HAND GESTURE DETECTION AND RECOGINITION SYSTEM

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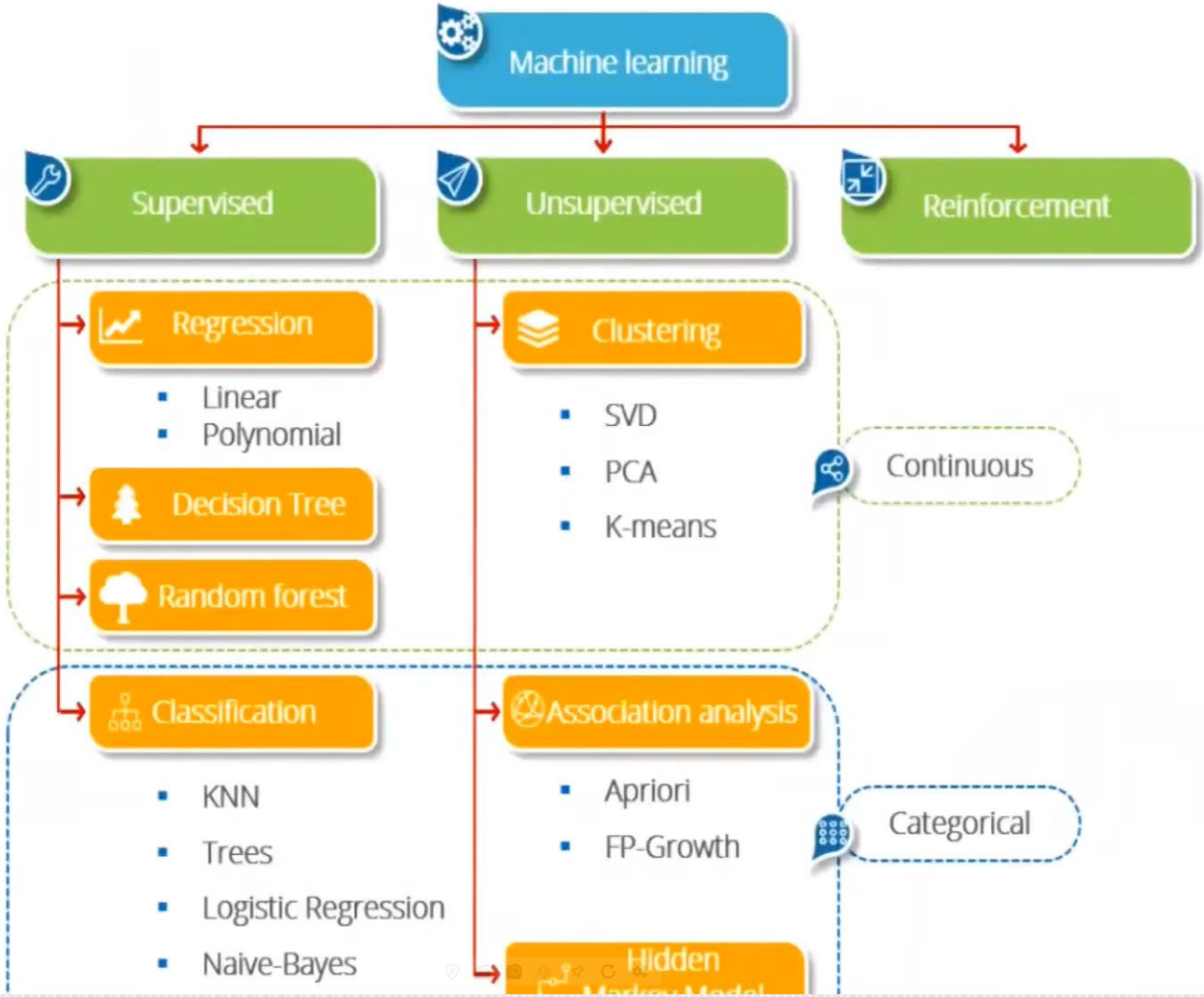
(white __ devil)

