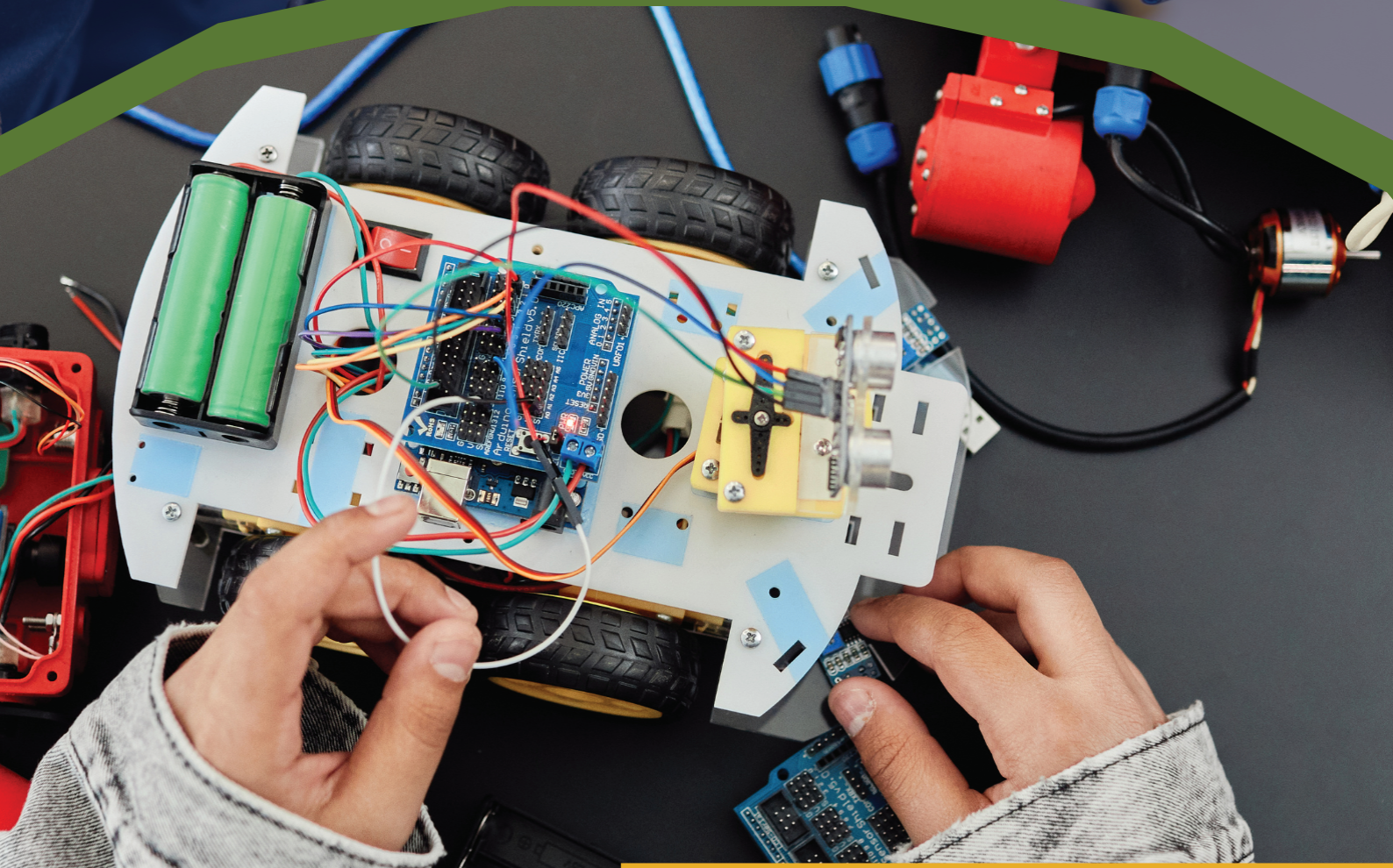



AI & ROBOTICS WINTER BOOTCAMP 2023



 SMME, NUST, H-12

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 www.ncai.pk

AI & ROBOTICS WINTER BOOTCAMP 2023

A Meaningful AI Winter Break!

