

GERSHOM SENEVIRATNE

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Ph.D. Student in Electrical and Computer Engineering | Researcher in Robot Navigation and Perception

EDUCATION

University of Maryland | College Park, Maryland

Ph.D. in Electrical and Computer Engineering

Aug 2023 - Present

GPA : 3.85

University of Moratuwa | Sri Lanka

B.Sc. (Hons) in Electronic and Telecommunication Engineering

Oct 2016 - Jun 2021

GPA : 3.97

RESEARCH EXPERIENCE

Graduate Research Assistant (Ph.D)

Motion Planning and Perception methods for Robot Navigation

Jun 2024 - Present

University of Maryland, College Park

Advisor: Dr. Dinesh Manocha

Technologies: Transformers, LLM, VLM, Cross-Attention, Representation Learning, Reinforcement Learning, ROS2, ROS, Pytorch, wandb

- Developed an algorithm for adaptive gait changes in quadruped robots that leverages cross-attention to dynamically fuse visual and time-series data, optimizing gait parameters for diverse terrain conditions."
- Developed autonomous robot navigation algorithms that interprets human commands using vision-language models to enhance navigation and behavioral compliance in outdoor environments.
- Developed an autonomous navigation algorithm that integrates vision-language models with proprioceptive sensing to assess terrain properties, improving navigational success rates in complex outdoor environments.

Undergraduate Researcher (Honours Thesis)

Behavioural and Local Planning and Maneuvering for Self-Driving [\[video\]](#)

Jan 2020 - Jun 2021

University of Moratuwa, Sri Lanka

Advisors: Dr. Peshala Jayasekara, Dr. Ranga Rodrigo

Technologies: ROS, CasADi, CARLA, Tensorflow, Keras, MPC, PID, Cubic Spiral Path planning, A* algorithm, CNN, FSM, LiDAR, ZED2 Depth Camera, Jetson AGX Xavier

- Developed a Finite State Machine to handle both Structured and Unstructured Environments.
- Implemented Path Planning using Optimization of Cubic Spirals.
- Implemented a Kinematic Model Predictive Controller for Lateral Control and a PID Controller for Longitudinal Control.
- Implemented parallel and perpendicular parking using Optimization Based Collision Avoidance.

Undergraduate Researcher (IEEE Signal Processing Cup 2020)

Anomaly Detection using Deep Reconstruction and Forecasting for Autonomous Systems [\[video\]](#)

Jan 2020 - May 2021

ICASSP

Advisors: Dr. Chamira Edussoriya, Dr. Dumindu Tissera

Technologies: ROS, Keras, Tensorflow, LSTM, GAN, CNN, AWS, Linux

- Created real-time Unsupervised Learning Algorithms integrated with ROS to detect anomalous scenarios in UAV systems.
- Developed a novel CGAN optimized CNN-LSTM Autoencoder based Forecaster to detect anomalies in time-series frontal camera data.
- Developed a LSTM Forecaster and an LSTM Autoencoder Reconstructor, to identify Instance and Transitional anomalies respectively, in time-series IMU data.

★ Secured the 2nd position globally in this international competition.

PUBLICATIONS

Under Review

- "CROSS-GAiT: Cross-Attention-Based Multimodal Representation Fusion for Parametric Gait Adaptation in Complex Terrains" [ICRA 2025]
G. Seneviratne, K. Weerakoon, M. Elnoor, V. Rajgopal, H. Varatharajan, M. K. M. Jaffar, J. Pusey, and D. Manocha(2024), arXiv:2409.17262 [\[paper\]](#)
- "BehAV: Behavioral Rule Guided Autonomy Using VLMs for Robot Navigation in Outdoor Scenes" [ICRA 2025]
K. Weerakoon, M. Elnoor, **G. Seneviratne**, V. Rajagopal, S. H. Arul, J. Liang, M. K. M. Jaffar, D. Manocha (2024), arXiv:2409.16484 [\[paper\]](#)
- "VLM-GroNav: Robot Navigation Using Physically Grounded Vision-Language Models in Outdoor Environments" [ICRA 2025]
M. Elnoor, K. Weerakoon, **G. Seneviratne**, R. Xian, T. Guan, M. K. M. Jaffar, V. Rajagopal, and D. Manocha (2024), arXiv:2409.20445 [\[paper\]](#)

