smoking Machine, Baylor College of Medicine

January/2023 – Present

- Collaborating with a cross-disciplinary team to build an automated cigarette exposure chamber for in-vivo experiments to study the impact of smoking on cancer therapy and chronic obstructive pulmonary disease
- Designed and implemented electrical and real-time operating system; includes efficient human-computer interaction, Raspberry Pi and Arduino serial communication for efficient control, operation sequence firmware, I2C and SPI communication for sensor communication and processing, PCB design and assembly

Social Link-Prediction using Mobility Data, University of Texas Austin

Fall 2023

- Created a social network leveraged from Foursquare human mobility and points of interested data in order to predict social interactions
- Constructed a network learning pipeline utilizing Node2Vec embeddings and GNNs for link prediction to predict who might interact with whom and where the interaction might occur in the social network

IoT Brain Computer Interface, The University of Texas Austin

Spring 2023

- Collaborated with one other colleague to design and build an assistive BCI to control various IoT devices using object detection for selection and EEG Motor Imagery signals for binary control
- Implemented real-time object detection using Google Edge TPU, programmed microcontroller firmware
- Streamlined object detection model and EEG motor imagery decoder to microcontroller over wireless communication protocols

SKILLS

Programming/Software: MATLAB, Python, Jupyter Notebook, Arduino, Meshmixer, PreForm, KiCAD

Applications: Machine-learning, digital signal processing, digital fabrication, prototyping, PCB design

Languages: Fluent in Portuguese, Spanish