

Marco Conati

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Summary

Versatile engineering graduate with skills in machine learning, software, controls, firmware, and hardware interested in challenging technical problems. Creative problem solver and dependable team player hoping to build my knowledge base and have an impact on the larger community through my work.

Education

Harvey Mudd College

Claremont, California

B.S. Engineering

May 2022

- Graduated with High Distinction
- GPA: 3.8

Relevant Coursework

- AI/Robotics:** Deep Learning, Reinforcement Learning, State Estimation
- Programming:** Data Structures, Algorithms, Program Development, Computer Architectures and Firmware
- Engineering:** Controls Engineering, Digital Signal Processing, Analog and Digital Electronics

Skills

- AI tools:** Proficient in Pytorch and Huggingface. Experience with Tensorflow and OpenAI gym
- Programming:** Python, C++, Matlab, JavaScript
- State Estimation/Controls:** Kalman Filtering, PF localization, Motion Planning, State Space, PID, Stability analysis

Research Experience

Harvey Mudd Music Information Retrieval Lab

Claremont, CA

Research Assistant

Nov 2021-May 2022

- Investigated approaches to finetune OpenAI's Jukebox model for MIR tasks with limited hardware resources
- Developed BERT models for a system to generate Chopin pieces from existing left/right hand measures

TA Instruments

Minneapolis, MN

Research and Development Intern

May 2020-Sept 2020

- Researched methods for compressing large sequences of time-series sensor data
- Implemented lossless (LZ77, bZip2, gzip) algorithms and lossy (Fourier Transform, Wavelet Transform) algorithms
- Compared speeds, compression ratios, and loss on previously collected data and made recommendations

Professional Work Experience

Trellisware Technologies

San Diego, CA

Product Systems Engineer

June 2022-Present

- Decomposing system requirements into hardware, FPGA, DSP, and microprocessor subsystem goals
- Designing tests and providing support to promote the development of new features

Projects

Codified Audio Language Modeling for Instrument Recognition

Docker, Pytorch, Python

Used the recent Jukebox model to extract audio features from the OpenMIC dataset. Trained shallow probes to identify the presence of 20 instruments based on Jukebox features. The probes had an average validation accuracy of 92.8%

Music Tracking Project

Jupyter, numpy, Python

With a partner, created and implemented an algorithm in code that tracks a musical performance against sheet music using the short time Fourier Transform.

Neural Nets for Edge Sensors

Pytorch, C++

Served as team leader developing a entrance-security system for Syntiant Corporation as a part of Harvey Mudd's clinic program. Our system relies on data from a 9-axis Inertial Measurement Unit deployed on the door of interest and consists of an event classifier and state estimator. The state estimator uses Kalman Filtering to predict door orientation and the event classifier identifies distinct events such as door opening using a convolutional neural network.

Other Activities

- Varsity Swimming:** Six-time conference Champion, three-time NCAA All-American, and three-time MVP(voted by team)
- Engineering Tutor:** Tutored engineering students in system modeling and signal processing courses
- Teacher's Assistant:** Three-time grader for systems engineering courses