

Antonio Teijeiro

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Objective

To contribute to an organization's medically oriented objectives during a summer internship.

Education

Bachelor of Science in Electrical Engineering
The University of Texas at El Paso (UTEP)

May 2019
Overall GPA: 3.92/4.0
Major GPA: 3.92/4.0
Summa Cum Laude – Highest Honors

Engineer in Training

FE exam passed 18 Dec. 2021

CISSP Associate

7 October 2020

Certified Ethical Hacker

28 February 2020

Security+ Certified

10 December 2019

Work and Research Experience

Computer Engineer

White Sands Missile Range, NM

White Sands Missile Range

10/19 – 09/20

- Monitored Red and Blue Team activity during security posture assessments (sponsored hacking attempts) of US Army systems.

Seizure Prediction using Machine Learning

El Paso, TX

UTEP

08/16 – 05/19

- Learned to apply both deep and shallow machine learning principles to develop models capable of learning to distinguish between preictal and interictal brain activity from exposure to EEG recordings.
- Used cloud computing services (Amazon Web Services EC2 instances and a GPU compute node from the Texas Advanced Computing Center's Maverick2 supercomputer).

Computer and Network Engineering Intern

Kennedy Space Center, FL

NASA

06/17 – 08/17

- Implemented the Spaceport Command and Control System design and updated design documents as needed.
- Automated future hardware verification tests of the hardware carrying data from the Mobile Launcher to the Launch Control Center.
- Created and modified complex firewall configurations that were deployed to the Kennedy Space Center network.

Electrical and Software Engineering Intern for Robotics Project

Kennedy Space Center, FL

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NASA

01/17 – 05/17

- Mentored High School students to build a complex robot for the First Robotics Competition (FRC).
- Taught students who had an interest in electrical engineering about voltage, current, pulse width modulation, solenoids, electromagnets, relays, DC motors, DC motor controllers, crimping and soldering electrical components, Java programming, and robotic simulation.
- Upon completion of the FRC competition season, transitioned to providing full time support for the Launch Control Systems hardware team. During this time, I ran cables, updated cable running lists, and wrote steps for a firewall hardware verification test and a distribution switch verification test.

Information Technology Intern

Greater El Paso's Credit Union

El Paso, TX

08/12 – 06/13

- Provided helpdesk support by opening service tickets, replacing defective hardware, remote accessing employee PCs (for simple issues), and coordinating with warranting companies to replace malfunctioning equipment
- Imaged and installed around 700 new PCs on a tight schedule
- Managed and resolved a 4-5 month long customer issue between a hardware manufacturer and the Credit Union regarding hundreds of defective CPU fans that were sent with the new PCs
- Trained my successor while performing my usual duties

Publications

IEEE Journal of Translational Engineering in Health and Medicine

El Paso, TX

Published – DOI: 10.1109/JTEHM.2019.2910063

- Submitted a paper titled “The Conceptual Design of a Novel Workstation for Seizure Prediction using Machine Learning with Potential eHealth Applications” as **first author**.
- The paper is 10 pages of intricate detail into the construction of the optimal workstation for machine learning-based seizure prediction research. The proposed workstation also excels at any EEG-based machine learning research in general.
- Removes a considerable financial and geographic obstacle to EEG-based machine learning research; comparable commercially available workstations can cost over USD 1000 more than the proposed workstation and are not available in most countries. The proposed workstation costs less than USD 1000.
- Enables the creation of wearable EEG-focused machine learning inference systems. Machine learning models are computationally intensive to train, but computationally light to deploy. Therefore, sophisticated models may be trained on the proposed workstation, then deployed to

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a wearable computer that utilizes the models to perform the desired inference using EEG signals in real-time.

Volunteer Experience

Lead/Rhythm Guitarist
My Church

El Paso, TX
07/11 – 09/20

- Played lead or rhythm guitar for bi/tri-weekly events.
- Mentored younger musicians.
- Learned to shoulder the responsibility of being a good role model to the community.

