

FACE DETECTION

PRESENTED BY PARAS MISTRY



WHAT IS FACE DETECTION?

- Face detection is a method to detect the face of a live test subject in real time using a single camera as the image acquisition source.
- It is a computer application for automatically detecting human face from a digital image or a video frame from a video source.



OBJECTIVE OF FACE DETECTION

- **To design real time face detection system.**
- **To utilise the face detection system based on Haar Classifier.**
- **To develop face detection system using Python programming language.**

ADVANTAGES OF FACE DETECTION

- **Reduced computational complexity**
- **Fast, Robust and a high detection rate**
- **Tolerance to monotonic illumination changes**
- **Fast and Accurate face detection**

DISADVANTAGES OF FACE DETECTION

- **Low detection rates (Difficult to detect faces in complex backgrounds or in presence of multiple faces)**
- **Sensitive to illumination**
- **Unable to detect the faces in different poses**
- **More support vectors are needed for high accuracy, so it increases the computation cost**

APPLICATION OF FACE DETECTION

- SECURITY
- GENERAL IDENTITY VERIFICATION
- SURVEILLANCE
- ACCESS CONTROL
- FACE IDENTIFICATION



TECHNIQUES FOR FACE DETECTION

- Knowledge-Based
- Feature-Based
- Template Matching
- Appearance-Based

KNOWLEDGE -BASED

The knowledge-based method depends on the set of rules, and it is based on human knowledge to detect the faces. Ex- A face must have a nose, eyes, and mouth within certain distances and positions with each other. The big problem with these methods is the difficulty in building an appropriate set of rules. There could be many false positive if the rules were too general or too detailed. This approach alone is insufficient and unable to find many faces in multiple images.



FEATURE-BASED

The feature-based method is to locate faces by extracting structural features of the face. It is first trained as a classifier and then used to differentiate between facial and non-facial regions. The idea is to overcome the limits of our instinctive knowledge of faces. This approach divided into several steps and even photos with many faces they report a success rate of 94%.



TEMPLATE MATCHING

Template Matching method uses pre-defined or parameterised face templates to locate or detect the faces by the correlation between the templates and input images. Ex- a human face can be divided into eyes, face contour, nose, and mouth. Also, a face model can be built by edges just by using edge detection method. This approach is simple to implement, but it is inadequate for face detection. However, deformable templates have been proposed to deal with these problems.



