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Assignment - 09

* Tittle :
Implement a neural network for a real life application.

* Aim :
Implement and understand working of Neural network for a real life application: Face recognition with Python.

* Objective :
To study and implement face recognition using Python and Open CV.

* Theory :

(i)

Machine learning	Deep learning
- Subset of AI that enables system to learn from data and identify patterns.	- DL is a subset of ML based on artificial neural networks.
- ML typically relies on structured data.	- DL automatically extracts features from raw data.

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Machine learning	Deep learning
- Human experts manually select features from data.	- Features are learned automatically by the network.
- less computationaly intensive	- Requires high computational resources

(ii) Open CV

Open CV is a open-source software library that provides tools for computer vision, ML and image processing. It is used in various applications such as face detection, object tracking and image recognition.

Key features :-

- Image Processing
- Object detection
- video analysis
- Machine learning
- Cross platform

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* Input :-
Input an image with a human face on it.

* Output :-
Algorithm will detect faces of all humans present in the image

* Algorithm :-
Neural network

* Platform :-
Linux

* FAQ's :-

Q1. Explain cascade and classifier in detail.

→ A classifier is an algorithm that is used to distinguish between different classes or categories of objects.
Types of classifiers :-

- Haar classifiers
- Support Vector Machines (SVMs)

In opencv, the most widely used classifier is 'Haar Cascade Classifier'.

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A cascade refers to the structure of the detection algorithm, which is a cascade of stages where each stage consists of a set of weak classifiers.
The cascade classifiers works by applying multiplying stages of classification.

Q2. What are other cascades provided by OpenCV?

→ (i) Face detection
(ii) Eye Detection
(iii) Smile detection
(iv) Lower / Upper body detection
(v) Car detection

Q3. Why do we need to convert image to a grayscale image?

→
- Simplifies data and reduces complexity
- Most detection algorithm use Gray Scale
- Improves performance and efficiency.
- Increases accuracy.

Conclusion :
Hence learned OpenCV using Python. learned Neural networks