Course Description

Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems; the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. Given its positive impact on the national economy, the technology is being implemented by countries across the world in various sectors thus being regarded as part of the fourth industrial revolution.

With global advancement, Pakistan as well is on the brink of an AI revolution. However, the shortage of AI skills is seen as a major barrier to the pace of the technology's adoption in Pakistan which is the single biggest hurdle to overcome in terms of achieving the necessary level of AI implementation across business operations in various sectors. To be concise, there is a huge demand in Pakistan already exists for AI skilled laborers. The shortage of talent is slowing down hiring – and without new AI hires, organizations simply cannot press forward with their AI strategies. To overcome such challenges and open new vistas of development-related AI applications in Pakistan, human resource management and capacity building need to be prioritized. Fostering talent and nurturing the expertise of youth in the field of artificial intelligence need to be done at a larger scale at all levels across the country.

Keeping this in view, NCAI combines their respective strengths to create opportunities to scale up skill development of AI in Pakistan and therefore is offering AI & ROBOTICS Winter Bootcamp 2023 for school-going students. We are aiming at a project-based learning experience taught by AI experts from the National Center of Artificial Intelligence (NCAI) in collaboration with AI Hive where no prior coding experience is required.

Learning Outcomes

- Build an impressive AI product for your college admission portfolio in the winter.
- Practical learning experience with live project work and demonstrations.
- AI based products demonstration in various AI Labs across NUST.
- Attend AI sessions with AI Experts.
- Tour to growing AI startups and data centers.
- Become a part of AI Community.
- Practical assignments at the end of every session.
- Experience various tech roles and learn how to make informed career decisions.

