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Age and Gender Detection

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ABSTRACT

- The detection is the technique in which various factors are recognized on the basis of input and according to requirements.
- In this work, novel technique is proposed which is based on SIFT
- The simulation is performed in MATLAB
- age and gender detection various techniques has been proposed to analysis features of the input image and on the basis of image features gender and approximation of age is defined.

Keywords:-

- ❖ Detection, SIFT, Morphological, key features

I. INTRODUCTION

- The enhancing of raw images that are received from the camera sources, from satellites, aircrafts and the pictures captured in day-to-day lives is called image processing.
- There is a need of analyzing and studying the digitally formed images.
- There are two main and very common steps followed for image processing. The improvement of an image
 1. image enhancement.^[1]
 2. segmentation.

II. LITERATURE REVIEW

- Yunjo Lee, et.al proposed in this paper ^[7], that the fMRI method is used to study upon age detection methods.
- The brain activation tasks related to face matching are performed and tested outside the scanner.
- There was a same result in face processing in older as well as young adults.
- The performance results high in both the cases having same facial viewpoints.

III. PROPOSED METHODOLOGY

- Age estimation shares many problems encountered in other typical face image interpretation tasks such as face detection, face recognition, expression and gender recognition.
- A procedure which includes specific techniques is used.

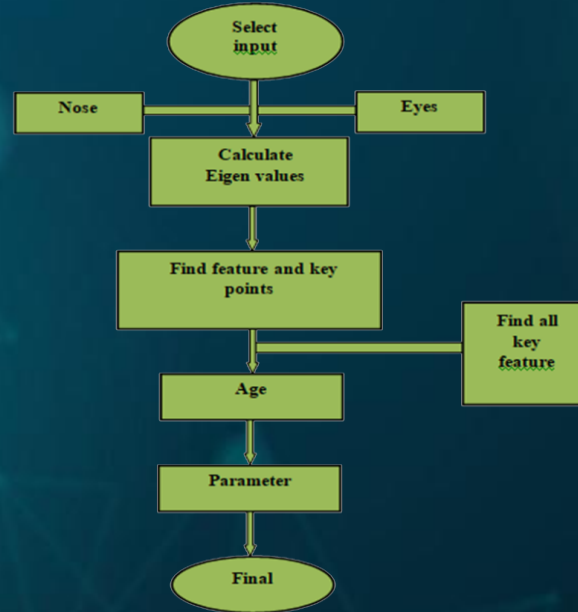
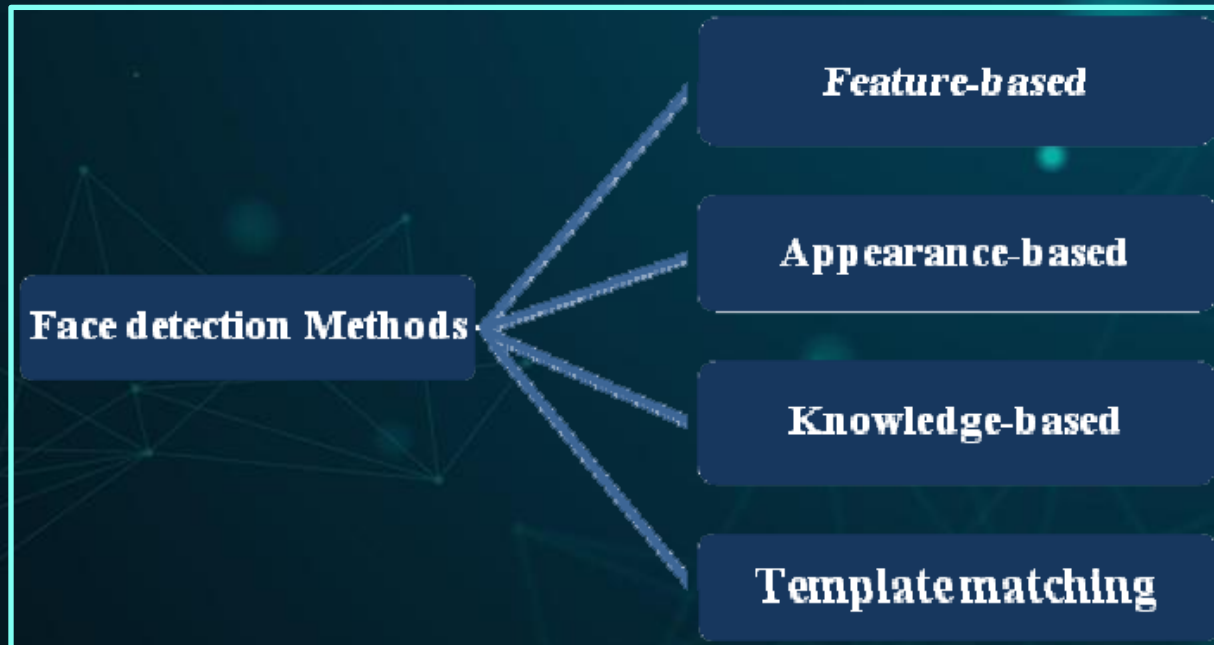


