Sumesh Thakur

Website: sumeshthakr.github.io

E-mail: sumeshthkr@gmail.com ✻ *Telephone:* +1 (782) 882-0240

LinkedIn: linkedin.com/in/sumeshthkr ✻ *GitHub:* github.com/sumeshthakr

Applied ML Researcher

Applied ML / CV researcher-engineer specialized in **3D perception (LiDAR/point clouds)** and **transformer / GNN-based modeling**, with publication record (IEEE IGARSS) and production deployment experience. Built research POCs and shipped real-time systems on embedded platforms (Jetson) using **Python/C++/CUDA**, focusing on dataset curation, evaluation, and performance optimization.

Core Competencies

GenAI / Deep Learning	Transformers (Seq2Seq, attention), ViT concepts; CNN–LSTM; optimization under compute constraints
Neural 3D / Graphics	Point clouds, LiDAR-camera fusion, SLAM/VO; 3D sampling, mesh processing/visualization pipelines
Research Execution	Reproducing SOTA, ablations, dataset creation, benchmarking (quality/latency), publication-quality writing
Engineering	Real-time pipelines, CI/CD, MLOps (Airflow/MLflow), Docker, Linux, Git

Open Source & Community

- **PointCloudSampling** (GitHub, 5⋆): Implemented **uniform** and **Poisson** downsampling utilities for point clouds; useful for **3D dataset preprocessing**, benchmarking, and rapid prototyping in perception pipelines.
- Community contributions: participated in upstream issue discussions (e.g., TensorFlow / PyTorch Geometric) focused on **installation/runtime debugging** and **reproducibility** in ML environments.

Experience

Canada Revenue Agency *Jan 2023 – Present*

Research & Technology Advisor (AI/ML & Software R&D)

- Performed deep technical reviews of software R&D initiatives, validating novelty, feasibility, and experimental rigor.
- Conducted technical analysis, guided innovation documentation, and ensured compliance with federal criteria.
- Delivered technical workshops and knowledge sessions on machine learning and automation.

Falkbuilt Inc. *Nov 2022 – Jan 2023*

Machine Learning Developer (3D Data Pipelines)

- Built an ETL and processing pipeline for **3D mesh reconstruction** and asset analytics using Python, MongoDB, and Trimesh; enabled scalable ingestion and transformation of 3D data.
- Prototyped and benchmarked ML model variants; tracked experiments using **MLflow** and orchestrated workflows via **Airflow**; tuned hyperparameters with **Optuna**.
- Improved iteration speed and comparability across experiments through standardized data schemas, versioned runs, and repeatable evaluation.

JCA Technologies *Jul 2020 – Nov 2022*

Perception Software Engineer (Autonomous / Real-Time) *Winnipeg, MB*

- Deployed perception algorithms and ML models on embedded platforms (**NVIDIA Jetson, JCA Eagle**) for autonomy workloads under real-time and resource constraints.
- Implemented **LiDAR–camera fusion**, **SLAM**, and **visual odometry** modules in C++/Python/ROS2; optimized point cloud and feature pipelines for throughput and robustness.
- Delivered production-grade software with CI/CD practices in agile workflows; collaborated across perception, embedded systems, and product integration.
- **Optimization focus:** latency-aware processing, memory/compute tradeoffs, and deployment stability on edge GPU platforms.

Nuance Communications *Sep 2020 – Dec 2020*
ML Research Intern (Seq2Seq / Video) *Montreal, QC*

- Developed a CNN–LSTM Seq2Seq pipeline for medical video subtitle generation; designed data preprocessing and evaluation for end-to-end training.
- Evaluated on TACOS dataset achieving **BLEU 0.71** and **METEOR 0.47**; documented architecture and results for research transfer.

BarrierBreak Solutions *Dec 2017 – Apr 2019*
Associate Software Engineer (Edge CV) *Mumbai, India*

- Led Android development of the "6 by 6" currency detection app using **InceptionNet + TensorFlow Lite**; curated and managed a **100,000+ image dataset**.
- Built device-side features (magnification, light detection) and optimized inference workflow for robust on-device performance.

Selected Research & Engineering Projects

- **Point Cloud Sampling Toolkit (Open-source)** — Implemented uniform and Poisson downsampling utilities for point cloud scans; used for rapid prototyping and preprocessing in 3D pipelines. github.com/sumeshthakr/PointCloudSampling
- **3D Mesh Reconstruction + Visualization** — Production ETL + rendering support for architectural 3D assets; mesh processing and visualization pipeline built for scale and reliability.
- **GNN-based 3D Detection/Segmentation Research** — Designed and evaluated graph-attention variants for 3D classification/segmentation; contributed novel architectures published at IEEE venues.

Selected Publications

- **IEEE IGARSS 2023**: GAGAT: GAN for 3D Classification and Segmentation
- **IEEE IGARSS 2022**: Graph Attention Network for Object Detection from Raw LiDAR Data
- **arXiv 2020**: Dynamic Edge Weights in GNNs for 3D Object Detection
- **IET Electronics Letters 2020**: Video-based Collective Motion Analysis via Shape Matching

Technical Skills

Languages	Python, C++, Java, CUDA, Bash
Frameworks	PyTorch, TensorFlow, OpenCV, ROS/ROS2
MLOps / Data	Airflow, MLflow, Docker, MongoDB, Optuna
Systems	Linux (Ubuntu), Git, CI/CD, REST APIs

Education & Awards

M.Sc., Computer Science — Saint Mary's University, Halifax 2021
MITACS Accelerate Funding ($10,000/semester) • FGSR Fellowship ($17,500/year) • 1st Place 3MT ($750)