Jeffrey Tsaw

Contact

jtsaw@andrew.cmu.edu

(415)-815-7698

jeffreytsaw.github.io

Coursework

10-703 – Deep Reinforcement Learning*

18-898 – Graph Signal Processing*

18-743 – Neuromorphic Computer Architecture

10-707 – Adv Deep Learning

15-750 – Graduate Algorithms

18-447 – Computer Architecture

33-234 – Quantum Physics

10-701 – Intro to ML (PhD)

ELEC0024 – Digital Signal Processing and Design (UCL)

18-349 – Introduction to Embedded Systems

Technical Skills

Languages

Python ■ C ■ SystemVerilog ■ ARM ■ x86-64 ■ MATLAB

Tools

PyTorch ■ TensorFlow ■ GDB ■ Linux ■ FPGA

Activities

CMU Club Tennis Team
Aug 2019 – Present

- Quarterfinalist at 2019 USTA Regionals

London Dragons Varsity Hockey Team
Jan 2020 – Jul 2020

- BUIHA Division 1 South Champions

CMU Club Hockey Team
Aug 2017 – Present

Asian Student Association
Aug 2017 - Present

Interests

Sport/Outdoor Climbing
Hockey
Tennis
College Basketball
Football
Math
Jazz Music

Education

Carnegie Mellon University
Pittsburgh P.A
M.S, B.S (with Honors) Electrical & Computer Engineering

- GPA - M.S: 3.95/4.00 | B.S: 3.82/4.00
- HKN and TBP Honour Societies

Experience

Apple Inc.
Hardware Engineering Intern | Cupertino, CA (virtual)| Sep'21 – Dec '21

- Worked on GPU Memory Verification team
- Integrated idle checks and developed coverage for 5 modules within GPU routing block
- Developed novel strategy to hit previously un-hit coverage points using Xceligen ML tool to **improve coverage of a coverpoint by over 10%**

Credit Suisse Securities
Technology Analyst Intern | New York, NY (virtual)| Jul '20 – Aug '20

- Designed and developed a 2-stage pipelined model to extract bond tickers, ISINs, and CUSIPs from Bloomberg chat data in an Agile environment
- Trained and tuned an NER model in spaCy to recognise bond information and non-bond entities with over **98% precision and recall**
- Successfully extracted over **90,000 bond tickers**

Carnegie Mellon University

- 10-701: Intro to ML (PhD) TA | Pittsburgh, PA | Jan '21 – May '21
- 18-349: Intro to Embedded Systems TA | Pittsburgh, PA | Aug '20 – Jan '21

Projects

HighMMT: High Modality Multi-Task Learning
MultiComp Lab CMU

- Developed modality heterogeneity metric to facilitate parameter of sharing during training of multitask Transformer model
- Developed a modality heterogeneity aware parameter sharing framework to achieve **SOTA across 4 tasks with a 10% reduction in parameters**
- **Submitted to TMLR 2022**

AutoVöt: An Autonomous RC Vehicle Convoy
Partner Capstone Project for 18-500 | Jan '21 – May '21

- Developed a convoy of RC vehicles capable of autonomously navigating an obstacle course through V2V communication, where only the lead vehicle has perception capabilities
- **1st Runner Up** out of 30+ 18-500 Capstone projects in Spring 2021

Hybrid Model for Solving Math Word Problems
Project for 10-707| Mar '22 – May '22

- Combined a bottom-up DAG extraction model with top-down tree decoder model into a novel hybrid neural model for solving math word problems
- Achieved 75% answer accuracy, **beating baseline SOTA of 74%**

RISC-V Processor
Project for 18-447 | Jan '21 – May '21

- Designed and implemented a synthesizable pipelined superscalar out of order processor on RV32I ISA in SystemVerilog, averaging 280 MIPS on prescribed benchmarks.
- Achieved **1st quartile performance** in Spring 2021 on prescribed benchmarks

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Recurrent GANs for Music Generation
Project for 10-701 | Aug '20 – Dec '20

- Extended a baseline recurrent BiLSTM GAN for music generation with a novel architecture containing an input mapping network, convolution and attention layers, and an FFT component
- Improved polyphony, unique tone variance, and complexity over baseline to more closely resemble actual classical music.

University College London
London, UK | Study Abroad, Spring 2020
Affiliate Electrical and Electronic Engineering

RISC-V Processor
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- Achieved 1st quartile performance in Spring 2021

The Empathetic Jukebox
Final Project for 15-112 Intro to CS | Apr '18 - May '18

- Created a music player that plays songs from user's playlists on Spotify based on user's emotions using Python, OpenCV, and BeautifulSoup
- Integrated machine learning in OpenCV to detect facial emotions, as well as Spotify API with web scraping to play the songs from YouTube
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Real Time Operating System
Solo project for 18-349 | Nov '19

- Designed and developed a real-time operating system using a rate monotonic scheduling algorithm for an ARM Cortex M4 processor on an STM32 microcontroller, capable of handling thread creation, deletion, and context switching, with PCP for mutexes

15-213: Computer Systems TA | Pittsburgh, PA | May '19 – Aug '19

- Taught fundamental computer systems concepts including x86-64 ASM, virtual memory, and threading to 30+ students

1. **Serial Engine Interface– USB 2.0**

   Partner Project for 18-341 | Nov '19

   • Implemented IN, OUT, DATA0, ACK, NAK packets and a control FSM to simulate read, write transactions with a thumb drive as part of the USB 2.0 standard

   Resume Job Compatibility Algorithm

   Credit Suisse Coding Challenge | May '19

   - Using Python and spaCy, developed and trained NER and NLP models to extract key details from resumes
   - Developed an algorithm to use details to find best candidate given a job description
   - 1st place at Credit Suisse Coding Challenge

SI & EXCEL Leader | Pittsburgh, PA | Aug ‘18 – Aug ‘20

- Designed and lead supplementary classes for Multivariable Calculus, Physics II, and Physics I for multiple groups of 10-100 students

18-349: Embedded Systems TA | Pittsburgh, PA | Aug ’20 – Dec ‘20

- Taught real-time embedded systems concepts in ARM Thumbv2 including serial protocols (I2C, SPI, UART), timers/interrupts, threading, and scheduling algorithms.