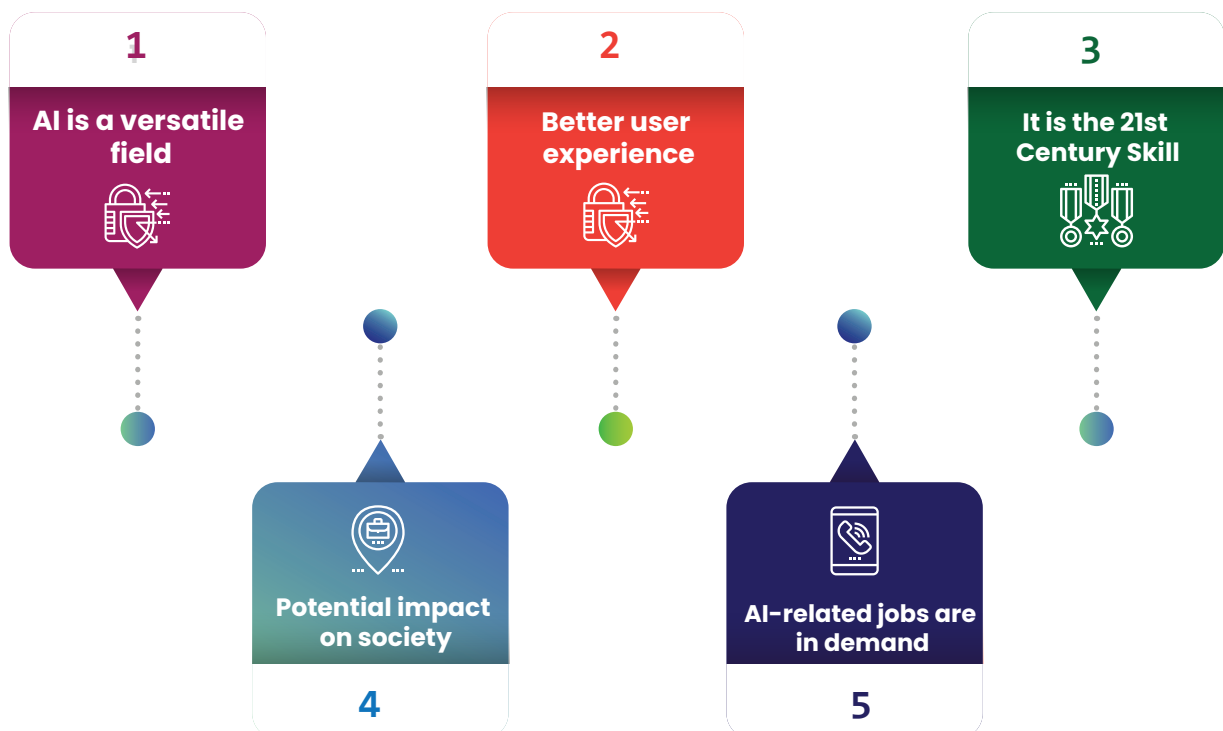
Program Overview

AI & Robotics Winter Bootcamp 2023 is designed to equip learners with knowledge regarding AI, develop a better understanding of their strengths as humans, identify their values, develop the skills needed to solve real problems, develop an interest in learning emerging technology, and put AI to good use. This is a project-based learning experience for the age of 14-18 taught by AI experts from the national hive of AI in Pakistan– NCAI in collaboration with AI Hive where no prior coding experience is required. Top AI Experts of Pakistan will be invited to share their success stories and students will be taken to technology facilities across the National University of Science and Technology (NUST) and in various NCAI Labs and world-class data centers.

Apart from the interactive activities, the program includes quizzes, programming assignments, and experiential learning modules. There is an equal emphasis on theory and practical, with numerous exercises and projects scattered throughout these two weeks. Learners who register for the program and successfully complete all modules receive a recognized **AI & ROBOTICS WINTER BOOTCAMP 2023** from NCAI, NUST along with learning toolkits.

Why Choose AI?

Here are 5 reasons why taking Fun AI Winter Camp is important



You'll Become Better At:

-  Developing creative thinking and problem-solving skills
-  Broadening the interests with all that is possible with AI
-  Becoming more data fluent and better analyze data
-  Learning decision-making and collaboration skills
-  Finding out how to better navigate and consume technology
-  Becoming more conscious creators and developers with a wilder worldview
-  Picking up new skills from the comfort of your home



Duration & Timing:



5-weeks

Tuesday &
Thursday



From 3:00pm
to 6:00pm

Provided Duration & Time is Tentative

Message from Chairman/CPD, NCAI



Artificial Intelligence is widely regarded as the electricity of tomorrow. It is set to disrupt the global players, how we live, work, commute, and how we maintain our relationships. Growth in jobs in sectors, particularly in the services sectors, financial, transportation, communications, logistics, leisure, and entertainment will be regularized because of the overall growth of economies as well as economic opportunities derived from the technological uproar in the field of AI.



Pakistan has its strengths, weaknesses, challenges, and characteristics. It's the sixth most populous country in the world with 220 million citizens. It has extraordinary young human power with about 65% of the population under 30 years of age, which can be trained and harnessed for the advancement of AI sector in Pakistan as well as to gain employment share for Pakistan in the international world. Given digitization and automation of various departments in Pakistan as well as the evolving global technology scene, AI is the most critical skill that is needed by today's professionals as well as young graduates to keep their qualifications relevant for jobs in the present era.

To overcome various challenges and open new vistas of development in AI, human resource management and capacity building needs to be prioritized. Fostering talent and nurturing the expertise of people in the field of artificial intelligence and robotics need to be done at a larger scale at all levels across the country.

Keeping this in view, AI Hive has designed the AI & Robotics Winter Bootcamp in collaboration with National Centre of Artificial Intelligence (NCAI), aiming at giving the participants a platform to learn Artificial Intelligence firsthand and explore applications and cases of AI along with better understanding of AI concepts and terms with expert advice exposing them to real life application of AI in different areas underlining the issues and preparing them to learn and grow in the field of AI.



