

## Aidan M. Gomez

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### Education

**Boston University** *B.A, Computer Science* January 2023

**Boston University** *Non-Degree: Advanced Topics, Deep Learning (CS523L)* Summer 2024

### Experience

**HCLTech** *Data Scientist (AI R&D), E3* July 2023 - Current

- Created agent models capable of analyzing unstructured data, deployed to production on Azure & GCP
- Utilized state-of-the-art NLP techniques to address mission-critical usecases
- Authored internal research on formal method verification of natural language output from LLMs

**BU Spark!** *Lead Machine Learning Engineer* May 2022 - January 2023

- Led and managed a cross-functional engineering team for clients at the NAACP
- Developed transformer-based models to identify & compare topics and contexts in local news stories
- Created an API to serve inference results to a Firebase real-time database & front-end

**BU Spark!** *Special Initiatives Machine Learning Engineer* May - September 2022

- Engaged with non-profit clients to evaluate the technical viability of proposed data projects
- Conducted exploratory data analysis on police activity & spending in Boston
- Drafted visualizations and delivered reports to clients at the American Civil Liberties Union
- Prepared course materials for a graduate-level practicum in civic data science

**OSLO AI, Voice Assistant** *Founder, Lead Developer* August 2021 - September 2022

- Built models for automatic speech recognition, NLU, intent matching, and speech to text
- Researched industry standards and devised novel approaches to voice assistant system architecture
- Designed and constructed compatible hardware & firmware for OSLO-native IoT devices
- Coordinated and oversaw UI/UX, frontend, and backend development teams

**Greenlight Group** *Lead Data Scientist* March 2021 - December 2021

- Led data science initiatives, delegated work to contractors, and ensured compliance with GDPR
- Architected a social network analytics system capable of delivering actionable insights (ETL)
- Communicated findings to executive stakeholders, facilitating data-driven decision-making

**SEÑAL NLP** *Full Stack Research Engineer* January 2021 - December 2021

- Implemented computational syntactic complexity analysis for Spanish language compositions
- Wrote, deployed, and maintained a Flask frontend enabling non-technical users to interact with models
- Collaborated in the design of a graduate course on Spanish language natural processing

**SPAWAR** *Intern - Unmanned Systems, Cryptography* June - August 2017

- Re-trained Tensorflow Inception to guide autonomous ground vehicles
- Utilized ROS to write controls systems for autonomous vehicles
- Ported hashing algorithms to FPGA-runnable HDL

### Teaching

**Boston University** *Data Science For Good (CS506) Course Design & Technical Advising* Fall 2022

**University of Florida** *Natural Language Processing for Spanish (Graduate), Course Design & Instruction* Summer 2021

### Personal Projects & Research

**Carbon Recycle (2024)**: Prototyped a bio-mimetic device for indoor carbon sequestration and air filtration. Designed subsystems for air intake, driving fan motors, filtration, solid state cooling, and diffusion through salt water free surface. Wrote firmware for local area network control.

**Newspaper (2024)**: Conducted longitudinal quantitative analysis of biased language across multiple news outlets. Implemented scripts to scrape full-text and custom NLP ETL pipelines for entity recognition and linking, author profiling, and analysis.

**Remote (2024)**: Reverse engineered API for Wyze Lights. Broke encryption to ascertain key used to encrypt commands to lightbulb. Re-implemented AES and the reverse engineered API alongside the keying system used by Wyze on the Espressif Chip, emulating commands as if they originated from a Wyze server. Expanded functionality so users can control an arbitrary number of Wyze lightbulbs locally, pre-empting Wyze servers altogether. Built a handheld device on which to run code, including haptic control system, biometric user verification.

**Formica, Mote, & Curie (2023):** Created IoT devices & corresponding distributed system/server for monitoring PM1, PM2.5, PM10, TVOC & CO<sub>2</sub> concentration, temperature, humidity, presence, barometric pressure and ambient light based on Espressif chips. Designed circuits to read data from Bosch, Broadcom, and Sensiron sensors. Drew on control theory to successfully filter sensor signals and handle adverse events in an automated fashion. Collected (still collecting) over a year of continuous data, sampled in two minute intervals. Architected & trained a CNN capable of forecasting future readings based on a number of different factors. Wrote ETL pipelines using Dask for quick analysis of millions of data points.

**I2C C2 (2022):** Designed decentralized peer-to-peer C2 architecture & implant using UDP hole punching to bypass enterprise firewalls. Authored novel exploits for obtaining and exfiltrating complete plaintext (unencrypted) iMessage conversations on OSX.

**GestureTrack (2021):** Trained models for multi-hand-landmark identification and pose and gesture classification. Fit additional model for time-series classification of hand-landmark movement in a projected three dimensional space. Exposed inference through a ZeroMQ pipeline permitting other applications to be controlled by gesture in real time with only a single camera.

**Senior Thesis, (2018):** Thesis on neural pathfinding & localization in biomimetic autonomous quadrupeds. Methodology included completing the design and construction of all mechanical, electrical, & software subsystems of a robotic quadruped.

## **Skills**

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### **Languages:**

Python, C/C#/C++, Java, Javascript, Verilog HDL, MyHDL, Go, Rust, OCaml

### **Developer Tools & Software:**

*Computer Aided Design:* Fusion360, Onshape, Cura, EasyEDA *Developer Tools:* Jupyter Notebook, Colab, VSCode, ROS, Unix, GQRS & Gnu Radio, Docker *Penetration Testing:* Wireshark, Ghidra, Postman, *Cloud Platforms:* AWS Lambda, Google Cloud Platform, Firebase, Azure

### **Frameworks & Technologies:**

*Data and Machine Learning:* Web Scraping, ArcGIS, GeoPandas, FastAvro, Parquet, Dask, Airflow, Cassandra, Kafka, TensorFlow & Keras, PyTorch, Scikit-learn, CUDA, Pinecone, OpenCV, Spacy, NLTK, Seaborn, d3.js, H5Py, SQL, transformers, TensorBoard, Langchain, Pandas, Numpy, SageMaker, Spark, kubernetes *Web:* NodeJS, WebRTC *Embedded Devices:* ARM, Espressif, I2C, Serial, CAN *Other:* asyncio, Windows API, ZeroMQ, XGBoost, W&B