

Kalana Ratnayake

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Education

MSc in Computer Science by Research

UNIVERSITY OF MORATUWA

Sri Lanka

Feb 2020 - Dec 2021

- Research Title - Navigation planning for a multi robot system exploring an unknown environment supported by volumetric data

BSc Engineering Honours in Computer Science and Engineering

UNIVERSITY OF MORATUWA

Sri Lanka

Nov 2015 - Jan 2020

- Integrated Computer Engineering (ICE) Stream
- Second Class - Upper Distinction (GPA : 3.65/4.2)
- Dean's List in semester 3, 6, 8
- Final Year Project Title - Motion planner to explore unknown rough terrain

Publications, Patents and Designs

K. Ratnayake, "Navigation planning for a multi robot system exploring an unknown environment supported by volumetric data", M.S. Thesis, University of Moratuwa, Dec 2021.

K. Ratnayake, S. Sooriyaarachchi and C. Gamage, "OENS: An Octomap Based Exploration and Navigation System," 2021 5th International Conference on Robotics and Automation Sciences (ICRAS), 2021, pp. 230-234, doi: 10.1109/ICRAS52289.2021.9476592.

K. Ratnayake, C. Gamage, S. Sooriyaarachchi, "A Robotic Device for Autonomous Navigation in Unstructured Cluttered Environment", National Patent LK/P/21836, Jun. 28, 2021 (Patent Pending).

S. Sooriyaarachchi, C. Gamage, C. de Silva, S. Pallemulla, S. Dharmaratna, S. Ranathunga, A. Jayasena, **K. Ratnayake** and S. Kahawala, "Computer Vision Based Multi-spectral Automatic Fabric Quality Inspection Machine with Physical Color Referencing", National ID LK/P/13468, Apr. 09, 2021 (Pending).

S. Sooriyaarachchi, C. Gamage, C. de Silva, S. Pallemulla, S. Dharmaratna, S. Ranathunga, A. Jayasena, **K. Ratnayake** and S. Kahawala, "Method and Apparatus for Detecting Surface Defects", PCT International Application PCT/IB2021/052945, Apr. 09, 2021. (Pending).

S. Sooriyaarachchi, C. Gamage, C. de Silva, S. Pallemulla, S. Dharmaratna, S. Ranathunga, A. Jayasena, **K. Ratnayake** and S. Kahawala, "Method and Apparatus for Detecting Surface Defects", National Patent LK/P/21709, Apr 08, 2021.

Work Experience

Research Engineer

INTELLISENSE LAB, DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, UNIVERSITY OF MORATUWA

Sri Lanka

Jan 2022 - Current

- Developing low-level firmware and high level control software for controlling an Unmanned Ground Vehicle (UGV)

Software Engineer (FabVis)

INTELLISENSE LAB, DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, UNIVERSITY OF MORATUWA

Sri Lanka

Feb 2021 - Current

- Designed and implemented a client system for fabric defect detection and a server system for model training

Research Assistant (FabVis)

INTELLISENSE LAB, DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, UNIVERSITY OF MORATUWA

Sri Lanka

Feb 2020 - Jan 2021

- Designed and implemented prototype client side system including process pipeline and user interface

Visiting Instructor (Module CS4352 - Robotics and Automation)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, UNIVERSITY OF MORATUWA

Sri Lanka

Aug 2020 - Feb 2021

- Prepared and conducted a series of practicals (<https://github.com/IntellisenseLab/CS4352-Practicals>)

Research Intern

RESEARCH ANALYSIS PROJECTION AND DEVELOPMENT BRANCH, SRI LANKA ARMY

Sri Lanka

Jul 2018 - Dec 2018

- Developed a physical design and a mathematical model for the quadruped robot using virtual model control

Projects

Xavier : Development of a Unmanned Warehouse Management Robot System

STACK : ROS, PYTHON, C++, OCTOMAP, PLATFORMIO

Jan 2022 - Current

- Focuses on building a Warehouse Management Robot System that utilizes unmanned ground vehicles
- Currently working on developing firmware for low-level controller and developing control software based on ROS for high level controller

FabVis : Development of a Machine Vision based Fabric Quality Inspection System

STACK : PYTHON, TKINTER, SPINNAKER SDK, DARKNET

Feb 2020 - Dec 2021

- Focused on building a fabric defect detection machine for detecting localizing and classifying defects
- Contributed by designing and developing the prototype process pipeline, client system and server system

Navigation planning for a multi robot system exploring an unknown environment

STACK : ROS, PYTHON, C++, PCL, OCTOMAP

Mar 2020 - Dec 2021

- Focused on extending the motion planner to explore unknown rough terrain into a multi robot system
- Created a global map and evaluated it to identify unexplored regions and guides the robots to explore them

Motion Planner to Explore Unknown Rough Terrain

STACK : ROS, PYTHON, C++, RPI, OCTOMAP

Jul 2019 - Dec 2019

- Focused on building a navigation system that can discover and map a previously unmapped area
- Evaluated the map and calculated a path and velocity commands to explore unexplored regions

Stealth enabled Evasion possible Robotic Tracking System

STACK : MATLAB, SIMULINK, SOLIDWORKS

Jul 2018 - Dec 2018

- Focused on building a quadruped robot
- Designed model using SolidWorks
- Mathematical model was designed as a Virtual Model Controller and built using MATLAB

Bipedal Robot

STACK : SOLIDWORKS, PYTHON, ARDUINO

Jan 2018 - Jun 2018

- Completed as an initiation to robotics and to test out various basic robotics concepts
- Mathematical model used inverse kinematics, implemented using Python and was controlled using Arduino

PanViewer

STACK : PYTHON, C++, OPENCV, CUDA, VISUAL C++

Jun 2017 - Dec 2017

- Focused on building a panoramic viewer that can view outside of a moving vehicle
- Captured 3 video streams from 3 cameras and stitched them into a single video in real time

Nano-Processor

STACK : XILINX ISE, SCHEMATIC, VERILOG

Jun 2016 - Dec 2016

- Focused on building a 4-bit processor on a BASYS2 FPGA
- Designed, simulated and developed using Xilinx ISE and Tested on BASYS2 FPGA

Skills

Programming Languages Python, C++

Tools and Technologies ROS, Octomap, PCL, OpenCV, PlatformIO, Matlab, Simulink, SolidWorks, Xilinx, GitHub

Languages Sinhala (Mother Tongue), English (IELTS score 8.0)

Awards and Certificates

Excellent Oral Presentation of the session

2021 5TH INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION SCIENCES

2021

- For the paper titled "OENS: An Octomap Based Exploration and Navigation System"

Extra-Curricular

Robotics and ROS webinar series

ACM STUDENT CHAPTER OF UNIVERSITY OF MORATUWA

2020

- Webinar series focused on introducing students to Robotics and ROS
- Github repository - <https://github.com/IntellisenseLab/ROS-Introduction>
- Youtube sessions - <https://youtube.com/playlist?list=PLfOXX2viEAvHrDi8QMmOrAGCTWxzGnrt2>

Chairperson

CS&ES AGM AND GET-TOGETHER 2019, DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2019

- Organized the Annual General Meeting of Computer Science & Engineering Society for the year 2019

Organiser

ROBOGAMES 2017, IESL STUDENT CHAPTER

2017

- Organized the RoboGames Competition for school students and university undergraduates at Techno exhibition