

# Bimsara Pathiraja

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## EDUCATION

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### 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

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### 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

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#### 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

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### **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 12<sup>th</sup> position in the nuScenes trajectory prediction leaderboard and the 1<sup>st</sup> 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

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Autonomous Driving, Deep Learning, Computer Vision, Robotics

## ACHIEVEMENTS

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

## PUBLICATIONS

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- 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

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### **Dr. Ranga Rodrigo – Head of Department**

Department of Electronics & Telecommunication Engineering, University of Moratuwa, Sri Lanka  
ranga@uom.lk

### **Dr. Peshala G. Jayasekara**

Department of Electronics & Telecommunication Engineering, University of Moratuwa, Sri Lanka  
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