SUBHADEEP KOLEY

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LinkedIn-Github

SUMMARY

1. **Have 1+ years of experience of research in the fields of robotics and UAVs.**
2. **Developed a ROS framework for a decentralized drone swarm that supports leader-follower mode and independent missions, which was used to deploy a swarm of 5 drones**
3. **Developed network monitoring and ROS based congestion control tools for moving mesh networks**
4. **Currently leading a team of four students to build a swashplate-less helicopter.**
5. **Co-authored a paper on thermal runaway of Lithium-ion batteries that won the best paper award at a conference.**

EDUCATION

IIEST(Indian Institute of Engineering Science and Technology), Shibpur
BACHELOR OF TECHNOLOGY • MECHANICAL ENGINEERING — 2020-Present
CGPA : 8.54/10 ***Transcripts***

South Point High School, Kolkata
AISSCE (All India Senior School Certificate Examination) 2020 — 2020
Percentage obtained : 93.8%

TECHNICAL SKILLS

- **Programming Languages**: Python, C/C++
- **Operating Systems**: Ubuntu, Windows
- **Stacks and libraries:** PX4, OpenCV, Rospy, MoveIt
- **Software**: ROS, Gazebo, CoppeliaSim, MSC Adams, Matlab, Arduino IDE, Solidworks
- **Microcontrollers and microprocessors:**: ESP32, ATmega328, RaspberryPi 4B

RELEVANT COURSES

Robotics and mechanics: Modeling and control of Mechanical Systems**,** Kinematics of Mechanisms and Robots, Elements of helicopter aerodynamics, Dynamics of Machines and Vibrations, Numerical Methods in Engineering, CAD Modelling and Simulation Laboratory, Design of Power Transmission Elements, Design of Frictional Machine Elements, CNC Machining

Machine Learning: Supervised Machine Learning: Regression and Classification, Introduction to Reinforcement Learning

RELATED EXPERIENCE

SURGE research intern, SPIN Lab, Indian Institute of Technology, Kanpur — Kanpur, Uttar Pradesh
Mentor: Dr. Ketan Rajawat — May 2023 – August 2023

- Worked in a team of 10 people on decentralized drone swarms Project report
- Developed inter-drone **collision avoidance algorithms** and tested them in Motion Capture Video
- Developed a network monitoring and **congestion control tool for mesh networks** in drone swarms
- Surveyed and developed **ROS based decentralized leader election** framework and algorithms
- Developed a **ROS framework for swarm missions** with leader follower mode and private mission modes Video

Flight software intern, EndureAir Systems — Noida, Uttar Pradesh
Mentor : Dr. Kuldeep Kumar Dhiman — December 2022 – February 2023

- Worked on and explored the **PX4 stack**
- Developed a **range extension kit on Matlab** for a drop tank Github repo

Undergraduate researcher, IIEST Shibpur — Howrah, West Bengal
Mentor : Dr. Joydeep Bhowmik — May 2022 – Present

- Building a **swashplate-less helicopter** from scratch.
- Built a wireless data acquisition system for the wind tunnel using **ESP8266 and MQTT**
- Built a cheap **tachometer** using line sensor and Arduino Github repo

Research intern, Jadavpur University Kolkata, West Bengal
Mentor : Dr. Sourav Sarkar July 2022 – Present

- Built a system to simultaneously record temperatures at multiple points on a turntable as a part of a Tata steel funded research project to find cooling rates in rolling mill cooling beds in steel power plants. Github repo
- Built a setup for the detection of thermal runaway of lithium-ion batteries using heat and gas sensors that led to a paper that won the best paper award at a conference.
- Reviewed literature on efficient fire detection algorithms and early detection of lean blowout in a combustor and implemented them using **Python and OpenCV**

Project trainee, Brahmastra Aerospace Systems Remote
July 2022 – August 2022

- Worked on a project titled "Relationship between maximum camber and alpha vs coefficient of lift curve

PROJECTS

Swashplate-less helicopter
Pitch control of helicopter using lag and lead hinges July 2022 – Present

- Building the helicopter from scratch. Inspired from Tim Station's video and Research paper
- Used AS5040 magnetic rotary encoder to read the BLDC motor's shaft angle and send throttle inputs accordingly.
- Designed a base for the motor and a hub on solidworks and got them 3D printed. Photo
- Currently working on getting the main controller loop to work fast enough to accurately send cyclic throttle inputs to the motor to get prominent pitch.

ROS based decentralized leader election framework and algorithm Repository
Built for the decentralized drone swarm at SPiN Lab, IIT Kanpur June 2023 – August 2023

- A decentralized leader election algorithm has been developed that will allow the swarm to elect a new leader in the event of leader failure or unavailability. Page 15 of Project report

Fire detection using Computer Vision and suppression using robotic arm
Pitch control of helicopter using lag and lead hinges July 2022 – Present

- Wrote and tested a fire detection algorithm using Python and OpenCV. Algorithm overview
- Prototyped a hanging arm that will suppress the fire. Video
- Used a RaspberryPi 4B as the main computer and developed a test setup
- Working on designing and printing a more stable hanging arm and a controller for the same

High performance multi-point wireless temperature acquisition system
Tata steel sponsored project at Jadavpur University July 2022 – September 2022

- Used Python and Arduino IDE to program the system. System overview Repository
- The system is being used to monitor temperature changes in a turntable that simulates a rolling mill cooling bed in a steel plant.

PUBLICATIONS

1. Ajit Das, Saumendra Nath Mishra, **Subhadeep Koley**, Sourav Sarkar, Achintya Mukhopadhyay, Swarnendu Sen: "Early detection of thermal runaway of lithium-ion battery- an experimental study". IEEE 3rd International Conference on "Sustainable Energy and Future Electric Transportation" Best paper award

EXTRACURRICULAR ACTIVITIES

1. **Winner of Halla Bol**, a debate competition (an event under Azadi Ka Amrit Mahotsav) organized by the **Debating Society of IIEST Shibpur.**
2. Winner of **Debatable**, a debate competition (an event under Azadi Ka Amrit Mahotsav) organized by Team P.A.W.

POSITIONS OF RESPONSIBILITY

1. **Event head** at **LitSoc,** the Literature Society of IIEST Shibpur.