Arxiv

- "Anomaly Detection using Deep Reconstruction and Forecasting for Autonomous Systems"
N. Bahavan*, N. Suman*, S. Cader*, R. Ranganayake*, D. Seneviratne*, V. Maddumage*, **G. Seneviratne***, Y. Supun*, I. Wijesiri*, S. Dehigaspitiya*, D. Tissera*, C. Edussooriya (2020), arXiv:2006.14556 [paper]

Theses

- "Behavioural and Local Planning and Maneuvering for Self-Driving" (Undergraduate Graduation Project)
G. Seneviratne*, V. Maddumage*, Y. Madhushanike*, R. Ranganayake*, S. Herath* (2021) [thesis]

Note : * denotes joint lead authors.

WORK EXPERIENCE

Software Engineer

Jan 2022 – Aug 2023

WSO2

Colombo, Sri Lanka

- Increased MFA capabilities of Asgardeo (CIAM IDaaS solution), by on-boarding the Duo Authenticator and sign-in with Microsoft, which increased the marketability of the product.
- Increased functionality and robustness of the Identity Server, an on-premise IAM solution, by separating audiences for Access Token and ID Token in OAuth2.0 flows.
- Contributed to the Architectural design and solutioning of a Consent Management System (Daisy) which will be deployed in the future.
- Ensured continuous functionality of the Identity Server 5.x/6.x through patches, and Asgardeo through product maintenance, which led to an increase in customer satisfaction.

Trainee Associate Electronics Engineer

Jun 2019 – Dec 2019

Zone24x7 (Pvt) Ltd.

Colombo, Sri Lanka

- Conducted inference capability benchmarking on an Android POS device's GPU/CPU, providing crucial insights into its performance and thereby offering the company valuable insights on the device's suitability for Federated Learning initiatives. Furthermore, a PoC Federated Learning solution was implemented on the Android device.
- Researched on deep-learning based segmentation techniques and developed a real-time hair segmentation solution. This was implemented on an Nvidia Jetson TX2.
- Increased the efficiency of a Pose Estimation DNN which used VGG-16 as the feature extractor, by replacing VGG-16 with MobileNet, allowing inference on Android devices developed by Zone24x7 and thus lowering costs for additional GPUs.

CERTIFICATIONS

Introduction to Self Driving Cars University of Toronto, Coursera	2020
State Estimation and Localisation for Self Driving Cars University of Toronto, Coursera	2020
Motion Planning for Self Driving Cars University of Toronto, Coursera	2020
Machine Learning Stanford University, Coursera	2019
Neural Networks and Deep Learning DeepLearning.ai, Coursera	2019

SELECTED AWARDS & HONORS

George Corcoran Memorial Award for Excellence in Teaching University of Maryland	2024
Dean's Fellowship University of Maryland	2023
Placed 2nd globally in the IEEE Signal Processing Cup ICASSP	2020
Dean's Honors List University of Moratuwa	2021
Mahapola Higher Education Merit Scholarship Govt. of Sri Lanka	2016

HACKATHON EXPERIENCE

IEEEExtreme 13.0 Programming Competition :	National Rank : 10, Global Rank : 201
AcesCoders v8.0 Programming Competition :	National Rank : 6
Google Hashcode 2020 :	National Rank : 6
MoraXtreme 5.0 Programming Competition :	National Rank : 10
MoraXtreme 3.0 Programming Competition :	National Rank : 5

SKILLS

Languages	: Python, Java, C++, Javascript, Matlab
Libraries	: Pytorch, Tensorflow, Keras, SciPy, Pandas
Software Tools	: ROS2, ROS, CARLA, Gazebo, MATLAB, Altium, SOLIDWORKS, Latex
Hardware	: Nvidia Jetson, STM32 Family, Atmel AVR, Altera DE2, Raspberry Pi
Technologies	: Maven, Gradle, Spring Boot, Jenkins, Git, ReactJS, HTML, CSS, Azure, Linux
Databases	: MYSQL, MSSQL, H2, Oracle, PostgreSQL
Soft Skills	: Problem Solving, Critical Thinking, Flexibility, Time Management, Clear Communication, Project Management, Dedication