Sathira Silva

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I am an enthusiastic, ambitious final-year computer engineering undergraduate who has developed a number of problem-solving skills, eager to secure a Computer Vision RA / RE job opportunity.

Interests

Computer Vision | Natural Language Processing | Vision-Language

Education

University of Peradeniya **Nov. 2018 – Dec. 2023 [Expected]**

B.Sc.Eng(Hons) in Computer Engineering

GPA: 3.65 / 4.00

Class: 2nd Upper [Expected]

De Mazenod College, Kandana **Jan. 2003 – August 2016**

G.C.E. Advanced Level

Achievements

ACES Coders v9.0 | An inter-university algorithmic programming competition organized by of UoP **2022**

Rank - 2 / 100+

Team Name: bitLasagna

IEEEXtreme 16.0 | 24-hour global algorithmic programming competition **2022**

Country Rank - 27, Global Rank - 427 / 6373

Team Name: bitLasagna

ICDS Mini Hackathon | An inter-university Data Science Hackathon **2021**

Rank - 5 / 100+

Team Name: bitLasagna

IEEEXtreme 14.0 | 24-hour global algorithmic programming competition **2020**

Country Rank - 2, Global Rank - 68 / 7000+

Team Name: InterGreat

ACES Coders v7.0 | An inter-university algorithmic programming competition organized by of UoP **2020**

Rank - 14 / 100+

Team Name: bitLasagna

Projects

S2TPVFormer: Improving 3D Semantic Occupancy Prediction using Spatiotemporal Transformers [ongoing] **Mar. 2023**

Index Terms: Computer Vision, 3D Perception, Autonomous Driving *Group*

Technologies: Python, PyTorch, MMEngine

- **We're the first group** to contribute to improving TPVFormer, an already existing 3D SOP transformer architecture, by introducing **temporal consistency**.
- Identified the importance of Cross-View Hybrid Attention (CVHA) in exchanging temporal information across the TPV representation.
- Implemented temporal fusion mechanisms with CVHA on top of existing spatial fusion operations.
- Our lower parameter model gained a substantial **3.1%** improvement compared to the state-of-the-art in mIoU for 3D SOP in nuScenes public dataset.

Autonomous Vehicle Emulator System (Internship Project) **Dec. 2022**

Index Terms: Image Processing, Computer Vision *Group*

Technologies: Python, OpenCV, PyTorch, ONNX

- As a prototype for inferencing various autonomous driving trajectory prediction neural networks deployed on GPU accelerated hardware, implemented an emulator system in collaboration with the Vega Innovations Autonomous Vehicle team.
- Implemented a neural network deployment pipeline by converting PyTorch saved models to ONNX and generating optimized computational graphs using Nvidia libraries.
- Used ArUco markers and OpenCV to implement a location tracking system in order to generate waypoints for the prototype RC car implemented by the Vega team.

Automatic Highly-Degraded License Plate Reconstruction & Recognition **Mar. 2022**

Index Terms: Image Processing, OCR *Group*

Technologies: Python, OpenCV

- Implemented a command line tool using Python to detect and recognize Sri Lankan license plates from images.
- Used various classical image processing techniques including histogram analysis, image filtering and Fourier domain analysis to enhance the image quality.
- Used OpenCV to localize the license plate from the image and segment the characters from the license plate.
- Used OCR to recognize the characters from the segmented images.

Sobriety Detection using Mobile Phone Gyroscope Data **Jan. 2022**

Index Terms: Time-Series Forecasting *Group*

Technologies: Python, TensorFlow, Scikit-learn, NodeJS

- Analyzed gyroscope data by visualization using signal processing techniques.
- Data cleaning, preprocessing and feature extraction using various methods.
- Implemented machine learning and deep learning models to classify the data.
- Contributed to develop a Node server to collect and process the data.
- Contributed to develop a prototype mobile application to send the data to the server.

Conversational Transformer Chatbot **Jan. 2022**

Index Terms: Natural Language Processing, Transformer *Individual*

Technologies: Python, TensorFlow

- Implemented a Transformer model from scratch referring to the paper "Attention is All You Need" by Vaswani et al.
- Used the Cornell Movie-Dialogs Corpus to train the model.
- Used the model to build a conversational chatbot.

Remote Keyboard Tutoring System **Jul. 2021**

Index Terms: Embedded Systems *Group*

Technologies: ReactJS, NodeJS, MongoDB, Espressif-IDF, Arduino

- Designed a web-based embedded system to remotely and interactively learn/teach piano using an electronic MIDI keyboard.
- Designed the circuitry for the hardware components using Fritzing and 3D models using SolidWorks.
- Developed the front-end of the web application using ReactJS.
- Contributed to develop the back-end of the web application using NodeJS and MongoDB.
- Used Espressif-IDF to develop the firmware for the ESP32 microcontroller.

Experience

Computer Vision Research Engineering Intern **Dec. 2022 – Mar. 2023**

Autonomous Vehicle R&D Division *Vega Innovations*

- Contributed to the integration of a transformer architecture called NEAT into an autonomous vehicle system, by reviewing the paper and understanding its internals.
- Developed real-time computer vision solutions for autonomous vehicles on high performance GPU inference embedded systems (Nvidia DRIVE PX2 / Jetson TX2).

Teaching Assistant: CO222 (Programming Methodology) **May 2021 – Sep 2021**

Department of Computer Engineering *University of Peradeniya*

- Supervised weekly 2hr long online lab sessions.
- Created questions for online quizzes based on the C programming Language.
- One-on-one sessions with students to tutor them on the C programming language concepts.

Technical Skills

Languages: C/C++, Python, Java, HTML/CSS, JavaScript, SQL

Developer Tools: Visual Studio, VS Code, Eclipse, Jupyter Notebook, Android Studio

Technologies/Frameworks: OpernMMLab, PyTorch, TensorFlow, Bash Scripting, GitHub, OpenCV, TensorFlow, ReactJS, NodeJS, Jekyll

Certifications

Natural Language Processing (hons) **Jan. 2022**
HSE University *Coursera*

Algorithms on Graphs **July 2020**
University of California San Diego *Coursera*

Data Structures **June 2020**
University of California San Diego *Coursera*

Convolutional Neural Networks **Feb. 2020**
DeepLearning.AI *Coursera*

Neural Networks and Deep Learning **Jan. 2020**
DeepLearning.AI *Coursera*

Relevant Coursework

Data Structures & Algorithms

Software Methodology

Image Processing

Artificial Intelligence

Networking and Web Application Design

Operating Systems

Computer Architecture

Programming Methodology

Discrete Mathematics

Probability and Statistics

References

Prof. Roshan G. Ragel

Head of Department,
Department of Computer Engineering,
Faculty of Engineering,
University of Peradeniya, Sri Lanka

Dr. Isuru Nawinne

Senior Lecturer,
Department of Computer Engineering,
Faculty of Engineering,
University of Peradeniya, Sri Lanka