Michael Liu

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Job Experience

Machine Learning Engineer — *Waterloo, ON*
WAT.ai (University of Waterloo Artificial Intelligence Design Team) — *Sept 2025 - Present*

- Collaborating with a small team of students on an applied medical imaging project focused on improving the detection of microaneurysms in fundus imaging.
- Led dataset curation and preprocessing, implementing reproducible data pipelines for data splits and augmentation to support ablation studies.
- Co-authoring a research paper titled "Techniques for Enhancing Small Lesion Segmentation in Diabetic Retinopathy Fundus Images Using CMAC-Net".

Tennis Instructor & Tennis Racquet Stringer — *Markham/Unionville, ON*
Unionville Tennis Club/Premier Racquet Clubs Markham — *Apr 2022 - Aug 2025*

- Coached 500+ hours across 4 summers leading group camps and private hitting sessions
- Built a personal racquet-stringing service for local tennis players from my basement.

Technical Skills

Programming Languages:	Python, SQL, C
Data/ML:	PyTorch, scikit-learn, Pandas, NumPy, Matplotlib, Streamlit
Databases/Tools:	PostgreSQL, MySQL; Git, GitHub; Jupyter Notebook, VS Code; Excel, Tableau

Projects

Small-Lesion Segmentation in Diabetic Retinopathy Fundus Imaging @ WAT.ai — *github/fundus-image-segmentation*

- Built a PyTorch data pipeline with image-mask augmentations for IDRiD, TJDR and DDR fundus datasets.
- Designed and trained CMAC-Net (U-Net Variation) models for the semantic segmentation of microaneurysms, hemorrhage, soft and hard exudates from scratch in PyTorch.
- Wrote task-specific loss functions (e.g. Focal Tversky) to address class imbalance.
- Conducting ablation study on applications of CLAHE preprocessing and loss-function selection to improve small-lesion segmentation performance.

Tennis Stroke Multi-Class Classification — *github/tennis-stroke*

- Built image classification models to identify tennis strokes from still images.
- Trained and compared pretrained CNNs (ResNet-18, MobileNetV3, ConvNeXt-Tiny).
- Applied Grad-CAM visualizations to interpret model attention.
- Deployed models on a Streamlit application.

Education

University of Waterloo — *Sept 2025 - Apr 2030*
BMath in Mathematics

- Major Average: 94% — Cumulative Average: 93%, Student ID: 21177966
- Activities: Varsity Cross-Country, Varsity Track, WAT.ai (Artificial Intelligence) Design Team

Bill Crothers Secondary School — *Aug 2021 - Jun 2025*
Ontario Secondary School Diploma

- Graduated 2nd in Class of 2025 with 99.17% Top 6 Grade 12 Average
- Awards: Academic Accomplishment Award, Excellence in Mathematics Award, 8x University of Waterloo Mathematics Contest School Champion