MARTIN MA

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EDUCATION

University of Waterloo   University of Waterloo
BASc Chemical Engineering with Option in AI   Sept 2016 - Apr 2021

- Cumulative GPA: 95%, Rank: 1/50, Dean's Honours List
- **Relevant Courses**: Intro to Machine Learning, Advanced Optimization, Data Mining, Autonomous Vehicles, Game Theory, CNN for Computer Vision (Stanford CS231n), Reinforcement Learning (Stanford CS234), Algorithms & Data Structures,

RESEARCH EXPERIENCE

University of Waterloo - Professor Krzysztof Czarnecki   Waterloo, Canada
Autonomous Vehicle Engineer   June 2020 - Aug 2020

- Co-designed and implemented an active learning framework for LiDAR-based 3D object detection.
  - Enabled training on multiple datasets (KITTI, NuScenes, CADC) and models (PointPillars, SECOND) by building dataloaders and abstraction layers.
  - Increased sample training efficiency by 5% through designing uncertainty-based acquisition functions.
- Enhanced model robustness and increased performance by 3% through training with epistemic and aleatoric uncertainty calcualted from Monte Carlo dropout in PointPillars network with PyTorch and CUDA.
- Minimized expected calibration error by calibrating network output using temperature scaling.
- Generated explanation for 3D object detection and collected meaningful trend between True Positive and False Positive using saliency and integrated gradient with Captum.

WORK EXPERIENCE

Suncor Energy   Calgary, Canada
Production Engineer   Sept 2019 - Dec 2019

- Reduced unreachable underground oil field temperature prediction error by over 60% through constructing a regression neural network with PyTorch.
- Enabled refinery system malfunction alert 1-3 days in advance with 83% precision using an autoencoder for anomaly detection in operating data using Kera.
- Automated tasks of calculating oil sample saturation level from lab pictures, with normalization for different light conditions using OpenCV.

Petro-Canada Lubricants   Mississauga, Canada
Process Engineer   Jan 2019 - Apr 2019

- Reduced plant power consumption by 12% through optimizing the plant controller operating functions using cost/benefit analysis.
- Predicted QC results with 90+% accuracy by designing a greedy selection algorithm and optimized parameters using dynamic simulation in Python.

AWARDS & HONOURS

Vice President of Chemical Engineering Student Society (2018-present)
First-in-class Scholarship (2019, 2020)
Engineering Faculty Upper Year Scholarship (2019)
President's Scholarship (2017)

SKILLS

Languages:	Python, Java, C++, C, MATLAB, SQL, HTML, CSS, JavaScript
Tools:	Linux, Git, Docker, CPLEX, ROS, Simulink
ML Libraries:	PyTorch, Tensorflow, Keras, Scikit-Learn, Captum

PROJECTS

Tetris.ai *Python, PyTorch, PyGame*   github.com/martinzwm/tetris-ai
Trained RL agent from raw pixels with Double Deep Q-Learning and Prioritized Experience Replay to achieve super-human performance in Tetris.

Style Transfer *Python, PyTorch*   github.com/martinzwm/stanford-cs231n
Train a model to artistically integrate any 2 pictures, output image contains the content of one image and the style of the other.

Lane Detection *Python, OpenCV*   github.com/martinzwm/lane-detection
Pipeline: Gaussian blur, Canny edge detection, RoI identification, Hough transform, lane classification

Path Planner *C++*   github.com/martinzwm/path-planner
Designed vehicle path planning algorithm to achieve lane following/changing, smooth trajectory, collision avoidance.

Robust Shortest Path *Python, CPLEX*   github.com/martinzwm/robust-shortest-path
Applied Benders decomposition to solve for shortest path problem when arc length is a random variable within an upper and lower bound.

EXTRA CURRICULARS

Champion of intramural hockey
Assistant soccer coach for U15
Intramural basketball
Guitarist in a band
Rock climbing