Sumesh Thakur

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PRINCIPAL INTERESTS

Mesh Processing, Pointcloud Processing, 3D Computer Vision, Graph Neural Networks, Convolutions Neural Networks, Applied Machine Learning, Scientific Software Development, Computer Graphics, Research Management, Technical Writing.

ACADEMIC BACKGROUND

M.Sc. Computer Science 2021
Saint Mary's University, Halifax, N

- M.Sc. thesis in machine learning under direction of Dr. Jiju Poovvancheri. Dissertation title: Graph Attention Network for Point Cloud Processing.

B.Tech. Computer Science Engineering 2018
Chandigarh Engineering College, Mohali, PB

- Focus areas: Software Development, Computer Graphics

EMPLOYMENT HISTORY

Machine Learning Developer Jan, 2022 - Present
Falkbuilt Inc., Calgary, AB

- Part of AI Research team
- Working on developing a novel Graph Neural network for Indoor Mesh Processing.
- Developed Mesh reconstruction tools using Trimesh and MongoDB library.
- Developed data visualization tools for a huge indoor mesh dataset for exploratory data analysis.
- **Skills**: PyTorch, Autoencoder, CUDA, GNN, Mesh, C++, Deep Learning, Python

Perception Software Engineer (Intermediate-I) July, 2021 - Jan, 2022
JCA Technologies, Winnipeg, MB

- Part of Perception team
- Researched and developed perception based solutions for precision farming.
- Developed Deep learning and Computer Vision algorithms for Point cloud processing and Image processing.
- Deployed Machine learning models on Nvidia Jetson and JCA's Eagle platform.
- Familiarized with Agile software development in Python, Modern C++, ROS 2 Foxy, Ubuntu 20.04
- Developed software cycle composed of High-Level Design, Detailed Design, Implementation, Unit Test, Integration test.
- Developing algorithms for Lidar and Camera based mapping, sensor fusion, simultaneous localization and mapping (SLAM), Computer Vision based visual Odometry.
- Experienced software release process and testing procedures.

- **Skills**: Modern C++ , Sensor Fusion, Tensorflow, MLOps, TensorRT, OpenCV, Computer Vision, ROS/ROS, SLAM, PCL, Linux-Ubuntu (Bash), Git, Jira, Docker, Agile Software Release (Scrum, Sprints, Demo), Software Release Process

Research Associate Dec, 2017 - April, 2019
Barrierbreak Solutions, Mumbai, MH

- Part of R&D Team
- Lead the development of "6 by 6" android application, India's first currency detection application for visually impaired.
- Maintained and annotated a dataset of Indian currency dataset, consisting of 1,00,000 examples and 9 classes.
- Deployed InceptionNet based ML model on android mobile devices.
- Developed light detection and magnifier tools for "6by6" android application.
- Developed testing tools for accessibility testing.
- **Skills**: Android Development, Tensorflow, MLOps, JAVA, Computer Vision

INTERNSHIP

Research Scientist Sep, 2020 - Dec, 2020
Nuance Communications, Montreal, QC

- Part of Central Research Team
- Researched and developed Sequence to Sequence model for automatic video subtitle generation.
- Developed Sequence-2-Sequence (CNN-LSTM) model for automatic video description for medical assistant and enhance patient-doctor interaction for DRAGON virtual assistant platform.
- Train and tested Seq2Seq model on TACOS Video data set corpus.
- Managed to get a benchmark score of 0.71 on BLEU and 0.47 on METEOR.

PUBLICATIONS

- Thakur, Sumesh, Pandey, B. and Jiju Peethambran. "A GRAPH ATTENTION NETWORK FOR OBJECT DETECTION FROM RAW LIDAR DATA". **IEEE-IGARSS 2022**.
- Thakur, Sumesh, and Jiju Peethambaran. "DYNAMIC EDGE WEIGHTS IN GRAPH NEURAL NETWORKS FOR 3D OBJECT DETECTION." **arXiv preprint** (2020).
- Pandey, B., S. Thakur, H. Joshi, A. Pradhanga, Y. Akiyama, and J. Peethambaran. "TOWARDS VIDEO BASED COLLECTIVE MOTION ANALYSIS THROUGH SHAPE TRACKING AND MATCHING." **IET Electronics Letter** (2020).

SCHOLARSHIPS AND AWARDS

- *MITACS Accelerate Funding* , MITACS & MODEST TREE, Jan. 2021 - Jul. 2021, **Valued at $ 10,000 per semester**
- *FGSR Fellowship*, SAINT MARY'S UNIVERSITY, Apr. 2019 - Jul. 2021, **Valued at $ 17,500 per year**
- *First Position, 3 Minute Thesis Competition*, SAINT MARY'S UNIVERSITY, Mar. 2020, **Won $750 as winning prize, competing with 19 participants from master's and PhD program.**

SKILLS

- **Programming**: Python, C++, C, JavaScript
- **DevOps**: Docker, CI/CD, Jenkins
- **MLOps**: MLFlow, Weights & Biases, Tensorflow Extended
- **Machine learning**: Tensorflow, Pytorch, Keras
- **Tools**: OpenCV, NumPy, Pandas, Flask, PyTest, Docker, Jenkins, Tensorflow Extended, ROS2, PCL, Open3D

EXTRA-CURRICULAR ACTIVITIES

- Head Coordinator, E-Games, CGC Landran, 2019
- Volunteer, Blind School, Sector 26, Chandigarh
- Volunteer, Asha Kiran School for Disabled Kids, Hoshiarpur
- Member, TORCA, Mountain Biking Club