## ARTIFICIAL INTELLIGENCE

These sessions open students up to the world of AI and Machine Learning. They explore different google AI experiments such as AutoDraw, Teachable Machine, etc to understand how machine learns. They then create on voice, image and text recognition projects using teachable machines and Scratch. They then explore deeper into how computer visualizes images and create various image and video manipulation projects using the CV2 library of python.

| SESSION | CONCEPT | SKILLS |
|---------|---------|--------|
| 01 | What Is Artificial Intelligence? | **AI Perception** <br> Understand perception and sensors, Playing with a Drawing AI and analysing the data that powers it. |
| 02 | History Of AI | **Explore Artificial vs Human Intelligence** <br> History and Important Milesones of AI, Myths around AI , Primitive AI. |
| 03 | How Does AI Work? | **Explore , Implement** <br> Need of Artificial Intelligence , Rule-Based AI to Machine Learning. |
| 04 | Emotion Detector Bot - I | **Build Rule Based System, AI Representation** <br> Create a simple Sentiment Analysis program. |
| 05 | Emotion Detector Bot - II | **Build Rule Based System, AI Representation** <br> Create a simple Sentiment Analysis program. |
| 06 | Smart Room - I | **Explore Artifical vs Human Intelligence** <br> Make a Smart Home system to control virtual devices. |
| 07 | Smart Room - II | **Explore Artifical vs Human Intelligence** <br> Make a Smart Home system to control virtual devices. |

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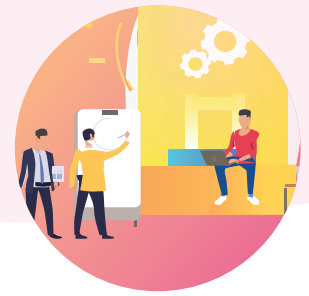| 08 | Image Detection, Recognition, And Image Classification With ML | **ML Pre-trained Models**<br>Make a face detection program using a machine learning model. |
|----|----|----|
| 09 | Teachable Machine & Introduction To Chameleon | **ML Data Variance, Designing Own Classifier**<br>Design own classifier to automatically distinguish between various Fruits. |
| 10 | Coding Chameleon & Introduction To Fooled | **Logic, Comprehension , Higher Order Thinking**<br>Make a chameleon in Scratch that changes colour to match its background. |
| 11 | Coding "Fooled" | **Logic, Comprehension , Higher Order Thinking**<br>Create variation in training the ML model. |
| 12 | Emoji Mask & Creating Face Filters | **ML Pre-trained Models**<br>Make an AI-powered face filter that adds a cartoon mask to your face. |
| 13 | Image Representation - I | **Logic, Comprehension , Higher Order Thinking**<br>Learn about how an image is represented digitally. |
| 14 | Image Representation - II | **Logic, Comprehension , Higher Order Thinking**<br>Understand image as a grid/table of pixels with color values . Learn about measures to find its quality, color depth and size. |
| 15 | How Computers Read Images? | **Logic, Comprehension**<br>Introduction to Computer Vision. Learn about : How Does A Computer Read An Image? and components involved in Image Processing. |

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| 16 | Getting Started with Image Processing | **Logic, Comprehension , Higher Order Thinking**<br>What is Image Processing? Read a Color Image as a GrayScale image , Read a Grayscale Image as a 2-Dimensional Array, Display, Write and Resize images using CV2 Library. |
|---|---|---|
| 17 | Edit Grayscale Images | **Logic, Comprehension , Higher Order Thinking**<br>Learn to create a GrayScale Image using 2D-Array and then edit the GrayScale image, pixel by pixel using nested For and If conditions. |
| 18 | Color Images With 3D Arrays | **Logic, Higher Order Thinking , Data Manipulation**<br>Learn how to read a color image data as a 3D-Array, How to access values of a 3D array using the example of weather forecast , Edit the color image by changing colors of few pixels or regions. |
| 19 | Edit Color Images - I | **Logic, Higher Order Thinking , Data Manipulation**<br>Learn about the Region of Interest , Practice the use of ROI to fill colors , Convert a colored image into its complementary colors to get an effect of image filter. |
| 20 | Edit Color Images - II | **Logic, Higher Order Thinking , Data Manipulation**<br>Learn about Swapping the color channels , How to add one image to another? |
| 21 | Edit Backgrounds | **Logic, Creativity**<br>Remove green background and add another background/ Merge two images. |

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| 22 | **Formative Assessment** | **Assessment of learning** |
|---|---|---|
| 23 | Edge Detection - I | **Logic, Creativity**<br>Code a program to identify edges as a contrast in color. |
| 24 | Edge Detection - II | **Logic, Creativity**<br>Learn about the applications of Edge Detection , Code Edge Detection program with OpenCV and Numpy Arrays. |
| 25 | Face Detection - I | **Logic, Creativity**<br>Face Detection Using OpenCV and Python , Use of CascadeClassifier object to extract the facial features , Adding a Rectangular Face Box. |
| 26 | Face Detection - II | **Logic, Creativity**<br>Perform Face Detection on group pictures as well as on videos. |
| 27 | Invisibility Cloak - I | **Logic, Higher Order Thinking , Data Manipulation**<br>Create your own invisibility Cloak using OpenCV. |
| 28 | Invisibility Cloak - II | **Logic, Higher Order Thinking , Data Manipulation**<br>Work with videos where the front image (cloak) is not static. |
| 29 | **Formative Assessment** | **Assessment of learning** |
| 30 | Machine Learning Algorithms | **Logic, Higher Order Thinking , Data Manipulation**<br>Concept of Machine Learning Algorithms , Types of ML Algorithms. |

| 31 | Decision Trees - I | **Logic, Higher Order Thinking , Data Manipulation**<br>Make the decision tree for given scenarios. |
|----|--------------------|-----------------------------------------------------|
| 32 | Decision Trees - II | **Logic, Higher Order Thinking , Data Manipulation**<br>Create a PacMan Game Project, Analysing the Decision Tree of the game. |
| 33 | Decision Trees - III | **Logic, Higher Order Thinking , Data Manipulation**<br>Create Tic-Tac-Toe project , Creating the Tic-Tac-toe ML model and Training Code. |
| 34 | Ethics and Bias in Machine Learning | **Logic, Higher Order Thinking , Data Manipulation**<br>Analysing bias and its impact on ML , create a project for the Biased ML model , Ethics in AI. |
| 35 | Neural Networks | **Logic, Higher Order Thinking , Data Manipulation**<br>Understanding the idea behind Neural Networks , how do they work , Image Recognition with Neural Networks. |
| 36 | Chatbot Project - I | **Step-Wise Thinking, Creativity, Logic**<br>Building a rule-based AI chatbot. |
| 37 | Chatbot Project - II | **Step-Wise Thinking, Creativity, Logic**<br>Building a rule-based AI chatbot. |
| 38 | Chatbot Project - III | **Step-Wise Thinking, Creativity, Logic**<br>Building a rule-based AI chatbot. |

| 39 | Make Me Happy Project - I | **Step-Wise Thinking, Creativity, Logic**<br>Making a machine learning project using Python code. |
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| 40 | Make Me Happy Project - I | **Step-Wise Thinking, Creativity, Logic**<br>Making a machine learning project using Python code. |
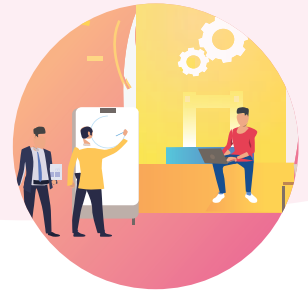
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