AMIR TOOTOONI

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EDUCATION

Master of Science in Computer Science September 2020 - May 2022
The University of British Columbia, Vancouver 4.33/4.33 GPA

Bachelor of Applied Science in Computer Engineering September 2016 - May 2020
The University of British Columbia, Vancouver 4.33/4.33 GPA

RESEARCH EXPERIENCE

Linear Information Theory May 2021 - May 2022
UBC Department of Computer Science

Worked with Prof. Joel Friedman on a problem relating to coded caching in a context first introduced by Maddah-Ali and Niesen in their paper "Fundamental Limits of Caching" My master's thesis is related a linear algebraic approach to this problem. It can be found in cIRcle.

Optimizing Aggregate Quality of Service with Sequential Jobs May 2019 - Sep 2019
UBC Department of Electrical and Computer Engineering

Through the NSERC USRA, worked with Dr. Sathish Gopalakrishnan on an optimization problem in the context of real-time systems. We were able to design and prove the correctness of an optimization algorithm for a specific case of scheduling problems.

PUBLICATIONS

Joel Friedman & Amir Tootooni "Coordination and Discoordination in Linear Algebra, Linear Information Theory, and Coded Caching." (2022). `https://arxiv.org/abs/2204.11802`

Sam Wiseman, Nima Saleh, Amir Tootooni, Parisa Eshraghi, Randy Jama, Sina Saleh, "Parathyroid identification during thyroid and parathyroid operations: A pilot study evaluating a novel low cost autofluorescence based device." (2021). *Am J Surg. 2021 Jun;221(6):1150-1158.* `https://doi.org/10.1016/j.amjsurg.2021.03.005`

TEACHING ASSISTANTSHIPS

CPSC 320 - Intermediate Algorithm Design and Analysis Jan 2022 - April 2022
UBC Department of Computer Science

CPSC 421 - Introduction to Theory of Computing Sep - Dec 2020 and 2021
UBC Department of Computer Science

CPSC 422 - Intelligent Systems Jan 2021 - April 2021
UBC Department of Computer Science

CPEN 221 - Principles of Software Construction Sep - Dec 2018 and 2019
UBC Department of Electrical and Computer Engineering

CPSC 261 - Basics of Computer Systems Jan 2019 - April 2019
UBC Department of Computer Science

TECHNICAL COMPETENCIES

Programming	C, C++, Java, JavaScript, Python, R, MATLAB
Frameworks & Tools	Git, Flask, Express, LaTeX, Gurobi, Jekyll
Prototyping Platforms	Arduino, Raspberry Pi, FPGA (with SystemVerilog)

AWARDS AND SCHOLARSHIPS

Graduate Teaching Assistant Award in The Department of Computer Science *2021*
Huawei Scholarships in Computer Science *2020*
Dean's Achievement Award in Engineering *2019*
NSERC Undergraduate Student Research Award *2019*
Trek Excellence Scholarship for Continuing Students *2017, 2018, 2019*
Martin Sikes Memorial Scholarship in Electrical and Computer Engineering *2018*
James Yan Award in Electrical and Computer Engineering *2018*
Donald J. Evans Scholarship in Engineering *2017*
SFU Faculty of Applied Science Excellence in Mathematics Award *2016*

COURSE HIGHLIGHTS

CPSC 422 - Intelligent Systems Fall 2018
Top 3% of the class with a grade of 96%

Based on Artificial Intelligence by David Poole. Some topics covered were approximate inference in Bayesian networks, temporal inferences in Hidden Markov Models, modeling with Conditional Random Fields, and Probabilistic Relational Models. The course had a heavy emphasis on current research, and discussing relevant research papers was a common activity in class.

CPSC 340 - Machine Learning and Data Mining Spring 2019
Top 5% of the class with a grade of 98%

Cross-listed as CPSC 532M (a graduate introductory machine learning course), primarily based on Murphys Machine Learning: A Probabilistic Perspective. The course covered subjects ranging from clustering and regression to neural networks and automatic differentiation. Assignments required implementation of topics covered in class, while the examinations had a heavy emphasis on theory.

TECHNICAL PROJECTS

Autofluorescence Imaging for Parathyroid Identification Sep 2019 - Jun 2020
Senior Year Capstone Project *Python, OpenCV, Raspberry Pi*

Worked in a multidisciplinary group of computer, electrical, and biomedical engineers for my capstone project. Our goal was to design, implement, and test an economical medical product. The product used the inherent autofluorescence of parathyroid glands to identify them during thyroidectomy. My focus was primarily on the software architecture and video processing side of the product, but I advised with the hardware design as well. This project culminated in a study published in the Journal and American Surgery.

BarCoin Jan 2019 - April 2019
Junior Year Design Project *JavaScript, Express, Pug.js, rambda, AWS, sha256*

A blockchain based cryptocurrency used for ordering drinks. The design closely followed that of BitCoin and was hosted on a type T2 EC2 instance on AWS. A detailed explanation of BarCoin can be found here.

Smartender Jan 2019 - April 2019

Junior Year Design Project *Python, Raspberry Pi, Flask*

An automated bartending machine controlled by a mobile application aimed to reduce lines at clubs and bars. Utilizes the aforementioned BarCoin cryptocurrency as a secure payment system. Designed and Built the device, programmed it to make drinks, and wrote an API for it to receive orders over a network. Github page of this project.

Polargraph Drawing Machine Summer 2018

Personal Project *Adruino Uno, C++*

Designed and constructed a drawing machine along with a drawing algorithm to take a picture and produce a corresponding single line drawing. The device functioned well and even drew sketches that were gifted to a close friend of mine.

PID Controller for Balancing a Ball Summer 2018

Personal Project *Python, Raspberry Pi*

Using an optical rotary encoder, a stepper motor, a Raspberry Pi 3, and a camera, a contraption was made that used a PID controller to balance a cue ball on a plank. One could gently hit the ball, but the controller would realign the plank so that the ball stayed on the ruler. This project had the primary purpose of making me comfortable with Python and a Linux environment.