Arvind Pandit

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Education

Indian Institute of Technology Dharwad (CGPA: 8.92) **Aug 2021 – July 2023**
MS (Research) in Control and Robotics: Guide - Dr.Ameer K. Mulla *Dharwad, Karnataka*

GEC, Surat - Gujarat Technology University (CGPA: 9.19) **Aug 2017 – June 2021**
Bachelor of Engineering in Electronics and Communication *Surat, Gujarat*

Research Interests

- Robotics and Automation
- UGVs and UAVs
- Computer Vision
- Autonomous Navigation
- Visual SLAM
- Embedded Systems
- AI and ML

Experience

RnD Engineer L2 **Sept 2023 – Present**
Indrones Solutions Private Limited *Navi Mumbai, Maharashtra*

- Computer Vision and its Applications, 3D reconstruction
- Drone Development and deployment

Research Intern **Apr 2023 – June 2023**
TCS Research & Innovation Labs *Bangalore, Karnataka*

- Vision-based navigation for Autonomous Mobile Robots
- 6DOF Moving Object Trajectory Tracking for Mobile Manipulator

Postgraduate Project Assistant **Aug 2021 – Aug 2023**
Indian Institute of Technology Dharwad *Dharwad, Karnataka*

- Collabrated on a project from **TiHAN** (Technology Innovation Hub on Autonomous Navigation, IIT Hyderabad) titled as **"Autonomous Aerial Navigation in Structure fire for victim detection"** and worked on the Aerial Navigation using a quadcopter with an LWIR camera and an IMU for pose estimation and mapping.
- Also contributed in the development of detcetion model for Human Detection using Thermal Images.
- Worked on the Simulation of Multiagent System, which included Quadcopters as agents and implemented different consensus laws.

Project Intern **May 2020 – Aug 2020**
Mind Mapperz Innovation Pvt. Ltd. *Delhi*

- Worked on the development of different learning kits such as Arduinobot and ESPbot.
- Work includes designing PCB for the different interfaces and providing software support for the kits.

Circuitry Head(Team GTU Robocon 2020) **July 2019 – June 2020**
GTU Robotics Club *Ahmedabad,Gujarat*

- To coordinate with the team and outpour the reliable, quality circuit, and programming
- PCB Designing and Development of Software for robots and Simulation

Projects

Visual Inertial Navigation for the Indoor GPS denied environment
Tools: ROS, Python, Gazebo **Aug 2021 – Aug 2023**

- Worked on position estimation of a quadcopter in an indoor environment using an IMU and Visual camera. (Monocular VINS)
- Using the feature tracking between consecutive images, the pose estimation of the body is obtained and fused with the IMU data to remove the scale ambiguity. After the posing estimation, a global optimization(Bundle Adjustment) is performed to reduce the estimation error.

Autonomous Navigation and Communication Robot(Final Year Project)
Tools: ROS, Gazebo, Python, C++,Arduino **Nov 2020 – June 2021**

- ANCRo is a ROS-based Autonomous Domestic Robot that can navigate from one place to another, avoiding obstacles. It also includes features like voice recognition, chats bot, and facial recognition.

- The CAD model was developed, and the software implementation was first performed in a Gazebo Simulation. Then, after the fabrication of the robot, it was ported to real hardware.

Solar Panel Cleaning Robot(Hackathon Project)
Tools: ESP32, Arduino, Fusion 360 **Feb 2020 – Aug 2021**

- Worked on the development of an Autonomous Solar Panel cleaning robot with an IOT-based user control
- An online model was developed which tracks the user data of cleaning frequency and predicts the frequency of cleaning based on past user data and weather conditions.

Publication(s)

- **Arvind Pandit**, Akash Njattuvetty, Ameer K. Mulla, "ROS-Based **M**ulti-**A**gent **S**ystems **CO**ntrol Simulation **T**estbed (MASCOT)", in *8th Indian Control Conference 2022*, Indian Institute of Technology Madras, India.(Accepted)

Technical Skills

Skills: Robot Operating System, CAD Designing, PCB Designing, Computer Vision, 3D Printing
Languages: Python, C/C++.
Developer Tools/Software: Gazebo, Mission Planner, Jupyter Notebook, Autodesk Fusion 360, EasyEDA, VS Code, Github, Latex, Docker, QGIS, Anaconda.
Frameworks/Libraries: NumPy, Matplotlib, OpenCV, Pytorch
Hardwares: Arduino, ESP8266, ESP32, Raspberry Pi, Jeston Boards, Pixhawk

Online Courses

- Visual Navigation for Flying Robots
- Python
- C/C++
- Deep Learning Specialization(4/5)

Competetions/Hackathons

- Participated as a team of 5 in the Smart Gujarat Hackathon and achieved 2nd position with a project titled "Autonomous Solar Panel Cleaning Robot" (July 2021).
- Participated in ABU Robocon 2020, achieved 1st runner-up position, and represented team India in International ABU Robocon 2020. (Dec 2020).
- Participated as a team of 4 in Mitsubishi Electric Cup 2020 with a project titled "Automatic Notebook Making Machine" (Feb 2020).
- Participated in ABU Robocon 2019 held at IIT Delhi and achieved 2nd runner-up position. (June 2019).

Workshops/Talks

- Presented and conducted a workshop on ROS (Robot Operating System) at the "Drone Design and Autonomous Navigation in Fire Rescue" workshop organized by FTRL and the Control & Robotics Lab at IIT Dharwad.
- Shared insights on ROS-based Multiagent System Control Simulation testbed in a talk at **ROSCON India 2023** .
- Delivered a lecture on AI and Computer Vision in drone applications at Government Polytechnic, Mumbai.