Course Content and Delivery Plan of 30 Credit Hours

Module 1 – AI Fundamentals

Intro to AI & Python Programming

- What is human intelligence?
- What is artificial intelligence?
- Advantages of artificial intelligence.
- Introduction to Python and its basic programming concepts
- Understanding of AI tools & software

Overview of Pictoblox

- Introduction to programming and PictoBlox.
Getting familiar with Pictoblox's interface

Module-1: Lab Assignment/ Practical Activity

Students will make their own stories come to life by adding dialogue and new scenes to the animation

Project Name: Backdrop, costume & animation pictoblox project

- Single Motor Car
- Traffic light
- Maze following robot



Module-2: AI Applications & Techniques

1. Applications of AI

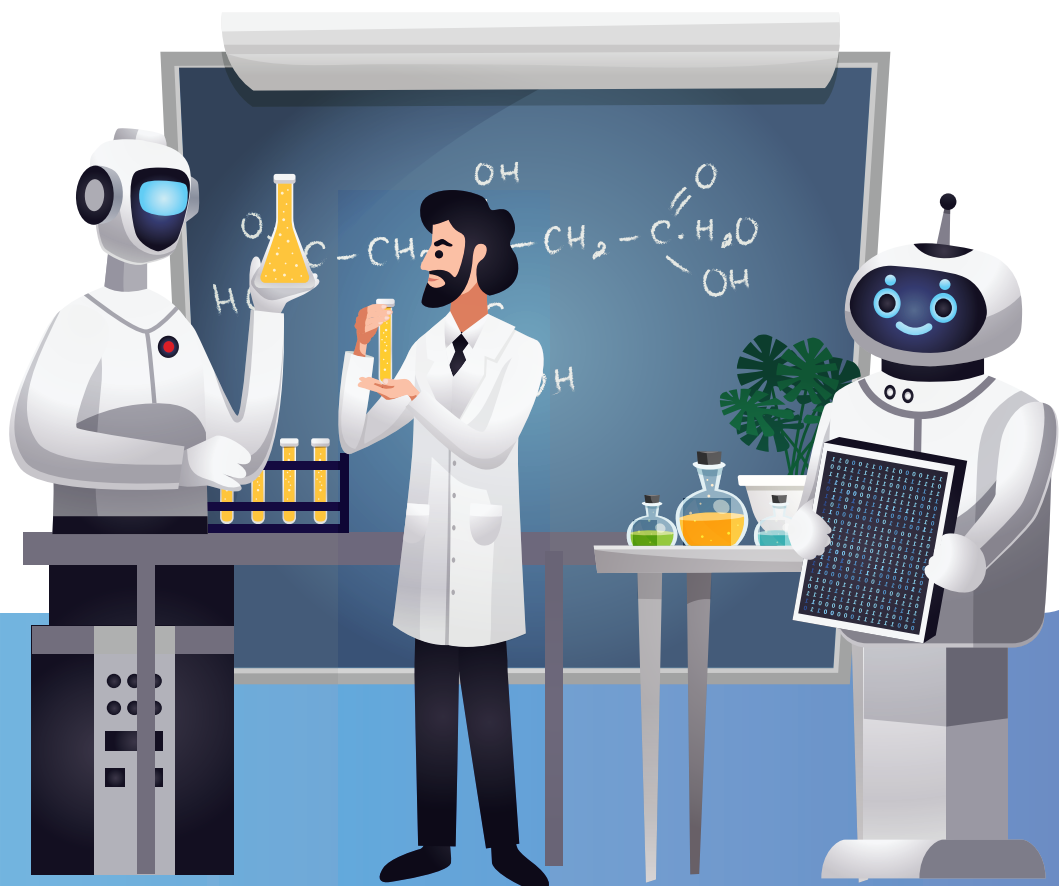
- What are applications of in different domains of life?

2. Face Recognition

- Understanding face detection from an image and how facial recognition works.

Module-2: Lab Assignment/ Practical Activity

Visit to Intelligent Field Robotics Lab, NCAI, NUST: Demonstration of the various lab's projects.