APPEARANCE-BASED

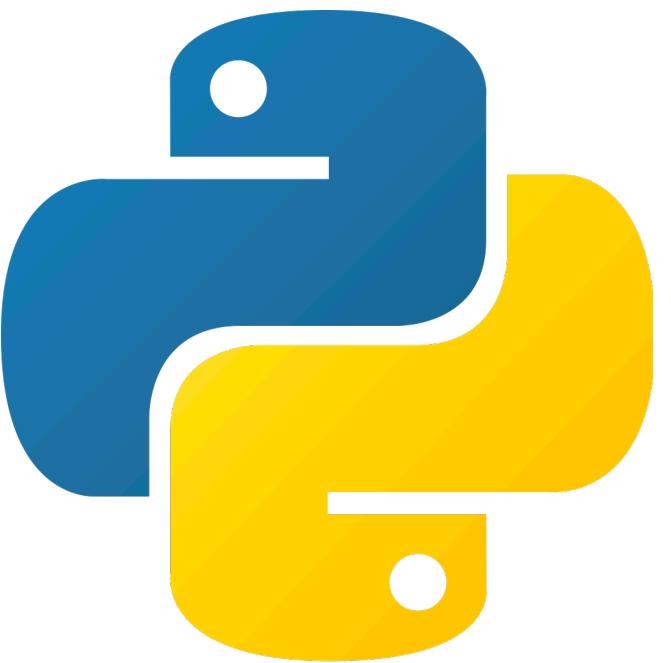
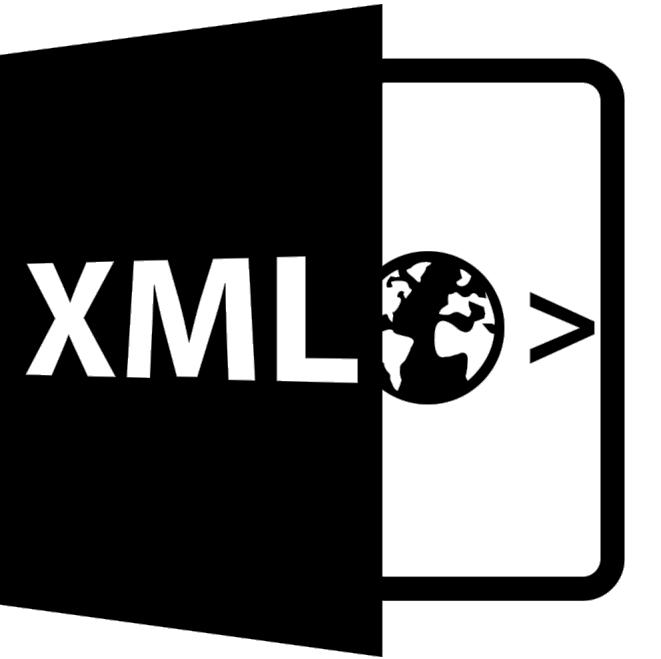
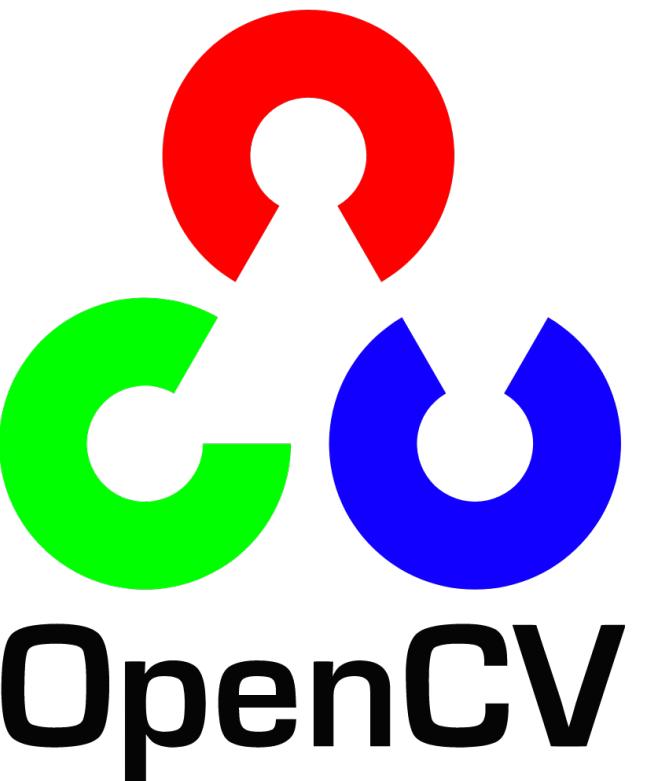
The appearance-based method depends on a set of delegate training face images to find out face models. The appearance-based approach is better than other ways of performance. In general appearance-based method rely on techniques from statistical analysis and machine learning to find the relevant characteristics of face images. This method also used in feature extraction for face recognition.



