Justin Ernest Mateo

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EDUCATION

Bachelors in Computer Engineering with Distinction **Sep. 2019 – Aug. 2024**
Simon Fraser University *Burnaby, BC*

- **CGPA: 3.59**
- Dean's Honour Roll: Summer & Fall 2020, Spring & Summer 2022, Summer 2023
- Embedded and Real-time Systems, Data Structures and Algorithms, Artificial Intelligence, Database Systems, Operating Systems, Feedback Control Systems

WORK EXPERIENCE

Project Manager Intern **Sep. 2023 – Dec. 2023**
Arlo Technologies Canada *Richmond, BC*

- Significantly reduced false detections in Arlo's multi-sensor product by designing a more reliable algorithm for smoke & CO alarms.
- Collaborated with internal teams (local and international) and external contractors to ensure project status updates and to update Jira.
- Delivered comprehensive data analyses and proposed software and hardware revisions to the Project Management and SW/HW teams.

Electromechanical Engineer Intern **Jan. 2021 – Dec. 2021**
Conetec Investigations Inc. *Burnaby, BC*

- Led the end-to-end development and enhancement of Conetec's iBPT system, including designing & implementing a DAQ system.
- Created detailed documentation, test plans, and training materials for knowledge transfer using Confluence for knowledge transfer.
- Optimized sensor accuracy across key products (eCones, eResitivity and more) by refining data analysis algorithms with Python and MATLAB.
- Completed side projects utilizing CAN drivers and Ethernet to communicate with peripherals for data acquisition.

PROJECTS

Automatic Ultimate Frisbee Launcher **Jan. 2024 – Jul. 2024**

- Made **FrisMe** end-to-end; a shelf-ready product capable of accurate curved throws to stationary or moving players, controlled via a mobile app.
- Designed and integrated subsystems for frisbee propulsion, launcher angle adjustment, aim control, machine vision and mobile app interface, running on an embedded system using BeagleBone Green's Debian OS.
- Implemented device drivers and validation tests in C for systems interfacing with low and high voltage components, including BLE modules and motor controllers. Testing included waveform measurements and visual verification.
- Utilized communication protocols (SPI, I2C, UART) and implemented motor control using PWM for precise control of peripherals.

Piano Tiles on ZedBoard **Jan. 2024 – May 2024**

- Created a video game for an Advanced Digital System Design course using ZedBoard, with hardware designed via AMD's Vivado Design Suite and software build using AMD's Vitis application.
- Wrote C software for hardware interfacing, sprite rendering through VGA, and interrupt handling, achieving seamless integration between hardware and software components.
- Designed and implemented hardware subsystems including a FFT, DMA block, real-time tile generator with VHDL, synchronized with a Zynq-7000 All Programmable SoC using audio data from .bin files.

EmoTune **Jan. 2024 – May 2024**

- Compiled a dataset of 200 hand-selected songs, extracting vocal features such as jitter, shimmer, intensity, and stress patterns using Python.
- Utilized pandas, matplotlib & scikit-learn to manipulate and visualize data analyses, training TensorFlow machine learning models to compare.
- Investigated emotion detection using only audio data, achieving 57% accuracy using k-fold cross-validation with a CNN model.

Binary Neural Network on FPGA **Feb. 2023 – Apr. 2023**

- Implemented a binary neural network entirely implemented in hardware on a DE2-115 FPGA board, achieving a grade of **120%.**
- Trained a Python-based BNN to classify images into numerical digits, extracting optimal matrix weights for the hardware implementation.
- Designed VHDL hardware to read image data and matrix weights stored in on-board ROM, facilitating the BNN's layers and data pipeline.

Spot-A-Bone **Oct. 2022 – Dec. 2022**

- Served as team leader of the group project of an Embedded Systems and Real-time Systems course, achieving a grade of **100.6%.**
- Integrated an enclosed embedded system using the BeagleBone Green as the MCU, employing cross-compilation with a Debian OS.
- Developed NFC communication for selecting songs/playlists, implemented face recognition for account login, utilized motion sensing for playback control, and incorporated the Spotify API, all developed in C and Python.

S-Talk **Oct. 2022**

- Created a chat-like program in C that lets one person talk to another through a terminal assuming they are connected to the same network.
- Leveraged UNIX UDP IPC, the client/server model and multi-threaded programming in C to ensure robust message sending and receiving

Titanic Survival Predictor **Feb. 2022 – Apr. 2022**

- Utilized Python libraries such as pandas, matplotlib, and seaborn for data manipulation and visualization, achieving an accuracy of **87%**.
- Analyzed a dataset of 891 passengers, applying preprocessing methods like filling in missing data and performing feature engineering transformations to optimize machine learning model performance.
- Implemented various Scikit-learn ML models including Random Forest, Logistic Regression, SVM and Perceptron using the preprocessed data.

Rush Hour in Java **Feb. 2021 – Apr. 2021**

- Developed and tested a Java program that solves an input Rush Hour board, based on the popular board game.
- Implemented an efficient A* algorithm utilizing the number of obstructing cars as a heuristic to determine optimal moves.
- Achieved a 100% grade on the project due to well-structured code, efficient performance and effective teamwork.

SKILLS

- **Programming Languages:** C, C++, Java, Python, MATLAB, VHDL, MySQL, JavaScript.
- **Hardware Tools:** Engineering tools such as function generator, oscilloscope, multimeter.
- **Soft Skills**: Adaptable, Bilingual (English and Tagalog), Coordinated, Independent, Inquisitive, Leader, Team-oriented.

INTERESTS

Cycling, hiking, snowboarding, basketball, gym, One Piece, games