

# GARTHIGAN KUMARASAMY

+94-765479683 | [garthigankumarasamy11@gmail.com](mailto:garthigankumarasamy11@gmail.com)



 Garthigan Kumarasamy |  Garthigan |  Garthigan |  Garthigan

Colombo, Srilanka

## OBJECTIVE

Research-driven Machine Learning Engineer with 1+ years of experience in Python, software development, computer vision, LLMs, robotics, and embedded systems. Skilled at bridging research and real-world applications, delivering scalable and intelligent solutions through advanced AI technologies.



## EXPERIENCE



- **SenzMate AIOT Intelligencies**  Nov 2023 - Present  
*Associate Machine Learning Engineer (Part Time)* Colombo, Srilanka
  - Developed and deployed a real-time people detection system using YOLO on the Nvidia Jetson Nano, achieving accurate detection with a processing speed of 50 frames per second .
  - Implemented TensorRT optimization in Python, enhancing detection efficiency and reducing inference time by 30 percentage, making it suitable for real-time applications in constrained environments.
  - Conducted performance analysis on people detection datasets, identifying key accuracy improvements and model optimization strategies.
- **Electrical Engineering Department , University of Moratuwa**  Jan 2025 - Ongoing  
*Visiting Instructor* Katubedda, Srilanka
  - Instruct and guide undergraduate students in hands-on robotics experiments, including sensor integration, motor control, and autonomous navigation.
  - Assist in designing and improving lab exercises related to robotics, ensuring alignment with modern automation and AI-driven technologies.

## EDUCATION

- **University of Moratuwa** May 2021 - May 2025  
*BSc.(Hons) in Engineering , Department of Electrical Engineering* Jaffna, Srilanka
  - GPA 3.60/4.00
- **Jaffna Hindu College** Jan 2011 - Aug 2019  
*High School* Jaffna, Srilanka
  - 3A in Advanced Level( Z-Score = 2.498 , Island Rank 198 , District Rank 19 )
  - 8A,B in Ordinary Level including English Literature

## PROJECTS

- **Enhanced Multimodal Human-Robot Interaction in Service Robots Using Generative AI** May 2024 - May 2025  
*Tools: OpenAI Whisper, YOLOv8, LLaVA-NeXT-Video, React, Python, PyTorch, BitsAndBytes quantization* 
  - Designed a modular multimodal interaction framework for service robots, enabling natural, context-aware, and emotionally intelligent communication using cutting-edge Generative AI technologies.
  - Integrated speech recognition, face recognition, emotion detection, and context-aware systems into robotic platforms, achieving seamless real-time interactions in laboratory environments.
  - Developed the architecture incorporating speech-to-text processing, visual emotion detection, and generative responses using models like LLaVA-NeXT-Video and YOLO.
  - Performed quantization and fine-tuning to adapt large language and vision models for resource-constrained hardware.
  - Implemented a fusion algorithm for multimodal input processing, enabling adaptive and human-like robotic responses.
- **Real-Time People Detection on Nvidia Jetson Nano [ SenzMate AIOT Intelligencies ]** Nov 2023 - Aug 2024  
*Python, DeepStream, Nvidia Jetson Nano, YOLO, TensorRT, , OpenCV, COCO Dataset, Image Processing* 
  - Developed a real-time people detection system for the Nvidia Jetson Nano, leveraging the YOLO model optimized for embedded environments.
  - Implemented TensorRT for model acceleration, achieving a detection rate of 50 frames per second and improving inference speed by 30 percentage for real-time application.
  - Created an efficient data preprocessing pipeline, using techniques like image resizing and histogram equalization, ensuring reliable detection across various lighting conditions and environmental settings.
  - Applied model quantization to optimize memory usage and increase processing efficiency, addressing the hardware constraints of the Jetson Nano platform.