Module-2: AI Applications & Techniques

1. Speech Recognition

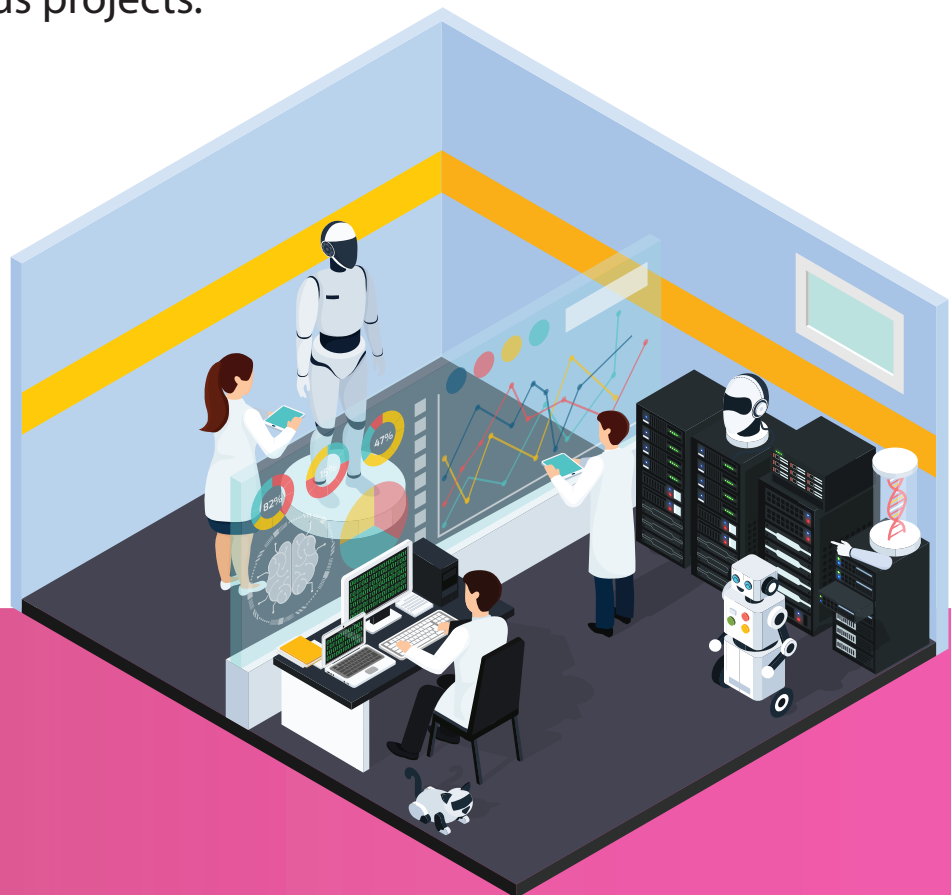
- How does speech recognition work? Using speech recognition in various projects.

2. Optical Character Recognition System

- What is OCR? How to recognize text from an image?
Understanding the functionality of OCR

Module-2: Lab Assignment/ Practical Activity

Visit to Deep Learning Lab, NCAI, NUST: Demonstration of the various projects.



Module-2: AI Applications & Techniques

1. Assessment no 1

2. Computer Vision

- Understanding human vision, computer vision, and its applications.
- How self-driving cars work?
- Artificial Intelligence extension and computer vision.
- Applications of computer vision.

