

# SHASHWAT MUDUGUR ASHOK KUMAR

West Lafayette, Indiana

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## EDUCATION

### Purdue University

Master of Science in Autonomy

West Lafayette, IN, USA

Aug. 2024 – Present

### Manipal Academy of Higher Education

Bachelor of Technology in Mechatronics, Minor in Electric Vehicle Technology

Manipal, Karnataka, India

Oct. 2020 – May 2024

Cumulative GPA: 8.54/10

## SKILLS & INTERESTS

**Technical Skills:** ROS2(Humble), NAV2, MicroROS, RTOS, CAD, 3D Printing, Git

**Programming Languages:** C, C++, Python, CMSIS, Embedded C, MATLAB, Simulink

## WORK EXPERIENCE

### Robotics Software Engineering Intern

Algobotix

May 2024 – July 2024

Bangalore, Karnataka, India

- Designed and developed a payload system for autonomous drone navigation, incorporating Raspberry Pi, IMU, battery, and converter, using CAD modeling and 3D printing techniques.
- Integrated MAVLink protocol with STM32 microcontroller for communication and control. [🐙 GitHub](#)
- Enabled ROS2 communication with PX4 flight controller through XRCE-DDS protocol to facilitate data exchange and real-time visualization. [🐙 GitHub](#)

### Research Intern

Robert Bosch Center for Cyber-Physical Systems, IISc (FOCAS Lab)

Jan 2024 – May 2024

Bangalore, Karnataka, India

- Designed a drone flight controller integrated with Micro ROS to interface with a Motion Capture System. Implemented fail-safe mechanisms utilizing onboard sensors for autonomous safe landing in case of communication loss. [🐙 GitHub](#)
- Conducted research and development on Prescribed Performance Control Algorithm for DC Motor, utilizing Teensy. [🐙 GitHub](#)
- Developed custom robot navigation with ROS2 Humble and NAV2, using SLAM and Lidar for mapping and path planning. [🐙 GitHub](#)
- Worked on an exhibit project focusing on ball catching with an RX-200 Serial Manipulator, leveraging OpenCV for vision processing, and integrated ROS Gazebo and RVIZ for simulation and visualization.

### Vehicle Engineering Intern

Ola Electric

June 2023 – Aug 2023

Bangalore, Karnataka, India

- Conducted simulations of 2W and 4W models using Gamma Technology Software to assess regenerative braking performance using supercapacitors.
- Designed a flight controller that utilizes PID control algorithms and integrates an MPU-6050 IMU sensor for precise drone stabilization and control.

## RESEARCH EXPERIENCE

### E-Powertrain Engineer

Moto Manipal – E-Superbike Team

Nov 2020 – May 2023

Manipal, Karnataka, India

- Designed the wiring harness of an electric superbike powered by 10kw PMSM Motor. Worked on calculation, design, and manufacturing the Li-ion battery pack also worked on MATLAB and Simulink for powertrain modeling and range calculations.
- Developed an interactive dashboard using Python and RaspberryPi3 and collected data from the motor controller using CAN (Controller Area Network) along with data logging system for monitoring and analysis through ESP32. [🐙 GitHub](#)

### Electronics and Energy Systems

Battery-Supercapacitor Hybrid System Research

March 2021 – Feb 2023

Manipal, Karnataka, India

- Explored methods to enhance electric vehicle range and battery life by integrating supercapacitor with battery and reviewed Adaptive Fuzzy Logic Controller for energy management.
- Delivered a presentation titled “Investigation into the Performance of Battery Supercapacitor Hybrid Storage System” at the prestigious Interdisciplinary Conference on Healthcare and Technical Research (ICHTR) International Conference in November 2021.

## LEADERSHIP & ACTIVITIES

**Team Leader at MotoManipal:** Emerged victorious in the Electric Bike Design Challenge organized by Mechatron Motors. Secured third place in the National Online E-Bike Design Challenge hosted by the Fraternity of Mechanical and Automotive Engineers.

**Sports Captain at New Horizon Public School:** Demonstrated effective leadership skills in organizing and promoting various national and state-level sports activities and events, enhancing sports and fitness within the school community.

**Captain and Team Member of Karnataka State Basketball Team:** Participated in the U-16 and U-19 age category tournaments.