Bimsara Pathiraja

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EDUCATION

University of Moratuwa, Sri Lanka *August 2017 - Present*

BSc(Hons) Eng. - Electronic and Telecommunication Engineering **Cumulative GPA 3.81 / 4.2**

Relevant Courses

- Advances of Machine Vision
- Machine Vision (A+)
- Image Processing & Machine Vision (A)
- Linear Algebra (A+)
- Calculus (A+)
- Data Structures and Algorithms (A)

Maliyadeva College, Sri Lanka *Jan 2008 – August 2016*

GCE Advanced Level **Z–score: 2.5311**

Mathematics – A, Chemistry – A, Physics - A **Island Rank: 58, District Rank: 5**

Other courses

- CS224n: Natural Language Processing with Deep Learning - Stanford University website
- CS231n: Convolutional Neural Networks for Visual Recognition - Stanford University website
- Build Basic Generative Adversarial Networks (GANs) – Deeplearning.ai (Coursera)
- Deep Learning Specialization 5 courses - Deeplearning.ai (Coursera)
- Machine Learning – Stanford University (Coursera)

EXPERIENCE

PromiseQ, Germany Jan 2022 - Present

Machine Learning Engineer – Part-time (remote)

Worked on planning the next training iterations and improving the accuracy of object detection models. Also worked on synthetic data generation and reducing false positives of the detection system.

Creative Software, Sri Lanka *Oct 2020 – March 2021*

Intern – Machine Learning

Worked on applying semantic segmentation models for corrosion detection and object detection in industrial environments

Ceyentra Technologies, Sri Lanka *August 2017 - Present*

Intern

Worked on Mediturn-IoT, an IoT patient notifying system for medical centers using the MQTT protocol

TECHNICAL SKILLS

Programming	Python, MATLAB
Deep Learning	Pytorch, TensorFlow, Keras
Computer Vision / Image Processing	OpenCV
Game Development	Unity
Electronic Circuit Design	Verilog HDL
Firmware Development	Atmel AVR, Arduino
IoT	MQTT Lens, Postman, ESP8266, Raspberry Pi
Project Management	Git, GitHub, GitLab, Jira, Trello
Cloud Services	Azure, Google Cloud Computing
Other Software & Tools	Linux, SSH, Jupyter, LaTEX

PROJECTS

Self-Driving Car Stage 2 – Multi-Sensor based Dynamic Object Detection, Tracking, and Trajectory Prediction – University final year project *June 2021 – Present*

Worked on trajectory prediction and signal light identification for autonomous driving. We proposed Class-aware attention for trajectory prediction where the future trajectory of the target agent depends on the vehicle classes of both target and surrounding agents. The model ranked 12th position in the nuScenes trajectory prediction leaderboard and the 1st place which uses rasterized maps for the implementation. The paper was submitted at IEEE-Intelligent Transportation Systems Conference (IEEE-ITSC).

Corrosion Detection – Creative Software *October 2020 – March 2021*

Worked on semantic segmentation for corrosion detection using U-Net using Pytorch. We started with a literature review and implemented U-Net for the task. I worked on model writing, training, and hyperparameter tuning. The custom loss function I implemented improved the accuracy from 70% to 90% and my data augmentation method reduced false positives heavily. Due to the lack of publicly available data, I also worked on synthetic data generation using Unity-3D.

Object Detection in an industrial setting – Creative Software *January 2021 – March 2021*

The object detection model was implemented using Detectron2 to detect industrial objects like motors, gauges, pumps, and valves. I worked on data annotation and writing a custom data loader for the model training.

Garment Reconstruction – NeurIPS Challenge *April 2020 – October 2020*

Completed data preparation part for the garment reconstruction of the NeurIPS challenge using the CLOTH3D dataset and SMPL body parameters. The data preparation included subsampling of points, iterative non-rigid sampling, and implementing custom max pooling and I used PyMesh, Open3D, Meshlab, MeshlabXML, and Pytorch Gemoteric libraries.

Deep Surveillance System – SLIOT Competition *April 2019 – October 2019*

The Deep Surveillance System is an IoT device that is triggered by threatening sounds to activate the camera. The product included hardware, sensors, ML model, and web-based UI as well. We used the Urban8K sound dataset and TensorFlow for model training and implemented using Raspberry Pi, OpenCV, and Azure. I worked on model writing, training, and hardware implementation. DSS won 2nd place in the open category of the Sri Lanka IoT competition (SLIOT).

RESEARCH INTERESTS

Autonomous Driving, Deep Learning, Computer Vision, Robotics

ACHIEVEMENTS

- **Datastorm data science competition 5th place** – 2020
- **SLIOT Competition 3rd place** – 2019
- **iHack app development competition 3rd place** – 2019

PUBLICATIONS

- Bimsara Pathiraja, Shehan Munasinghe, Malshan Ranawella, Maleesha De Silva, Ranga Rodrigo, and Peshala Jayasekara, “Class-Aware Attention for Multimodal Trajectory Prediction”, - submitted to IEEE International Intelligent Transportation Systems (IEEE-ITSC) 2022

REFERENCES

Dr. Ranga Rodrigo – Head of Department
Department of Electronics & Telecommunication Engineering, University of Moratuwa, Sri Lanka
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Dr. Peshala Jayasekara – Senior Lecturer
Department of Electronics & Telecommunication Engineering, University of Moratuwa, Sri Lanka
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