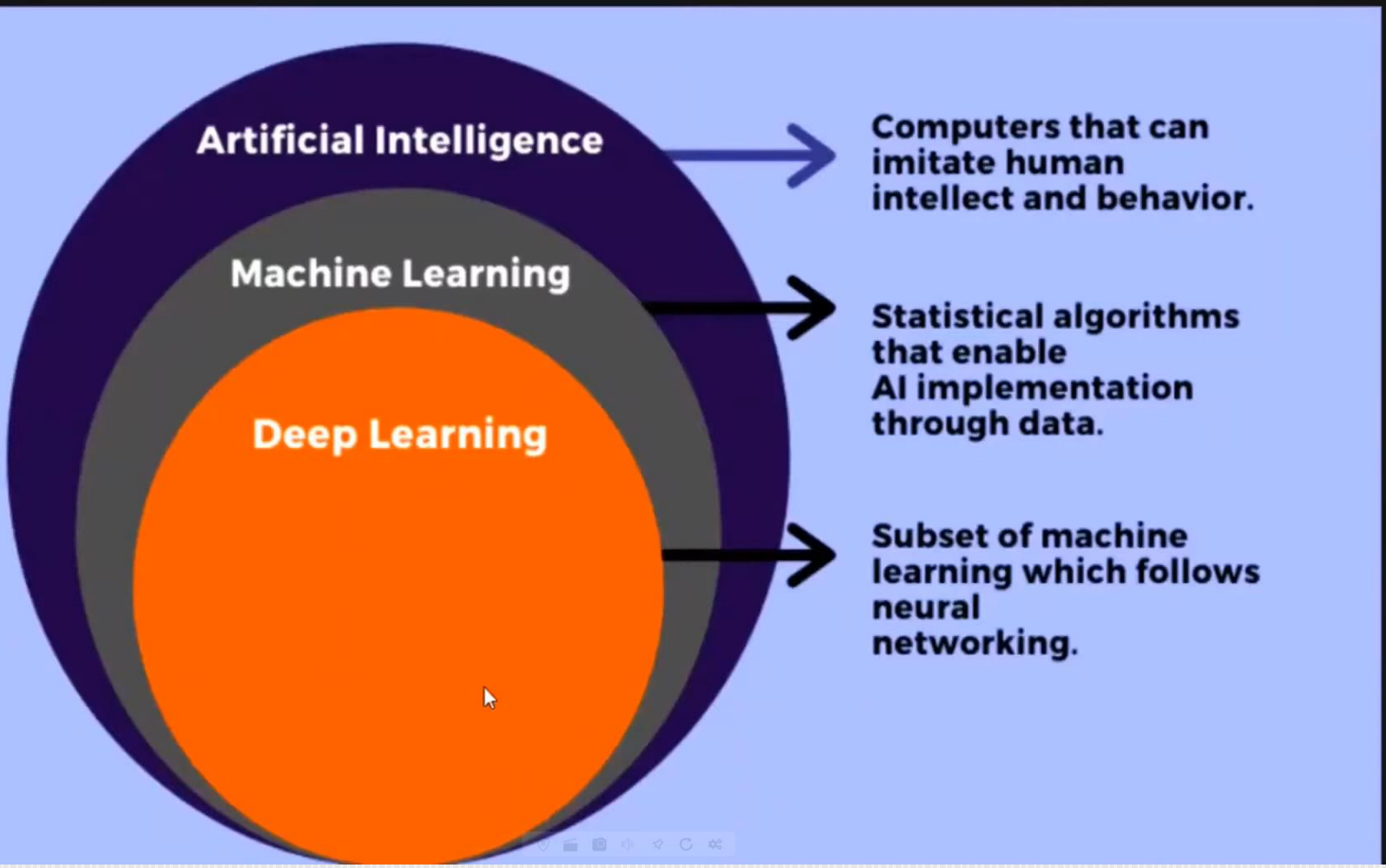
What is Machine Learning?

- Machine Learning is a subset of artificial intelligence which focuses mainly on machine learning from their experience and making predictions based on its experience.

