Martin (Ziwen) Ma

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Education

Harvard University Cambridge, Massachusetts
SM Computational Science and Engineering Sept 2022 - Apr 2024

- GPA: 4.0/4.0
- Relevant Courses: Stochastic Methods for Data Analysis, Inference and Optimization, AI Research Experience

Massachusetts Institute of Technology Cambridge, Massachusetts
MS Chemical Engineering Practice Sept 2021 - Aug 2022

- GPA: 5.0/5.0
- Teaching assistant for Chemical Kinetics and Reactor Design
- Relevant Courses: Numerical Methods, Systems Engineering, Dynamic Programming & Reinforcement Learning

University of Waterloo Waterloo, Canada
BASc Chemical Engineering Sept 2016 - Apr 2021

- GPA: 95%, Dean's Honours List
- Option (similar to Minor) in Artificial Intelligence, Specilization in Process Modelling, Optimization and Control
- Relevant Courses: Advanced Optimization, Machine Learning, Data Mining, Algorithm Design & Analysis, Methods and Tools for Software Engineering, Autonomous Vehicles

Awards & Honours

Keith And Helen Rumbel Fellowship (2021-2022)
Vice President of Chemical Engineering Student Society (2018-2021)
First-in-class Scholarship (2019, 2020)
Engineering Upper year Faculty Scholarship (2019)
President's Scholarship (2017)

Publications

On the Use of Machine Learning and Deep Learning for Radar-Based Passenger Monitoring
Hajar Abedi, Martin Ma, Jennifer Yu, James He, Ahmad Ansariyan, George Shaker
IEEE - AP-S/URSI, 2022

Research Internship

Professor George Shaker Waterloo, Canada
Machine Learning Applications in Wireless Sensing Sept 2020 - Feb 2021

- Developed a Convolutional LSTM network to localize passenger and classify occupant type using multi-input multi-output (MIMO) frequency modulated continuous wave (FMCW) radar, improved accuracy by 20% compared to the previous method.

Professor Krzysztof Czarnecki Waterloo, Canada
Autonomous Vehicle Perception June 2020 - Aug 2020

- Implemented an active learning framework for LiDAR-based 3D object detection and improved sample efficiency by 5% through designing uncertainty-based acquisition functions.
- Developed a visualization tool for explainable AI using saliency methods.

IPEX - Dr. Louis Daigneault Mississauga, Canada
Fire-Resistant PVC Pipe Sept 2017 - Dec 2017

- Composed a new PVC piping formulation that enhanced smoke resistivity by 30% while maintaining other physical properties through conducting a design-of-experiment (DOE).
- Scaled up the proposed formulation in plant-scale trials and troubleshot rheology difficulties.

Industrial Internship

Technip Boston, Massachusetts
Technical Consultant Aug 2022 - Aug 2022

- Proposed a design for Tungsten catalyst recycle process in the targeted chemical flow diagram after analyzing several methods commonly used in the field.

AstraZeneca Gaithersburg, Maryland
Technical Consultant June 2022 - July 2022

- [Patent pending] Developed a real-time locating system (RTLS) prototype to track equipment positions using ultra-wided (UWB) and integrated with autonomous mobile robots (AMR).
- Implemented a neural support vector machine (NSVM) to achieve 78% accuracy in classifying clinical trial properties of monoclonal antibody.

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

- Reduced the unreachable underground oil field temperature prediction error by 30% through constructing a physics-based neural network, this led to a 1.3 million dollar annual benefit.

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

- Reduced power consumption by 12% through optimizing parameters in the operating function of the anti-surge compressor controller in the dewaxing unit.

PROJECTS

Manufacturing Design of Gluten-Free Beer - *Professor Christine Moresoli*
A beer production model using fungal peptidase to produce beer with a gluten content < 20 ppm for people with Celiac Disease.

Robust Shortest Path *Professor James Bookbinder* github.com/martinzwm/robust-shortest-path
A shortest path problem with stochastic arc length, solved with Benders decomposition.

Chest X-Ray Disease Segmentation *Professor Pranav Rajpurkar*
https://github.com/martinzwm/CheXzero
Self-supervised learning (CLIP-based model) toolkit to segment lung-related disease areas on chest X-Ray.

Technical Skills

Tools:	Docker, CPLEX, Simulink, COMSOL, MATLAB, ASPEN
Programming:	Python, Java, C++, SQL
ML Library:	PyTorch, Tensorflow, Keras, Captum