JAYDEEP GODBOLE

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EDUCATION

Indian Institute of Technology, Kharagpur *July 2017 - May 2021(Expected)*
Bachelor of Technology, Instrumentation Engineering (Major) **CGPA: 9.24** / 10
Department of Engineering

Bachelor of Technology, Computer Science and Engineering (Minor) **ACGPA: 9.67** / 10
Department of Computer Science and Engineering

RESEARCH INTERESTS

Robotics — Autonomous Ground and Aerial Vehicles — Computer Vision — Deep Learning — Visual Mapping

PUBLICATIONS

Jaydeep Godbole et al. (2019). A Prototype of an Intelligent Ground Vehicle for constrained environment: Design and Development In: IEEE International Conference on Control and Robots, South Korea - 2019 (Accepted) (pre-print available on request.)

PROJECTS

Autonomous Ground Vehicle Research Group February 2018 - present
Embedded Systems and Computer Vision Researcher
Guide *Prof. Dr. Debashish Chakravarty*, Dept. of Mining Engineering, IIT Kharagpur

- Team Autonomous Ground Vehicle (AGV) is a multi-disciplinary research group at IIT Kharagpur working on diverse modules of autonomous driving like Motion Planning, Computer Vision, Simultaneous Localization and Mapping (SLAM), Structure from Motion, Advanced Control Systems, Probabilistic State Estimation, etc.
- Developed the overall electronic architecture, embedded systems, localization, planning and vision modules for the robots Eklavya 6.0 (2018) and 7.0 (2019), for participating in the Intelligent Ground Vehicle Competition (IGVC) Autonav Challenge. The team placed **2nd** place out of about 40 teams worldwide in both the 2018 and 2019 versions of the event. **Design Report — Video**
- Developed traffic sign detection modules for autonomous driving using various features. Implemented HAAR and LBP features for region proposal. Designed a Resnet-based deep learning model for sign classification and implemented YOLO-based end-to-end models for traffic sign recognition.
- Worked on LiDAR point cloud registration using the iterative closest point algorithm
- Implemented geometric SFM algorithms for pose recovery and mapping using 3D point triangulation.
- Experienced in system integration of robots with multiple sensors and actuators. Experienced in working with IMUs, GPS, LiDAR, Stereo cameras, encoders, etc.
- Currently working on developing deep learning models for odometry and sparse point cloud generation using stereo images. Also working on exploration mapping in GPS denied environments using UGV and UAV, for localizing and mapping the environment together using intercommunication for data transfer.

Greendriod January 2018 - April 2018
Controls and Software Team Member **Design Report**

- Part of the silver-winning inter hall Hardware Modelling team which designed an autonomous lawn mower and seed sowing robot.
- Integrated the system using cheap computational resources like Raspberry Pi 2 and Arduinos.

- The robot was powered using LiPo batteries, which were powered by solar panels. I designed an algorithm for efficient charging of the robot by controlling its orientation with respect to the sun while considering the surrounding lighting conditions.

OSCAR January 2019 - April 2019
Embedded and Software Team Member **Design Report**

- Part of the gold-winning inter hall Hardware Modelling team which made an autonomous sewer cleaning robot.
- This problem statement was inspired by the condition of sewers in India, and the unhealthy conditions that the sewage cleaners have to face.
- Designed a waypoint generation algorithm for efficient sewage cleaning and disposal, using sewage segmentation from an image of the sewer using background subtraction.

Medical Image Analysis using Deep Learning July 2019 - present
Student Research Assistant
Guide Prof. Dr. Debdoot Sheet, Dept. of Electrical Engineering, IIT Kharagpur

- Currently working on identifying and segmenting different components of the human eye like legions, vessels, optic disc, etc from a retinal fundus image. Working on training a neural network on multiple smaller dataset, each with only few classes annotated and validating on a bigger, all inclusive dataset. The aim of this project is to aid the doctors in India for digital analysis of images and prediction of diseases/disorders on a scale that is not humanly possible.

OTHER ACTIVITIES

IEEE Winter Workshop December 2018

- Mentored an IEEE certified workshop on image processing for freshmen at IIT Kharagpur.
- Built an image processing robot capable of blob following using the library Opencv in C++.

Technology Robotix Society July 2017 - present

- Team member of the students society at IIT Kharagpur responsible for organization and conduction of robotics events at Kshitij, the largest techno-management fest in Asia.
- Organized robotics events in ROBOTIX 2018 and 2019, which saw a combined footfall of 500+ students from across the country.
- Mentored in a project on indoor mapping using RGB-D cameras. Video.

ACADEMIC ACHIEVEMENTS

- Achieved an All India Rank of 580 out of over 1400000 students who appeared for JEE Mains, 2017.
- Currently holding academic rank **3** in Instrumentation Engineering at IIT Kharagpur.

COURSEWORK

University: *Ongoing:* Machine Learning | Image Processing | Digital Electronic Circuits | Control Systems Engineering | *Completed:* Algorithms - I (Theory and Lab) | Programming and Data Structures (Theory and Lab) | Signals and Networks | Probability and Stochastic Processes
Online: Deep Learning (Coursera) | CS231n (Stanford) | Computer Vision (Udacity)

SKILLS AND TECHINICAL EXPERTISE

Programming Languages	C, C++, Python, Matlab
Libraries and Frameworks	ROS, Tensorflow, Keras, Pytorch, Gazebo, Git, OpenCV, Numpy, PCL
Hardware Platforms	Arduino, Raspberry Pi, Beaglebone
Softwares	Eagle, SolidWorks