Flow chat


Machine learning
Supervised
Unsupervised
Reinforcement
Regression
Linear
Polynomial
Decision Tree
Random forest
Clustering
SVD
PCA
K-means
Continuous
Classification
KNN
Trees
Logistic Regression
Naive-Bayes
Association analysis
Apriori
FP-Growth
Categorical
Hidden

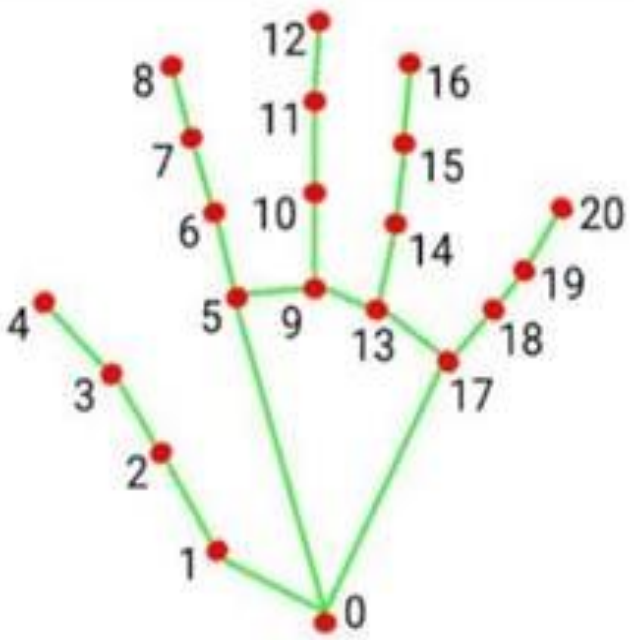
Steps to learn (AI 'OR' ML)



INTRODUCTION

- Gesture recognition helps computers to understand human body language. This helps to build a more potent link between humans and machines, rather than just the basic text user interfaces or graphical user interfaces (GUIs). In this project for gesture
- Recognition, the human body's motions are read by computer camera. The computer then makes use of this data as input to handle applications. The objective of this project is to develop an interface which will capture human hand gesture dynamically and will control the volume level .

HAND SPORT



0. WRIST
1. THUMB_CMC
2. THUMB_MCP
3. THUMB_IP
4. THUMB_TIP
5. INDEX_FINGER_MCP
6. INDEX_FINGER_PIP
7. INDEX_FINGER_DIP
8. INDEX_FINGER_TIP
9. MIDDLE_FINGER_MCP
10. MIDDLE_FINGER_PIP
11. MIDDLE_FINGER_DIP
12. MIDDLE_FINGER_TIP
13. RING_FINGER_MCP
14. RING_FINGER_PIP
15. RING_FINGER_DIP
16. RING_FINGER_TIP
17. PINKY_MCP
18. PINKY_PIP
19. PINKY_DIP
20. PINKY_TIP

MODULES

Modules we used.

- cv2
- mediapipe
- math
- hypot
- Ctypes
- Cast
- POINTER
- comtypes
- CLSCTX_ALL
- pycaw.pycaw
- AudioUtilities
- IAudioEndpointVolume
- numpy

