

# ALI NAQVI

Phone: (+1) 647-997-0548 ◊ Email: [naqvial8@mcmaster.ca](mailto:naqvial8@mcmaster.ca)

Homepage: [ali-naqvi.ca](http://ali-naqvi.ca)

[Github](#) ◊ [LinkedIn](#)

## SUMMARY

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I have a strong passion for creative algorithms and techniques to solve complex problems. Recently, my work has been focused on evolutionary computation and its methodology with reinforcement learning for time series forecasting. Parallel with this, I research state-of-the-art deep learning models for sequential decision-making tasks. Overall, I am always eager to acquire new skills, understand important challenges, and find impactful solutions.

## EDUCATION

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### McMaster University

*Sept 2023 - August 2025 (expected)*

MSc in Computer Science (Thesis)

GPA: 4.0/4.0

*Related courses: Evolutionary Computation, Neural Networks with Graphs*

### University of Windsor

*June 2023*

BSc Of Computer Science (Honours), Artificial Intelligence Specialization

GPA: 3.7/4.0

*Related courses: Neural Network and Deep Learning, Design and Analysis of Algorithms, Linear Algebra*

## RESEARCH INTERESTS

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- Evolutionary computation
- Reinforcement Learning
- Deep Learning
- Computational neuroscience and bio-inspired AI
- Sequential decision-making models

## PUBLICATIONS

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### Towards Evolving Creative Algorithms: Musical Time Series Forecasting with Tangled Program Graphs

June 2024

*Ali Naqvi, Stephen Kelly*

*(Status: Accepted as Workshop Paper)*

- 2024 Conference on Artificial Life (<https://2024.alife.org/>)

### Evolving Many-Model Problem Solvers

June 2024

*Stephen Kelly, Eddie Zhuang, Ali Naqvi, Tanya Djavaheerpour*

*(Status: Accepted as Book Chapter)*

- Genetic Programming Theory & Practice XXI (<http://gptp-workshop.com>)

### Tangled Program Graphs with Indexed Memory in Control Tasks with Short Time Dependencies

July 2024

*Tanya Djavaheerpour, Ali Naqvi, Stephen Kelly*

*(Status: Accepted to Conference)*

- 16<sup>th</sup> International Conference on Evol (<https://ecta.scitevents.org/>)

## ON-GOING WORK

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- Competitive Hebbian Learning for Multi-task Decomposition in Tangled Program Graphs - Under Review: Gecco 2025, regular paper

## RESEARCH EXPERIENCE

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## Web Application for Sequential Recommendation System

September 2022 - March 2023

*Supervisor: Dr. Luis Rueda*

- Designed and implemented a sequential dynamic movie recommendation system using Deep Reinforcement Learning to provide personalized recommendations.
- Developed the system to support multiple users, continuously updating recommendations based on user interactions and preferences.
- Built using Python, JavaScript, TensorFlow, Flask, and ReactJS, combining backend machine learning models with a responsive frontend interface.

## Medical Document PHI Filter

January 2023 - April 2023

*Supervisor: Dr. Edward Komissarchi*

- Led research on PDF processing and optical character recognition (OCR) techniques to analyze sensitive medical data.
- Assessed BERT-based deidentification models, including the Stanford base model and custom models trained on the i2B2 dataset, for efficacy in identifying and anonymizing Protected Health Information (PHI).
- Integrated multiple deidentification models to enhance PHI matching and filtering accuracy.
- Developed and deployed an automated PDF PHI filtering pipeline, eliminating the need for manual intervention.

## TEACHING EXPERIENCE

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### COMPSCI 2SD3: Concurrent Systems [McMaster University]

Winter 2024

Role: Teaching Assistant

Responsibilities: Taught weekly labs for all sessions, and contributed to grading and feedback.

### COMPSCI 3GC3: Computer Graphics [McMaster University]

Fall 2023

Role: Lead Teaching Assistant

Responsibilities: Taught weekly labs for all sessions, and contributed to grading and feedback.

### Programming for Beginners [University of Windsor]

Winter 2023

Role: Teaching Assistant

Responsibilities: Contributed to grading and feedback.

### Operating Systems [University of Windsor]

Fall 2022

Role: Teaching Assistant

Responsibilities: Held weekly office hours, and contributed to grading and feedback.

### Key Concepts in Computer Science [University of Windsor]

Summer 2022

Role: Teaching Assistant

Responsibilities: Held weekly office hours, and contributed to grading and feedback.

### Social Media & Mobile Tech [University of Windsor]

Winter 2022

Role: Teaching Assistant

Responsibilities: Held weekly office hours, and contributed to grading and feedback.

## NOTABLE PROJECTS

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- . *Simulink-Style Data Preprocessing Pipeline for ML*: Developed a streamlined data preprocessing pipeline inspired by Simulink, optimized for machine learning algorithms.
- . *Implementation of Hierarchical Graph Pooling*: Re-implemented the methods from the "Hierarchical Graph Pooling with Structure Learning" paper; compared and analyzed the differences in results between the original work and the re-implementation.

- . *Analysis of the Google Landmark Competition 2021:* Designed a Shifted Window Transformer model to tackle the largest Google Landmark dataset.
- . *Exploring Efficiency Amongst Supervised Models:* Researched the accuracy and efficiency of various supervised learning models applied to the MNIST dataset.
- . *Comparative Analysis of Convolutional Neural Network Architectures:* Authored a research paper comparing convolutional neural networks with alternative models using the MNIST dataset.
- . *Exploring optimization strategies with the prisoner's dilemma:* Conducted an in-depth investigation into different optimization strategies for the prisoner's dilemma game, culminating in a research paper.

## ACHIEVEMENTS

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Gold LEAD Medallion, awarded by University of Windsor

*July 2023*

## SKILLS

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<b>Working Knowledge</b>	Python, C/C++, PyTorch, Numpy, Pandas, Tensorflow
<b>Intermediate Knowledge</b>	SKLearn, Java, JavaScript, SQL
<b>Languages</b>	English (Native), Urdu