

Students' Diary

When my second semester was about to end, we were informed about the one-month visit of Prof Srikanth Saripalli (Director of CANVASS lab at Texas A&M). Fortunately, he also took the Sensing and Planning for Autonomous vehicles course during this period. All his lectures were thought-provoking and put all my understanding of Autonomous vehicles in proper perspective. Personal interactions with him elucidated the path I should take to excel in this field. Working with people who own startups, making cool stuff to work for the first time, meeting people from different fields, fenced in with Autonomous vehicles. I could not have asked more for my 20s.



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A great experience that drastically enhanced my life.

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Being one of the first students to join the pioneer batch of India's first Master's program in the domain of Autonomous Vehicles brought me closer to fulfilling my childhood passion for working with automobiles, which became even more exciting. I chose Mechanical Engineering as my Bachelor's degree at IIT Dharwad from 2016 to 2020 and investigated every nook and cranny of automobiles. I decided to pursue a career in the automotive industry after working with Volvo cars in 2017 and interacting with numerous industry professionals.

Along with my primary interest, I am constantly researching new technologies and advancements. Had worked on numerous projects in the Robotics domain using IoT and Cloud. Machine learning was another topic that piqued my interest while working on research projects at IIT Bombay.

The COVID-19 Pandemic affected us all in different ways. My seat in the Masters of Automotive Engineering program at RWTH Aachen, Germany, was declined because they did not accept international students, and my fallback job offer was also revoked. When exploring alternatives, this new Smart Mobility program at IIT Hyderabad appeared like a godsend. This was an obvious move where I could combine all of my passions into one large venture and participate in this exciting initiative. My first interaction with our professors was during my interview selection process. The encounter sparked my curiosity about working here. Everything had to be built from scratch. It was an excellent opportunity to display my enthusiasm. Had done various courses like Autonomous Navigation, Machine Learning, Introduction to UAVs, Computer Vision, Intelligent Transportation Systems, Sustainable Energy, etc. Dr Ashok Kumar Pandey's Vehicle Dynamics class is one of my favourites. I chose to work under him for my Thesis because he worked in one of my favourite fields. He was the one who encouraged me to pursue my passion for ground vehicles, both personally and professionally.



Along with an impressive academic record, I was offered an internship at Mercedes-Benz R&D in the Autonomous Driving field, where I not only gained hands-on experience with the technologies' real-world application but also built safety frameworks for several subsystems in AD and ADAS. As part of innovation developmental milestones, I also created features for Mercedes' infotainment system.

Thanks to Dr Rajalakshmi, TiHAN's Project Director, and my Faculty Advisor, for her unwavering commitment to seeing TiHAN expand at an exceedingly quick speed that was often difficult to keep up with. During my time at TiHAN, I was appointed as the overall MTech representative, responsible for the coordination and organization of not just key research programs and clusters but also major events. Thanks to all of my Smart Mobility friends and colleagues who believed in me and without whose help I would not have been able to succeed in this position.



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Thanks to DST for sponsoring this NMICPS project to establish a technological hub for autonomous navigation, which allowed us to do not only theoretical research but also hardware implementation. In such a short period of time, the TiHAN testbed was completed at a rapid pace. It is a first-of-its-kind, cutting-edge Testbed for Autonomous Navigation (Aerial/Terrestrial). Proving Grounds, Test tracks, Mechanical integration facilities such as Hangers, Ground control stations, Anti-drone detection systems, State of the art Simulation tools (SIL, MIL, HIL, VIL), Test tracks/circuits, Road Infra - Smart Poles, Intersections, Environment Emulators such as Rainfall Simulators, V2X Communications, Drone Runways & Landing area, Control Test centers are among the facilities.

I would be eternally grateful to my TiHAN mentor, Dr Akshay Ramesh Jadhav, Post Doctorate Fellow, Department of Electrical Engineering, for his vast technical knowledge in almost everything while also consistently guiding me in newer methodologies and technologies. In January 2022, I began working under him. I was a member of the Connected and Autonomous Vehicles (CAV) lab, where I worked on practically every area of Self Driving Vehicles, from sensing, localization, and path planning, through actuation, control, and safety.

I was involved in the development of an autonomous bicycle, which is the need of the hour for campuses like IIT Hyderabad as well as for Indian conditions in general. The electric bicycle can now drive itself to and from the user, allowing for last-mile connectivity and encouraging ride-sharing. An application was created to summon and track the bicycle to the user's position in real-time.

Next, I worked on establishing basic navigation algorithms using GPS and a camera on a smaller car in the testbed. There was a lot of optimisation done here. I was able to work on industry-grade equipment and gear that I would not have been able to do otherwise. It was a fantastic research experience in the field of autonomous driving, and it is the reason I am where I am now.

My main objective was to create self-driving campus transportation. In this project, I was engaged in developing Autonomous Shuttles from scratch. We modified a brand new electric 14-seater shuttle to follow commands. Drive-by-wire is what we call it. After command-based testing of various scenarios, we began integrating communication and inter-program divulgence protocols. An in-vehicle controller was equipped to accommodate low-level actuations, as well as numerous sensors such as GPS, IMU, Camera, and LIDAR for various algorithms responsible for making vehicle decisions. A Navigation technique was constructed using numerous of these algorithms to move the vehicle given the destination, just like a human-driven, but without a driver. With increased robustness, we expect such autonomous vehicles to gradually replace the regular shuttle service on IITH's major routes to transport fraternity members in and around campus.

Finally, I want to thank all of my project colleagues and staff for their assistance, whether it was with their codes and algorithms through changing batteries in vehicles. I am currently working as a Senior Engineer in Autonomous Driving at Robert Bosch. I would undoubtedly miss IITH and TiHAN, which were such an important part of my life. What I assumed was a placeholder turned out to be a great experience that drastically enhanced my life.

