Michael Peet

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Experience

Miovision Technologies (Traffic Analytics and Smart Cities)   Sept - Dec 2018
Machine Learning Software Developer – Tensorflow, Python, Matplotlib (Pyplot), NumPy, OpenCV, Unreal Engine
- Refined existing and added new data augmentation methods using Tensorflow and OpenCV. Improved learning rate decay schedule of RMSprop Optimizer to improve performance of Miovision's Single Shot Multibox Detector Model. **Decreased False Negative Rate by 6% on average to 7.23% and 95th percentile False Negatives by 22.23% to 28.41%.** The new model was presented to the company and deployed to production by the end of the co-op term.
- Experimenting with refining default anchor boxes with **Scikit-learn's K-Means Clustering** and **rewriting Smooth L1 localization and Sigmoid classification loss functions** in Tensorflow to ignore small objects.
- Identified performance bottleneck in training infrastructure and proposed workaround to **make model training 2 times faster on average.**
- Customized the CARLA Autonomous Driving Simulator. Wrote Python Scripts to produce annotated frames for a synthetic data training system to **improve model performance on underrepresented classes and challenging conditions** (headlight glare, rain, harsh shadows, etc.)
- Trained two new full time hires on how to use the model training/validation infrastructure and helped them gain familiarity with the code base so experiments could continue after the end of my co-op term.

Miovision Technologies (Traffic Analytics and Smart Cities)   Apr - Aug 2017, Jan Apr - 2018
Software Developer - Ruby on Rails, MySQL, Passenger, JQuery, React, Slim, Sidekiq
- Diagnosed and fixed a production slowdown causing all servers to be unresponsive. Used Ruby-Prof for performance profiling. **Production functionality was restored in about 4 hours** and the fix made Travel Time Report generation **200 times faster** overall.
- Streamlined Travel Time Report PDF Creation code to make it **6 times faster**, and optimized Ruby on Rails' ActiveRecord ORM queries to make **website performance 2.3 times faster** on average for modified components.
- Designed and implemented communication between Miovision's Datalink and video processing servers using multiple small Sidekiq workers and Amazon SQS queues to decouple long running tasks as part of an effort to **eliminate a legacy server costing $21800 per year.**
- Implemented data visualization tool using JQuery to help sales keep track of metrics and identify cities where traffic scouts could be sold.
- **Reproduced Datalink environment in Docker containers**, allowing for faster environment setup and enabling cross platform development.

BuildDirect Design Center (3D Design for Kitchens and Bathrooms)   Sept - Dec 2016
Software Developer – Python, Django, PostgreSQL, AngularJS, FlexboxGrid
- Wrote Python layout filtering module to implement Design Standards, **33% decrease in layout generation time,** increased layout viability.
- Streamlined deployment workflow by integrating with **Github Deployments API** and writing a Slack plugin to display deployment status.

Videostream (Google Chrome App Streaming Media to Chromecast)   Jan - Apr 2016
Software Support Specialist - HTML, CSS/LESS, JavaScript, Java, Objective-C
- Worked in a hybrid development/support role, providing technical support and taking user feedback to implement requested features into Videostream app **(2M+ users).** Resolved over **2200 customer support tickets in multiple languages.**
- Using Javascript, implemented a **Recent Downloads** feature into the app, currently used by over **5000** users daily.
- Coded across **Android** (Java), **iOS** (Obj-C) and **Web** (Javascript) to implement a Netflix style Continue Watching feature.

Favourite Personal Projects

Tensorflow Model Training Pipeline (Python, Keras, Tensorflow, Matplotlib)   Sept 2018 - Present
- Created model training pipeline using Tensorflow to prepare training and validation tfrecords, train the model using iterators to load the data, export it as a frozen graph, and load that graph to make predictions.
- Wrote Jupyter Notebook scripts to identify and display samples with highest validation loss with Matplotlib, making model analysis easier.
- Using Model Training Pipeline as a base to implement **YOLOv3 network.**

Kaggle Machine Learning Challenges – Deep Neural Networks (Python, Keras, Tensorflow)   Jan - Apr 2018
- Wrote Convolutional Neural Network to classify 80x80 images of cats and dogs. Used input normalization, data augmentation (brightness shifting, image flipping, cropping, colour shifting, etc.), He Normal weight initialization, and Bayesian Hyperparameter Optimization for a **validation accuracy of 96%.**
- Wrote LSTM network to classify different types of toxic internet comments in multiple languages. Leveraged Facebook pretrained word embeddings and data augmentation using Google Translate for a **validation AUC of 0.985**

Voluntel – Web App (Node.js, Socket.io, ExpressJS, React, EJS, MongoDB, PassportJS, Google Maps APIs)   Nov 2016 - Jan 2017
- Web app to connect volunteers to opportunities. Wrote user profile, login, authentication, file management, posting creation.
- Wrote newsfeed using web sockets to update posting info, allowing users to apply to postings/track applicants in real time.

Universal Television Remote (Microcontroller C, Fritzing)   Sept - Dec 2014
- Created universal television remote around PIC12F683 microcontroller to transmit Infra-Red TV protocols, including SIRC, RC5, and NEC.

Education

University of Waterloo
BASc, Mechatronics Engineering
Artificial Intelligence Option
2015-2020

Award Highlights
- **University of Waterloo President's Scholarship:** Admitting Average over 90% (2015)
- **Governor General's Academic Medal:** Highest Academic Average (2015)
- **Swimming:** Placed 3rd in regional competition (2015)
- **Karate:** Achieved 1st Degree Black Belt (2014)

Additional Skills

Programming
- Bash, Java, C++, Matlab

Tools
- PyCharm, Sublime, Git, Linux (Ubuntu), PDB, AWS, Datadog