Mengyu Yang

Machine Learning · Computer Vision · Human-Computer Interaction

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Education

University of Toronto *Toronto, Canada*

B.A.Sc. in Engineering Science (Major in Machine Intelligence) *Sep 2017 - Apr 2021*

Publications

Mask-Guided Discovery of Semantic Manifolds in Generative Models

- ***Mengyu Yang****, David Rokeby, Xavier Snelgrove.* Submitted to NeurIPS 2020 Workshop on Machine Learning for Creativity and Design.

Soloist: Generating Mixed-Initiative Tutorials from Existing Music Instructional Videos Through Audio Processing

- *Bryan Wang,* ***Mengyu Yang****, Tovi Grossman.* Submitted to CHI 2021.

Research

Vector Institute for Artificial Intelligence & Dalhousie University

Undergraduate Thesis, Advised by Professor Sageev Oore *Sep 2020 - Present*

- Developing an expert-labelled and well-curated dataset for controllable music generation and other machine learning applications in music

BMO Lab in Creative Research in the Arts, Performance, Emerging Technologies and AI

Research Intern *May 2020 - Present*

- Submitted to NeurIPS 2020 Machine Learning for Creativity and Design Workshop
- Designed a method using the L-BFGS optimizer along with a physics-inspired loss function to discover multiple disentangled directions in the latent space corresponding to local feature manipulation on the generated image
- Experimented with different optimizers, self-designed loss functions, and loss landscape exploration techniques with the goal of manifold learning in generative models with a focus on StyleGAN2

Dynamic Graphics Project, University of Toronto

Undergraduate Research Student, Advised by Professor Tovi Grossman *Sep 2019 - Sep 2020*

- Collaborated in building a music learning system which generates personalized tutorials from existing music instructional videos using audio processing
- Leveraged various deep learning audio processing networks and designed algorithms to extract musical information and provide real-time feedback on the user's performance
- Helped design front-end video navigation tools to address existing limitations with learning an instrument using traditional instructional videos

Dynamic Graphics Project, University of Toronto

Undergraduate Research Student, Advised by Professor Khai N. Truong *May 2019 - Sep 2019*

- Developed computer-aided methods for teaching piano sight reading, consisting of a set of software which allows a computer to analyze and evaluate a pianist's playing performance from both an auditory as well as visual perspective
- Designed and implemented an audio processing system and dynamic-programming-based algorithm for identifying wrong notes, achieving **100%** accuracy on all testing examples
- Used computer vision libraries, OpenCV and Dlib, to develop a face detection and pupil tracking tool based on input from a regular webcam to determine when the user is performing incorrect gaze response and head postures

Experience

Industry

Salesforce

Intern *Sep 2020 - Present*

- In collaboration with Engineering Science's Machine Intelligence Capstone Design course
- Utilized models and techniques from natural language processing to analyze customer support correspondences and motivate internal process changes and improve chatbot technology

Teaching

Division of Engineering Science, University of Toronto

ESC101/102 Teaching Assistant *Sep 2019 - Apr 2020*

- Undergraduate teaching assistant for the Division of Engineering Science's two design courses
- Graded student assignments including field note reports and core competency evaluations
- Listened to student groups present design showcases and provided feedback on next steps and areas of improvement

Leadership

Division of Engineering Science, University of Toronto

NSight Mentor *Sep 2019 - Apr 2020*

- Provided one-on-one mentorship for a first-year Engineering Science student
- Organized socials and gave advice to help mentee adapt and transition into both the program and general university life

Dynamic Graphics Project, University of Toronto

Project Adviser for High School Student *Jul 2019 - Sep 2019*

- Advised a high school student, working under a professor, to develop a method for transferring measurement data from digital calipers to a computer to be used for real-time 3D modelling by mapping input data from a 3D environment and converting it into a CSV file

Division of Engineering Science, University of Toronto

Student Ambassador *Sep 2018 - Apr 2020*

- Attended outreach events to network and communicate with incoming students and families, including the Ontario Universities Fair, Top Applicant Event, and EngSci Orientation

Engineers Without Borders, University of Toronto Chapter

Campaign Manager *Sep 2018 - Apr 2018*

- Organized and attended fundraising and outreach events throughout the school year to raise awareness for the UN's Sustainable Development Goals

Honors & Awards

Academic

2020	**Dean's Honour List**	*University of Toronto*
2019	**Dean's Honour List**	*University of Toronto*
2018	**Dean's Honour List**	*University of Toronto*
2017	**Dean's Honour List**	*University of Toronto*

Scholarships

2017	**University of Toronto Scholar**	*University of Toronto*
2017	**William Ian Mackenzie Turner 2T5 Admission Scholarship**	*University of Toronto*
2017	**Faculty of Applied Science and Engineering Admission Scholarship**	*University of Toronto*

Skills

Languages	Python, C, PostgreSQL, MATLAB, command line interface
Libraries	PyTorch, NumPy, Pandas, OpenCV, Dlib, Matplotlib, Librosa
Fabrication	Circuit Design, Breadboard Prototyping, Arduino Prototyping, Soldering

Projects

Musical Instrument Recognition within Polyphonic Music *2019*

- Developed and trained a unique multi-model neural network, consisting of stacked binary classifiers for each instrument class, to identify instruments being played within multi-instrumental music
- Exercised proper ML engineering techniques such as programming with CUDA on clusters and utilizing version control for collaboration

Recurrent Neural Network for Sentiment Classification *2019*

- Used natural language processing techniques to develop a neural network for sentiment analysis, classifying sentences as either objective or subjective by using Word2Vec embedding on a dataset of Rotten Tomatoes and IMDb posts
- Trained both a CNN and RNN to evaluate and design for an optimal architecture and overfitted each model for debugging

Convolutional Neural Network for American Sign Language Classification *2019*

- Developed and trained a convolutional neural network on self-gathered data to predict the letter being signed from an image of a hand
- Conducted activities of a data scientist by first cleaning, then pre-processing with normalization, and finally balancing data to ensure a consistent amount of data from each label is represented in both the training and validation datasets

Autonomous Tire-Stacking Robot *2018*

- An autonomous robot which detects poles along a path and deploys tires based on a predetermined logic for total tires
- Designed, prototyped, and soldered custom circuits based on the functions required of the robot including H-brdiges, sensors, motors and respective drivers, and their connections to various microcontrollers

Interests

- Piano - Grade 10 RCM certification; studied with Valerie Tryon, Member of the Order of Canada
- Tae Kwon Do - 2nd degree black belt
- Swimming
- Technology