★ AI Expert Speaker Session/ Motivational Session

Pakistan's Top AI Expert Speaker



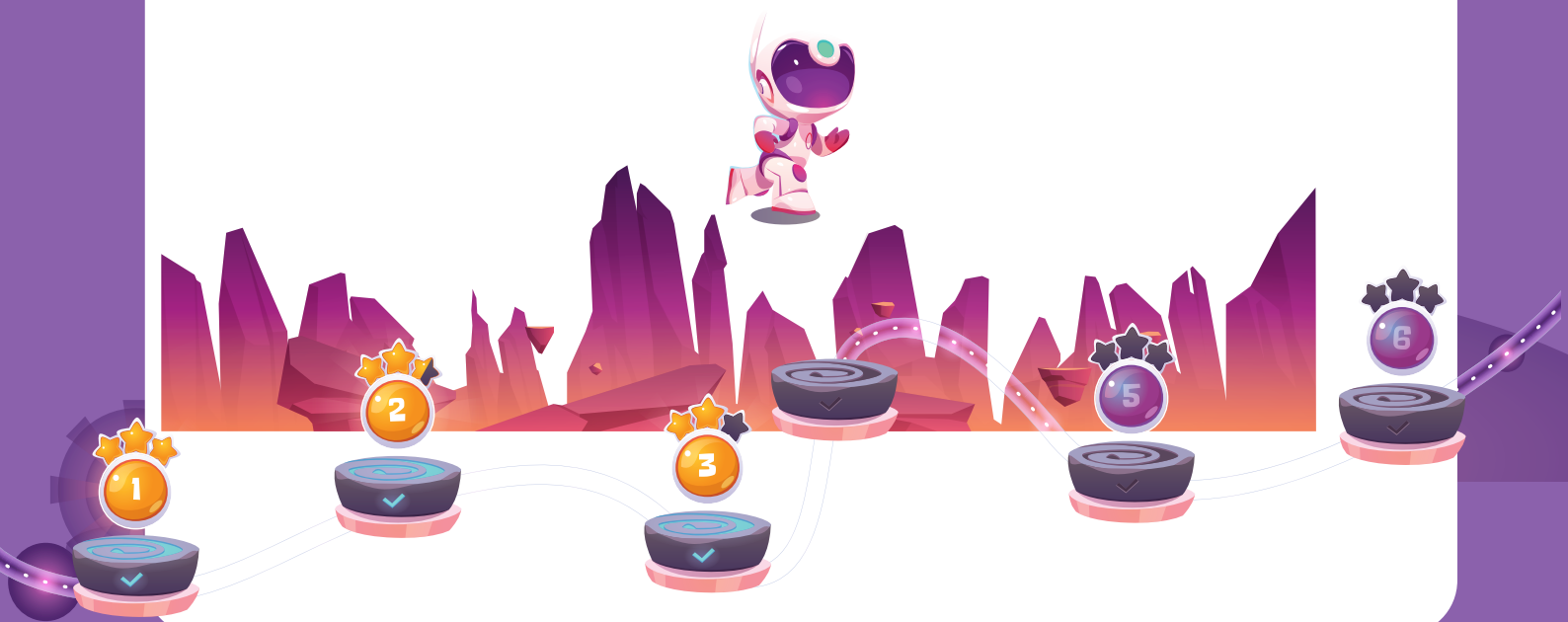
Module-3: Design Thinking

1. Overview of Design Thinking
2. 5 phases of Design Thinking

Module-3: Lab Assignment/ Practical Activity

Project Name: 2D Graphic Game Design using Python

Project Name: A dodger's game with sounds and images



Module 4: Machine Learning

1. A hands-on application-based introduction to machine learning

- Understanding Human Learning Process
- How Machine Learn
- Introduction to Teachable Machines
- Cat vs Dog: Training Data for ML
- Cat vs Dog: Training the model
- Cat vs Dog: Image Classifier
- Application of Machine Learning

Module-4: Lab Assignment/ Practical Activity

Project Name:

