Ajit Mutalik

+91-9769005479 | mutalik.ajit19@gmail.com | Github - Ajit-M | LinkedIn Profile

EDUCATION

B.E. Electronics and Telecommunication Engineering,
University of Mumbai | CGPA - 6.53/10 July 2015 - May 2019

EXPERIENCE

Research Assistant, Indian Institute of Technology, Kanpur - Aerospace Department Since Nov 2019
Principal Investigator - Associate Prof - Dr. Mangal Kothari

- Developing Autopilot stack for autonomous aerial vehicles using CDAC's VEGA microprocessor, based on RISC-V architecture.
- Integrating multiple sensors such as IMUs, magnetometer, barometer, and GPS sensor for attitude and altitude estimation using Extended Kalman Filter and working on integrating micro-ROS framework with FreeRTOS for providing an architecture to pass messages between tasks.
- Working on the localization of GPS-denied UAV using currently available satellite images.

Software Engineering Internship, Hexatech IT Ventures Pvt Ltd June 2016 - August 2016

- Developed a web-based Real-Time Appointment Scheduling module for patients, which was part of Hospital Management Software designed for Guru Nanak Hospital and Research Institute.

ACADEMIC PROJECTS

Mapping and 3D Reconstruction of Underground Coal Mine, August 2017 - April 2018
Mentor - Associate Prof - Mrs. Sanjivani Chakote

- Developed a robust four-wheel differential drive mobile robot for mapping the inaccessible areas of the underground coal mine.
- Studied and implemented dynamics and control of four-wheel differential drive mobile robot through 'Control of Mobile Robots' course by Prof. Magnus Egersted.
- Developed sensor fusion algorithm for fusing wheel odometers and IMU's for localization in the 2D plane.
- Used Gmapping for creating 2D Occupancy Grid Maps and Octomap for creating 3D Occupancy grid maps.

Tunnel Mapping and Surveillance System August 2018 - April 2019
Mentor - Associate Prof - Mrs. Sanjivani Chakote

- Developed a pan and tilt system to map the tunnel, monitor the tunnel's oxygen levels and harmful gases.
- Worked on Localization using visual odometry, used RTAB-Map for visual odometry, and Octomap for 3D Occupany Grid maps.
- Developed an attitude estimation algorithm using a 9-DOF IMU using Extended Kalman Filter.
- Implemented control algorithms for pan and tilt mechanism and worked on acquiring and filtering data from MQ-9 Carbon monoxide and methane sensor.

PERSONAL PROJECTS

- Lane Detection and finding curvature of the Lane.
- Traffic sign Classifier using LeNet Architecture.
- Semantic Segmentation of road using Fully Convolutional Neural Network.
- Cloning Driver Behaviour using Convolutional Neural Networks.
- Localization of a simulated car using Extended Kalman Filter.

RESEARCH INTEREST

Perception, Computer Vision, Simultaneous Localization and Mapping (SLAM), Sensor Fusion, Embedded Systems

AWARDS

Winner of Smart India Hackathon Hardware Edition - 2019 (Robotics and Drones Category)
Indian Institute of Technology, Kanpur - Media Coverage Link

Winner of First prize in e-Yantra Idea Competition (e-YIC) - 2018
Indian Institute of Technology, Bombay

Awarded First prize in Hardware Category of National Level Project Competition - Srijan 2018
Ramrao Adik Institute of Technology, Navi Mumbai

SKILLS

Programming Languages - C, Embedded C, C++, Python, MATLAB

Libraries and Frameworks - OpenCV, Robot Operating system (ROS), Point Cloud Library (PCL), Tensorflow, Keras, PyTorch, FreeRTOS, PX4

Hardware - Pixhawk, STM32, Arduino, Raspberry Pi, Nvidia Jetson TX2

Others - Gazebo, Git, LaTeX

PUBLICATIONS

- Mr. Ajit Mutalik, Mr. Vineet Menon, Mrs. Sanjivani C. Chakote, Dr. M. D. Patil, A Mobile Device for Mapping and Monitoring of Underground Coal Mine *(Patent)*, Filed in December 2018, Application No. - 201821049115

RELEVANT COURSEWORK

- Control of Mobile Robots by Prof. Magnus Egerstedt.
- Udacity's Introduction to Computer Vision by Georgia Tech - CS6476 by Prof. Aaron Bobick.
- Stanford University CS231n: Convolutional Neural Networks for Visual Recognition.
- Photogrammetry I & II by Prof. Cyrill Stachniss at the University of Bonn.

VOLUNTEERING EXPERIENCE

Technical Team Member, Computer Society of India, Mumbai — August 2015 - April 2017

- Developed a Web application during TECHKNOW 2016 College Tech Fest for theorganizing committee of Computer Society of India. It helped the organizer for managing the events and assigning the volunteers to a specific event. Every Volunteer would have his account displaying the assigned event, and it's status.
- Developed a Web Application for solving quiz, which was a part of an event during TECHMATE 2015 College Tech Fest. The contestant would fill in the necessary details for participating and solve the quiz. At the end of the quiz, the application would verify answers and display the result.