Jeremy Ma | Curriculum Vitae

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Final semester master's student at University of Toronto. Interested in Machine Learning, Computer Vision, Algorithms, Parallel Computing, App Development, and FPGA. Looking for full time opportunities for the upcoming year.

Previous Employment

Modiface Inc.   **Toronto**
Software & Research Intern   *May 2018–Present*

- Developed model compression technique that yields model over 10 times smaller while preserving accuracy

University of Toronto   **Toronto**
Teaching Assistant   *January 2018 –May 2018*

- Teaching Assistant for *Algorithms and Data Structures*

Analog Devices Inc.   **Toronto**
FPGA & Embedded Systems Intern   *May 2015–Sep 2016*

- Optimized high speed *DSP(digital signal processing) hardware*
- Optimized driver softwares for *FPGA(field programmable gate arrays) systems*
- Developed network systems for hardware control

University of Toronto   **Toronto**
Research Assistant   *May 2014–Sep 2014*

- Implemented control systems to stabilize quantum random number generation for cryptography systems.

Publications

- *Knowledgify: Knowledge Distillation for Regression Tasks via Mixup* (first author)
- *Automatic Image-based Skin Diagnostics using Deep Learning* (second author)
- *Patent for Model compression* (in progress)

Education

Academic Qualifications

University of Toronto   **Toronto**
Master's in Computer Science   *2017–2019*

University of Toronto   **Toronto**
Bachelor's in Electrical and Computer Engineering, cGPA: 3.77/4.0   *2012–2017*

Notable Projects

- **GAN** *'Text-to-Image-to-Text Translation using Cycle Consistent Adversarial Networks'*

  Abstract: Text-to-Image translation has been an active area of research in the recent past. The ability for a network to learn the meaning of a sentence and generate an accurate image that depicts the sentence shows ability of the model to think more like humans. Popular methods on text to image translation make use of Generative Adversarial Networks (GANs) to generate high quality images based on text input, but the generated images don't always reflect the meaning of the sentence given to the model as input. We address this issue by using a captioning network to caption on generated images and exploit the distance between ground truth captions and generated captions to improve the network further. We show extensive comparisons between our method and existing methods.

- **RL** *'Deep Transfer for Model-Free Reinforcement Learning Using Autonomous Intertask Mappings and Q-Learning'*

  Abstract: In model-free reinforcement learning it is typically challenging to solve complex or sparse-reward tasks tabula rasa. This paper modifies the method from Ammar et al. (Ammar et al., 2013) for transferring experience from one reinforcement learning task to another where the tasks differ in both their state and action spaces. The reliance on the unrealistic assumption of possessing a black-box model of the target task reward function is removed, and we introduce a method that transfers source task Q-values instead. We find that transferring source task Q-values achieves better transfer results than the black-box model based method for one experiment involving a goal state, sparse reward target task (2D Mountain Car to 3D Mountain Car).

- **SDR** *'Low-cost software defined radio (best hardware project UofT ECE department 2017)'*

  Abstract: Software Defined Radios (SDRs) have greatly improved in recent years due to emerging software technologies in digital signal processing and radio communications. Hobbyists and amateur radio operators that use SDRs often need basic electrical test equipment for various experiments. However, they often do not own expensive test equipment such as a spectrum analyzer (SA) which limits their capabilities of learning and experimenting with radio frequency design. The final design we created was able to fill this gap by integrating key SA hardware features in a traditional SDR using a custom PCB, FPGA, and PC. Our device was able to work as a standard SDR via GNURadio and as a spectrum analyzer via the Qt Framework, using the FPGA for data communication via USB.

- **App** *'Android app Favourama (Co-founder and co-developer)'*

  Abstract: Favourama is a real time, local mobile platform which allows people in a community to ask and offer each other favors either for money or for free. The objective of our business is to build a solid mobile platform that involves virtually everyone in the local community and allow people to interact and help each other in real time. Favourama's mission is to become the most popular media where people can give and receive favors among each other at their own terms and convenience. To put into details, we will provide a mobile platform where people can easily find assistance, provide help/services and negotiate the rewards; we will also strive to establish ourselves as the regulator and monitor of the favor transactions.

Technical skills

- **Programming Languages:** C/C++, Python, Javascript, Java, Shell, Matlab, Verilog.
- **Deep Learning Libraries:** Pytorch, Tensorflow, Keras, Caffe2.