



A COLLABORATION OF ASTROWING MNIT AND TSAW.



BUILDING ON IMAGINATION



**INTRODUCTION TO
COMPUTER VISION WITH
RASPBERRY PI**



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

"Everything begins with a vision"

A machine without computer vision is like a human without eyes. Computer vision enables Sophia to recognise who she is talking to, and self-driving cars to recognise roads, traffic signs and other cars on the road. Thus, computer vision, a fairly advanced field, is a must for every engineer's portfolio. In this workshop, we will cover this marvel of technology from scratch: introduce the basics, and gradually move on to the deeper concepts, so you can use computer vision for your own applications.

We will also introduce you to Raspberry Pi (a mini computer) which will be your companion for computer vision and robotics journey.

Lots of learning lies ahead, you need to broaden your vision.

Prerequisites:

None

Target Audience:

Anyone Interested

WORKSHOP SCHEDULE

DAY 1:

- INTRODUCTION TO COMPUTER VISION
- HOW A COMPUTER INTERPRETS AN IMAGE
- APPLICATIONS OF COMPUTER VISION
- WHAT IS IMAGE PROCESSING
- INTRODUCTION TO `OpenCV`
- `OpenCV` IN PYTHON
- EXPLORING AN IMAGE USING `OpenCV`
- INTRODUCTION TO RGB, HSV AND OTHER MODULES

DAY 2:

- COLOR DETECTION IN `OpenCV`
- IMAGE FILTERING AND MORPHOLOGICAL OPERATIONS
- SMOOTHENING AN IMAGE
- IMAGE SEGMENTATION
- CONTOUR DETECTION
- SHAPE DETECTION IN `OpenCV`
- 10 PROJECTS YOU CAN DO ON `OpenCV` IN PYTHON

DAY 3:

- WHAT IS RASPBERRY PI (RPI)
- RPI VS ARDUINO
- APPLICATION OF RPI
- GETTING STARTED WITH RPI
- INSTALLING OPERATING SYSTEM IN RASPBERRY PI
- EXPLANATION OF GPIO PINS AND OTHER HARDWARE ON PI
- INTERFACING CAMERA AND OTHER SENSORS TO RPI
- `OpenCV` WITH RPI
- 10 PROJECTS YOU CAN DO WITH RPI
- HOW TO DEVELOP ON SKILLS GAINED: PROJECTS 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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