



A COLLABORATION OF ASTROWING MNNIT AND TSAW.



BUILDING ON IMAGINATION



**INTRODUCTION TO
AUTONOMOUS VEHICLES
WITH CARLA AND
IMITATION LEARNING**



ABOUT US

Robotics Club MNNIT is a diverse group of robotics enthusiasts from all the college departments, which runs under the umbrella of the Student Activity Centre of MNNIT Allahabad.

Established in 2016, we are mainly concerned with building robots for academic purposes, competing at national events, or even building just out of imagination. This puts us in frequent contact with a plethora of software, hardware, and technologies, like Computer Vision, Simulation Softwares (Gazebo, Pybullet, etc.), CAD Softwares, ROS, devising algorithms, path planning, Machine Learning, Microcontrollers, Kinematics to name just a few of many. Since its creation, this club has seen the completion of hundreds of projects, participated and won accolades in multiple national-level events, and organized various workshops with a decent footfall.

Working closely with the industries, our people regularly acquire lucrative tech giants packages, internships in IITs, and various tech companies.

Our club has also been the birthplace of a startup TSAW in the drone sector, gaining ground in the field and as a company.

We have a team of friendly experts equipped with all kinds of tutorials and workshops along with a compelling workspace to make you an integral part of this rapidly expanding world.

Jigyasa

“Tell me and I forget, teach me and I may remember, involve me and I learn.”

-Benjamin Franklin

Jigyasa is the workshop venture of the Technical clubs of MNNIT, namely Robotics, Aeroclub, and Astrowing, in collaboration with TSAW, a fully functional drone startup that emerged from our clubs. We are motivated by the desire to supplement education with the present-day industry requirements, making the participants future-ready with their skills and a problem-solving mindset.

The workshops under Jigyasa comprise various projects, activities, and interactive sessions, which will help you understand the most difficult concepts in the most comfortable manner. Hence, by emphasizing innovation and imagination, these workshops will instill in your minds a profound scientific temperament and fascination towards technology.

OVERVIEW

“Thousands of accidents happen everyday, and almost all the time, it’s a human error”

Autonomous vehicles aren’t a dream any longer; they’re an essential part of a smart society. AI has revolutionized autonomous vehicles so much that in the coming future, driving wouldn’t be a necessary skill. We would be looking into all the aspects of an autonomous vehicle, understanding the ‘ perception, planning and control’ stack of a self-driving car, and help you acquaint with everything that goes inside this seemingly daunting blackbox. Since you can’t practice on a real vehicle, we will also introduce you to CARLA: a state-of-the-art simulator. By the end of this workshop, you will be proficient enough to write your own codes to automate a vehicle.

Prerequisites:

None

Target Audience:

Anyone Interested

WORKSHOP

SCHEDULE

DAY 1:

- INTRODUCTION TO AUTOMATION
- GETTING STARTED WITH AUTONOMOUS SYSTEMS UNDERSTANDING PERCEPTION, PLANNING AND CONTROL
- INTRODUCTION TO SELF DRIVING CARS
- PRESENT STATE OF SELF DRIVING CARS
- INTRODUCTION TO COMPONENTS OF AUTONOMOUS VEHICLES-LOCALISATION,MAPPING,PATH PLANNING AND CONTROL
- INTRODUCTION TO ML AND AI
- AI IN AUTONOMOUS VEHICLES

DAY 2:

- AI IN AUTONOMOUS VEHICLES(CONTD.)
- UNDERSTANDING LOCALISATION
- GNSS IN DETAIL, ODOMETRY AND KALMAN FILTER
- UNDERSTANDING MAPPING
- UNDERSTANDING THE SENSORS IN AUTONOMOUS VEHICLES
- UNDERSTANDING PATH PLANNING
- SOME BASIC PATH PLANNING ALGORITHMS

DAY 3:

- INTRODUCTION TO CONTROL
- UNDERSTANDING BEHAVIOUR CLONING
- INTRODUCTION TO CARLA-AUTONOMOUS DRIVING SIMULATOR
- CONTROL PROBLEM IN CARLA
- BEHAVIOUR CLONING IN CARLA
- HOW TO DEVELOP ON SKILLS GAINED: ASSIGNMENTS AND RESOURCES

OUR OTHER WORKSHOPS

ASTRONOMY

- Beginner's walkthrough of Astronomy
- Diving Deeper into the Cosmos
- Astronomy from an Engineer's Perspective
- Establishing an Astronomy Club

AEROSPACE

- Introduction to Flight
- A peek into the Aerospace Sector
- Getting Started with Drones
- Drone Automation
- Establishing an Aeroclub in your College
- First step to Aerodynamics with OpenVSP, F360 and Ansys

GENERAL

- Rise and Program
- Think3D: Fundamental of 3D Modelling and 3D Printing
- Learn3D: Introduction to CAD and 3D Printing

ROBOTICS

- Kickstart your journey into Robotics
- Introduction to Artificial Intelligence
- Introduction to Kinematics in Robotics using PyBullet
- Kit-up to Set-up: To Establish a Robotics Club
- Build your own Robot
- Introduction to Simulation Software in Robotics
- Stepping into Electronics and Arduino
- Introduction to Computer Vision with Raspberry Pi
- Introduction to Autonomous Vehicles with CARLA and Imitation Learning
- Internet of Things (IoT)

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