TOOLS USED

IN FACE DETECTION PROJECT

- Python
- OpenCV
- HaarCascade

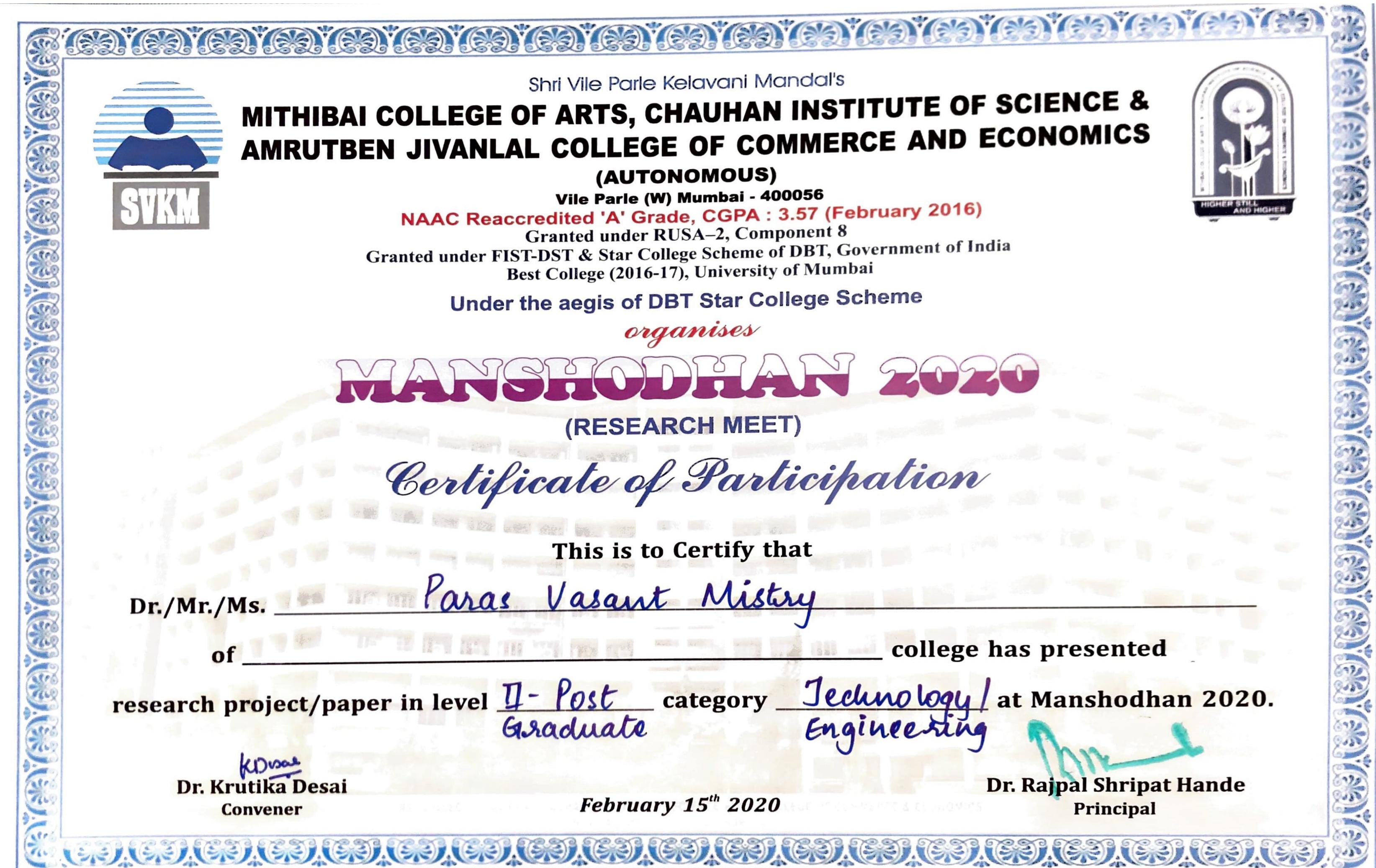


FUTURE PLANS

- Design an intelligence system that can analyse object
- Remove all its limitations
- Empower media and security services



CERTIFICATE OF MANSHODHAN



THANK
YOU!

The graphic features the words "THANK" and "YOU!" in a bold, sans-serif font. The letters are composed of multiple overlapping layers of color, including yellow, pink, purple, teal, and white. The "!" symbol is a smaller, rounded exclamation mark located to the right of the word "YOU!". The overall effect is a vibrant, modern, and playful design.