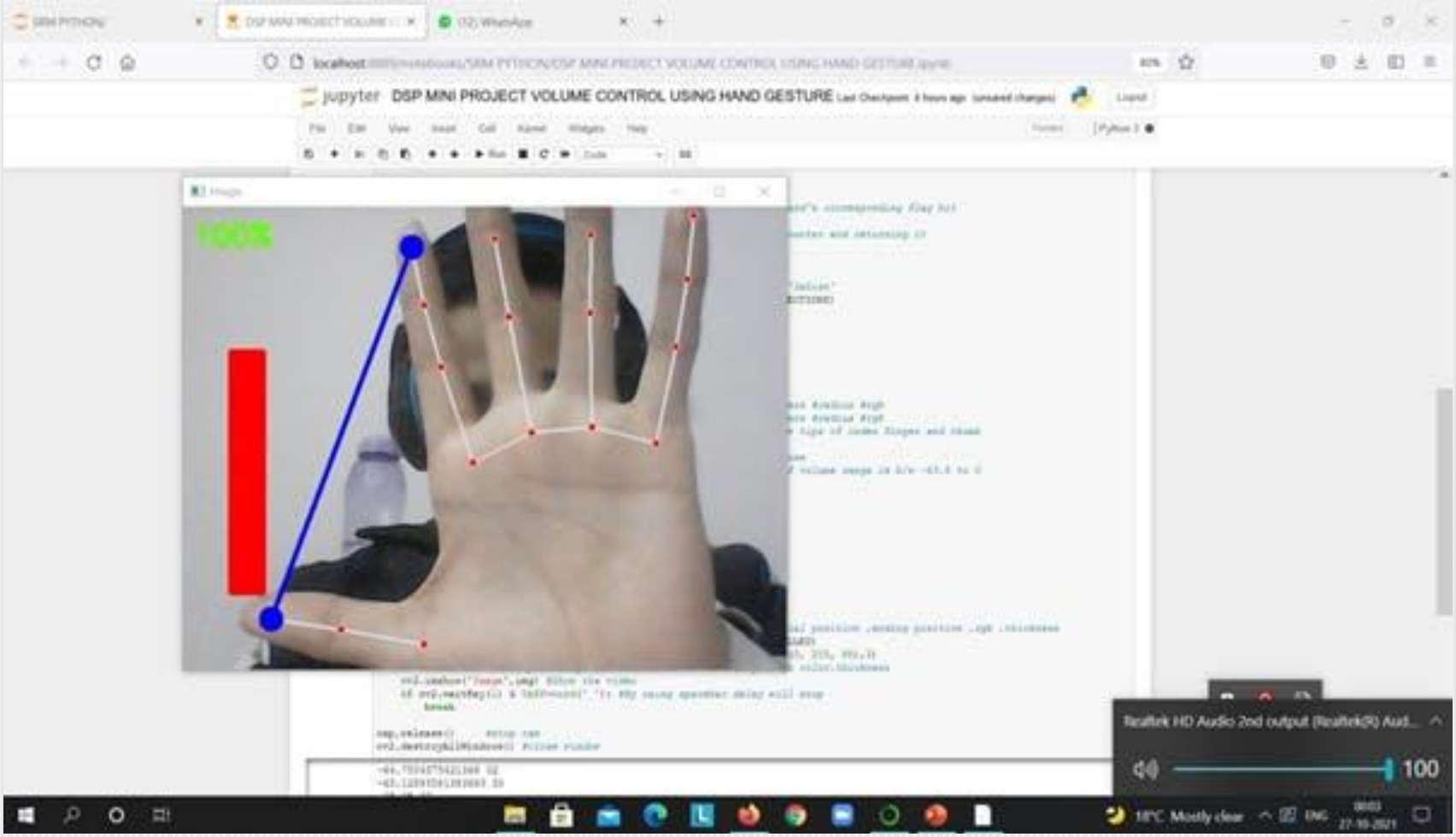
Numpy ,Pycaw

- NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.
- Pycaw : Python Audio Control Library

MediaPipe

- Mediapipe is an open-source machine learning library of Google, which has some solutions for face recognition and gesture recognition, and provides encapsulation of python, js and other languages. MediaPipe Hands is a high-fidelity hand and finger tracking solution. It uses machine learning (ML) to infer 21 key 3D hand information from just one frame. We can use it to extract the coordinates of the key points of the hand.

Final Output



WORKING PRINCIPLE

- The camera in our device is used for this project. It detects our hand with points in it so as it can see the distance between our thumb finger tip and index finger tip. The distance between the points 4 and 8 is directly proportional to the volume of device.

METHODOLOGY/APPROACH

- Detect hand landmarks
- Calculate the distance between thumb tip and index finger tip.
- Map the distance of thumb tip and index finger tip with volume range. For my case, distance between thumb tip and index finger tip was within the range of 30 – 350 and the volume range was from -63.5 – 0.0.
- In order to exit press ‘Spacebar’

ADVANTAGES

- Easy to use
- Hassle free
- Fun to use
- More interactive

DISADVANTAGES

- Cant be used for long distance
- Sometimes not accurate
- Requires a decent camera
- May be confused by two palms


Thank You