Minahil Bakhtawar

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GitHub

Education

University of Toronto *Graduating Spring 2026*
B.A.Sc Engineering Science, majoring in Machine Intelligence

Experience

Software Engineering Intern *Toronto, ON*
Magna Electronics *May 2024 – May 2025*

- Integrated **ONNX** models into C++ inference pipelines for Volkswagen and Mazda autonomous driving systems, streamlining multi-camera perception.
- Evaluated obstacle detection models using custom KPIs to identify false positives, localization errors, and improve overall detection reliability.
- Fine-tuned **YOLO** models, increasing keypoint accuracy by 9% for camera calibration and pose estimation.
- Maintained simulation platform backend to enable automated validation and early-stage ML testing.

Technical Team Member *Toronto, ON*
University of Toronto Formula Racing *Jan 2023 – Present*

- Created image detection datasets for the autonomous formula car of the driverless subteam at the UofT Formula Team.
- Used **PyTorch, ONNX and TensorFlow** with **CUDA** to speed up the inference times of the model detecting cones in the path of the car while retaining accuracy and benchmarking model performance estimates across different ML frameworks. Achieved 95.37% accuracy and **decreased inference times by 23%**.
- Lead model quantization and used XGBoost model with **pandas and sklearn** to optimize model hyperparameters.
- Trained **yolov7** models with optimized hyperparameters using NVIDIA Jetson.

Research Intern *Toronto, ON*
UofT Physics Department *May 2023 – August 2023*

- Generated synthetic datasets using NetworkX to support research on community detection algorithms in Graph Neural Networks (GNNs), enabling improved results, owing to larger datasets.
- Containerized a Simulation Software using Docker and Singularity in a Linux environment to run large-scale physics simulations for background classification.

Research Intern *Toronto, ON*
Engineering Science, University of Toronto *May 2022 – Aug 2022*

- Designed the early-stage feature pipeline for a voice-enabled virtual assistant for the elderly, focusing on usability and accessibility in care homes.
- Co-authored a peer-reviewed literature review on NLP preprocessing: "The Impact of Preprocessing on the Automated Scoring of the USMLE Step 2 Clinical Skills Exam," IEEE CIBCB 2022.

Publications

The Impact of Preprocessing on the Automated Scoring of the USMLE Step 2 Clinical Skills Exam August 2022
Yi Fei Lu, Nupur Shenoy, ***Minahil Bakhtawar***, Sneha Balaji,
IEEE_CIBCB_2022

Projects

Lane Detection Image segmentation *github.com*

- Compared the performance of a traditional UNet model against a UNet model with ResNet-50 encoding blocks using the TuSimple dataset. Found improved recall and F1 score with the combined model.

k-Cluster for Breast Cancer Prediction *github.com*

- Used NumPy to write the K-Cluster algorithm from scratch to determine risk of Breast Cancer using predictive modelling. Investigated relationship between distortion and number of clusters.

Technical skills

Skills: Python, PyTorch, TensorFlow, Docker, SQL, NumPy, JAX, Pandas, Scikit learn, Seaborn, Matplotlib, NetworkX, Linux, Computer Vision, RNN, CNN, Deep Learning, GitHub, GitLab