

Humza Iqbal

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EDUCATION

University of Toronto

Toronto, ON

Computer Science Major & Statistics Major

Sept. 2021 – April 2026

Courses: Statistical Methods for Machine Learning II; Neural Networks and Deep Learning; Algorithm Analysis and Complexity; Probability; Regression Analysis; Analysis on Manifolds (Analysis III); Real Analysis

RESEARCH & DEVELOPMENT

Research Student | SickKids & Zhen Lab | Dr Ali Darbandi and Dr Mei Zhen

June 2024 - Present

- Contributed to high-quality 3D volume production from scanning electron microscopy (SEM) images for complex biological structures by supporting pre-imaging, imaging, and post-processing stages.
- Automatic SEM Imaging Pipeline:** Developed scripts to automate stages of the SEM imaging process, including instance segmentation of sections on wafers, semantic segmentation of tissue within sections, image quality evaluation, and autofunctions for autofocus adjustment that protects samples from repeated irradiation.
- Automatic Water-Leveling System:** Developed and implemented an automated system to maintain consistent water levels with microliter precision, ensuring smooth section collection in array tomography. Monitored water reflection and kept levels within precise bounds during cutting.
- Image Stitching for Large Samples:** Engineered a system to continuously stitch live feeds of histological sections, resulting in a comprehensive image that preserves cellular structure across the entire sample.
- Python, PyTorch, and OpenCV were generally used to complete these tasks. A variety of classical image analysis techniques and machine learning algorithms were used.

PROJECTS

U-Net Cell Segmentation | Python, Tensorflow, Keras | [Github](#) | [Report](#)

Jan. 2024

- Implemented a CNN with the U-Net architecture to process and segment microscopy images.
- Utilized CNNs as the basis, followed by Olaf Ronneberger's U-Net research, for a model grounded in research.
- Addressed sample scarcity by implementing U-Nets with data augmentation, achieving a final validation accuracy of 83.73% measured with the IoU metric.

Autopilot Airplane | Python, C++ | [Github](#)

Oct. 2020 – July 2022

- Engineered a physical airplane with autonomous and non-autonomous capabilities using C and Arduino.
- Leveraged GPS technology to enable real-time location tracking of the aircraft, displayed on a Python GUI.
- Developed Python scripts for automating data collection and assessment tests, utilizing NumPy.
- Designed and implemented a responsive control system and user-friendly interface.

Human Feedback Database | Python, Node.js, Postgres, React | [Website](#)

Sept. 2024

- Developed a Database in collaboration with the Human Feedback Foundation, centralizing human feedback data to support AI research and improve data accessibility.
- Implemented a forum and user account system allowing users to register, rate, and discuss datasets, fostering a collaborative research environment.
- Built backend functionality including dataset querying, search filters, and CRUD operations.

Health Harbor | Python, Cohere, CockroachDB, React, Flask | [Github](#)

Sept. 2023

- Developed a Pharmaceutical Inventory System for Hack the North 2023, using Flask to serve a REST API, React, and CockroachDB for a scalable, efficient database.
- Implemented a disease diagnosis clustering system with Cohere's LLM API, achieving 95% accuracy.

TECHNICAL SKILLS

Languages: Python, R, C/C++, Java, JavaScript, PostgreSQL, MIPS32 Assembly

Frameworks & Libraries: PyTorch, OpenCV, NumPy, TensorFlow, React, Node.js, Flask

Hardware/Tools: Git, Arduino, Logisim, Soldering, AutoCAD, InventorCAD, Lathe, Milling Machine

INTERESTS

Swimming; Reading Fantasy and SciFi; Curb your Enthusiasm; Seinfeld; Sopranos; The Wire