- **Developed a Robust face detection and recognition system** Jan 2024  
*Tools: Python, OpenCV, Haar Cascade Classifier, SQLite, Machine Learning (Face Recognition Algorithms)*   
 ◦ Developed a high-performance face recognition system combining the YOLOv8 object detection framework and FaceNet embedding for robust and efficient identification.  
 ◦ Implemented FaceNet for feature extraction and high-accuracy face matching.  
 ◦ Achieved high detection accuracy with minimal latency in real-time scenarios.
- **Personal Portfolio Website** Apr 2025  
*Tools: Javascript, React.js, Tailwind, Vercel, Node.js*   
 ◦ Designed and developed a responsive personal portfolio website to showcase professional achievements, projects, and skills.  
 ◦ Integrated animations and dynamic elements for an engaging user experience.  
 ◦ Deployed Online: Hosted on Vercel.  
 ◦ Project Link: [\[Garthigan's Portfolio\]](#)

## SKILLS

- **Programming Languages:** Python, C++, Java, SQL
- **Data Science & Machine Learning:** TensorFlow, PyTorch, OpenCV, Scikit-learn, YOLO, Pandas, NumPy
- **Database Systems:** MongoDB, SQLite
- **Web Technologies:** HTML, CSS, JavaScript, Flask/Django, Rest APIs, React, Node.js
- **Cloud Technologies:** Microsoft Azure, Vercel
- **DevOps & Version Control:** Git, GitHub, Docker
- **Specialized Area:** Machine Learning, DeepStream, Computer Vision, Real-Time Embedded Systems, Natural Language Processing (NLP)
- **Mathematical & Statistical Tools:** MATLAB, NumPy, SciPy, Statistical Modeling
- **Other Tools & Technologies:** TensorRT, Nvidia Jetson Nano
- **Research Skills:** Data Analysis, Algorithm Implementation

## HONORS AND AWARDS

- **Runners-Up in Video Clip** May 2021  
*IEEE Signal Processing Society* 

## VOLUNTEER EXPERIENCE

- **Co-Director of Design** Jan 2023 - Jan 2024  
*IEEE Power and Energy Society*
- **Video Chair** Jun 2022  
*MERcon Conference 2022*
- **First Aid Instructor** 2013 - Present  
*St John Ambulance*

## EXTRA-CURRICULAR ACTIVITIES

- **President** 2018 - 2019  
*St John Ambulance , Jaffna Hindu College*
- **President** 2024- Present  
*Media Production and Promotion Team , University of Moratuwa*
- **Member** 2022-2023  
*Cricket Team , University of Moratuwa*
- **Member** 2018-2019  
*Cricket Team - Jaffna District U19 Cricket Team*
- **Champions** 2015,2016,2017  
*Provincial Level Badminton Championship - Northern Province*

## CERTIFICATIONS

- **Neural Networks and Machine Learning | Coursera** 2023
- **Deep Learning for Vision | Coursera** 2024
- **Generative AI for Everyone | Coursera** 2024
- **Udacity : Intro to TensorFlow for Deep Learning** 2024
- **Kaggle : Intro to Machine Learning** 2022
- **Kaggle : Python** 2022
- **Microsoft : C#** 2024
- **Google : Foundations of UX Design** 2022

## ADDITIONAL INFORMATION

**Languages:** English (Proficiency level), Tamil (Proficiency level)

**Interests:** Photography, Teaching, Designing, Video Editing

## UNIVERSITY MODULES

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Pattern Recognition  
Data Structures and Algorithms  
Applied Statistics  
Modular Software Development  
Operating Systems  
Project Management

Embedded Systems and Programming  
Intelligent Systems And Machine Learning  
Linear Algebra  
Neural Networks and Fuzzy Logic  
Machine Learning Fundamentals  
Database Management Systems

## RESEARCH PUBLICATIONS

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- **Towards Enhanced Multimodal Human-Robot Interaction in Service Robots using Generative AI.**  
*Garthigan, Tharmilan, Henoshan. Presented at World AllIoT Congress 2025, Seattle, May 2025.*

## REFERENCES

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1. **Dr. Logeeshan Velmanickam**  
Senior Lecturer Grade II,  
Department of Electrical Engineering,  
University of Moratuwa.  
Email: logeeshanv@uom.lk
2. **N.Nirojan**  
Tech Lead,  
SenzMate IOT Intelligencies,  
Email: nirojanbsc@senzmate.com