Skills

Programming:

Good working knowledge of Python and Simulator Description Format (SDF) code. Fair working knowledge of C, MATLAB, assembly, and bash scripting. Basic knowledge of C++. Proficient with the Gazebo Robotics Simulator, embedded systems, and SOLIDWORKS.

Machine Learning:

Familiarity with both deep and shallow learning practices. Fair working knowledge of Amazon Web Services and Jupyter Notebook.

Hardware:

Extensive knowledge of computer architecture. Experienced with designing biomedical instrumentation systems, such as a functioning electrocardiograph (ECG) machine. Proficient at soldering and basic printed circuit board design and etching.

Operating Systems:

Linux-based and Unix-based systems (cannot elaborate without risking an export) and Windows.

Networks:

Good understanding of network fundamentals. Successfully created firewall configurations that involved functionality such as security policies and zones, virtual routers, and IGMP implementation. Created a firewall hardware verification test which required the design of firewall configurations that would be used at a later date by NASA quality assurance to demonstrate that the firewall protects against a predetermined list of network attacks. Created a similar document for a network distribution switch, which was used to demonstrate that the switch would perform the functionality required by NASA. Earned 3 widely respected cybersecurity certifications — Certified Information Systems Security Professional (CISSP) Associate, Certified Ethical Hacker (CEH), and Security+ — while working at White Sands Missile Range.

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Projects

RNAvLab: created a software tool, using Python, that automates fisher's exact test calculations on data uploaded to RNAvLab — a university-based website that automates transcriptome analyses for cancer researchers.

Independently creating a Brain-Computer Interface that uses sEEG recordings to classify which of two arbitrary thoughts the wearer is thinking.

- Using a custom biopotential signal acquisition circuit
- Using a Raspberry Pi and an Amazon Web Services EC2 P2.xlarge instance to automate the training process: The Pi displays instructions to the wearer while preprocessing and storing the data. When a predetermined dataset size has been reached, the Pi initializes the AWS instance, uploads the data, commands the instance to train a model using the data, downloads the trained model, and deploys the model for inference. The classification of the user's thought is displayed in the same terminal window.

Senior Design I & II: in a team of three, partially successfully — see descriptions of individual assignments below — implemented a wearable epileptic seizure prediction system capable of predicting seizures up to 35 minutes ahead of time.

(Successful) One partner's system consisted of:

- a signal generator to reproduce sEEG signals from the CHB-MIT dataset. This is the closest we could come to having a patient to test the system on.

(Unsuccessful) Another partner's system implemented:

- a GUI that allows the user to adjust the sensitivity of the system and constantly displays the user's likelihood of having a seizure.
- sEEG signal acquisition
- an alarm

(Successful) My system implemented:

- deep learning inference on a Raspberry Pi (after the model is trained using cloud computing resources).

Biomedical Instrumentation: successfully and independently created an ECG machine that used lead I of Einthoven's triangle.

Successfully and independently programmed a Tetris game (complete with a basic GUI consisting of a main menu and game over options) and Conway's Game of Life using Python.

Microprocessor Systems I: successfully, in a team of two, created an embedded system which implemented all peripheral functionality of a secure entry point system. The complete secure entry point system consisted of a keypad, an ultrasound proximity detector to detect the palm of a user's hand as they tried to use the keypad, a servo motor to engage/disengage a lock or simulate a gate, an accelerometer to detect sudden jolts, a piezo buzzer using PWM to sound a variable pitch alarm, two microcontrollers working in tandem via UART communications, an LCD screen, and C.

My partner's system implemented:

- The software system to store user profiles, verify credentials, and provide administrative functions

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My system implemented the remaining necessities of the security system:

- control of the servo motor, alarm, and ultrasonic proximity detector
- brute force entry detection
- text display to the LCD

I also implemented:

- serial (UART) communications between the microcontrollers
- low power modes

Introduction to Digital Systems: successfully and independently created an interactive 4-bit CPU using LogicWorks.

Awards

- Spring 2019 Best UTEP Senior Design project
- Top Electrical and Computer Engineering Project – 2019 ExCELLence in Senior Design National Showcase
- Outstanding Senior Spring 2019