1. Rock, Paper & Scissor Game Development
2. An interactive virtual assistant (like SIRI or Alexa)



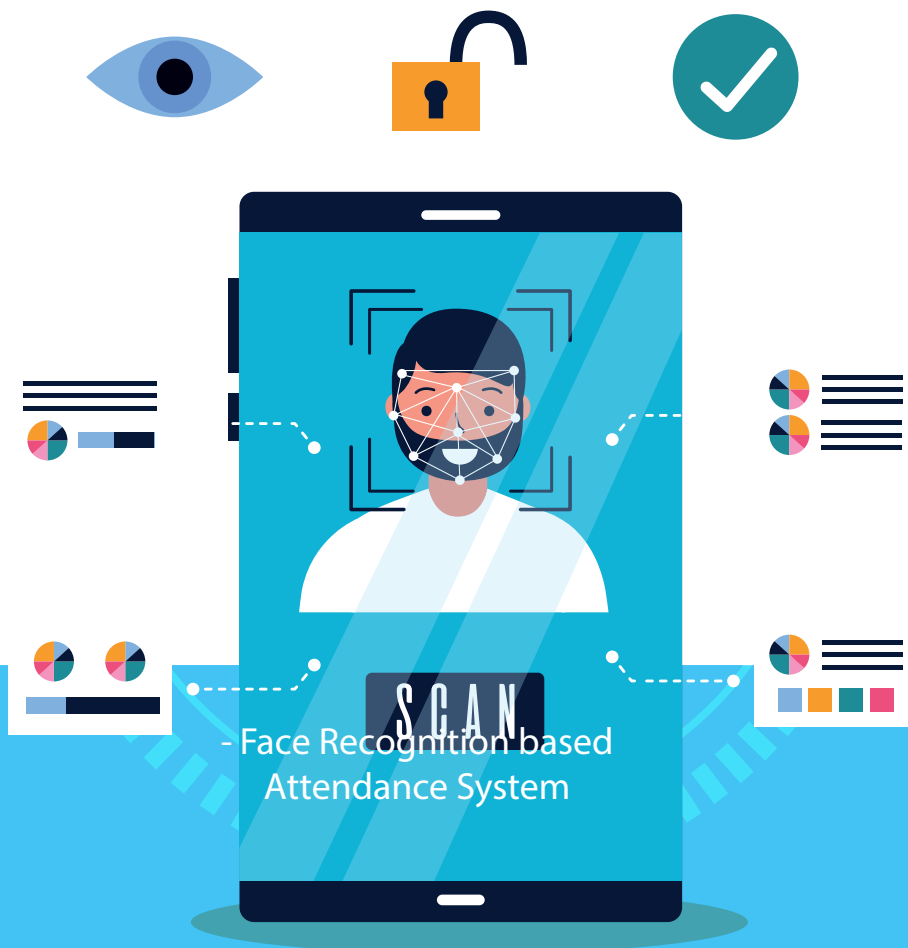
Module 4: Machine Learning

Supervised & unsupervised learning/ decision-based learning

Module-4: Lab Assignment/ Practical Activity

Project Name:

- Pose Classifier ML Project
- Smart AI Chatbot
- Face Recognition based Attendance System



Module 5: Ethics of AI

1. Ethics in Artificial Intelligence

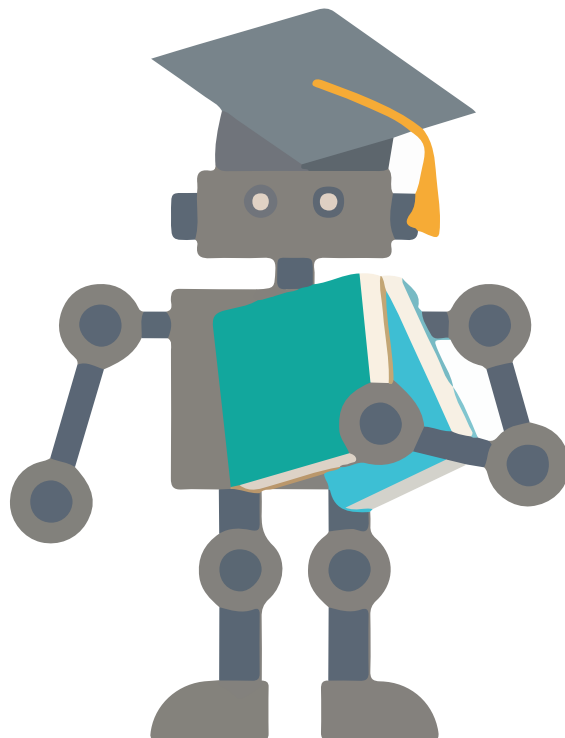
- What is Ethics?
- Why Ethics
- Ethics in AI
- Understanding AI ethics. Training a False model.

**Ethics in
Artificial Intelligence**



Module 6: Final Project

Machine Learning Project



MACHINE LEARNING