Fig. Flowchart of proposed technique

- Eigen Values: For a square matrix A of order n , the number is an Eigen value if and only if there exists a non-zero vector C such that $AC = \lambda C$.

Face Detection Methods:-

- ❖ Yan, Kriegman, and Ahuja presented a classification for face detection methods.
- ❖ the face detection algorithms could belong to two or more groups.
- ❖ These methods divided into four categories. These categories are as follows-



1.Knowledge-Based:-

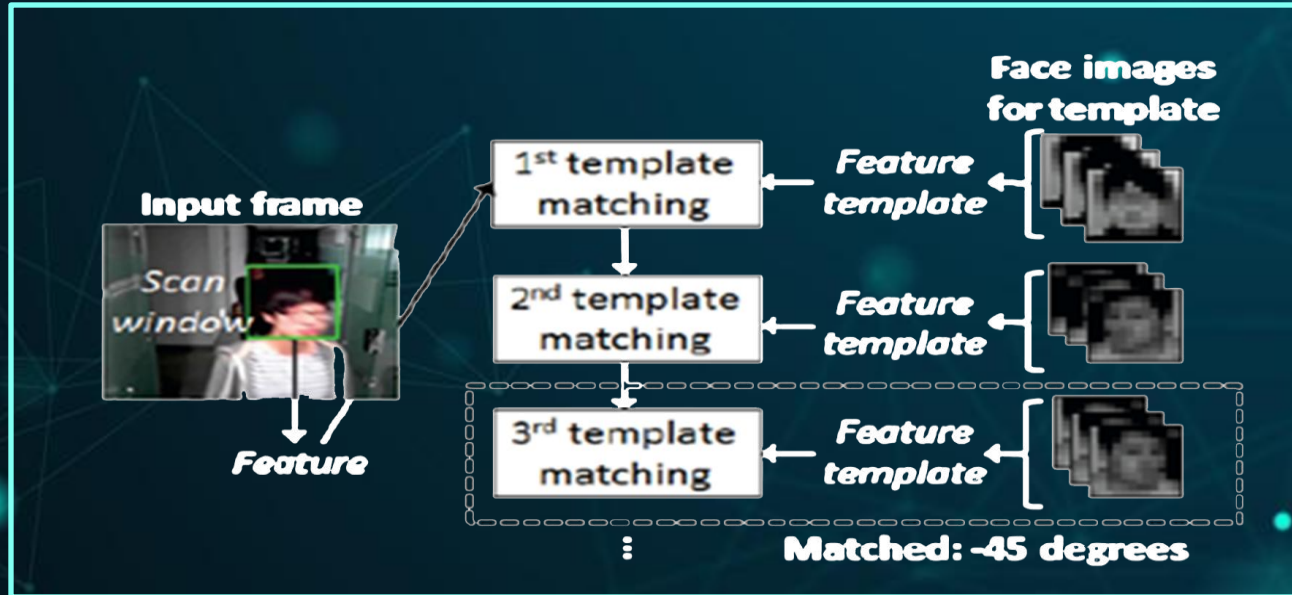
- The knowledge-based method depends on the set of rules, and it is based on human knowledge to detect the faces.
- Ex- A face must have a nose, eyes, and mouth within certain distances and positions with each other.
- The big problem with these methods is the difficulty in building an appropriate set of rules.

2.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%.

3.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.



4.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.
- This method also used in feature extraction for face recognition.
- The appearance-based model further divided into sub-methods for the use of face detection which are as follows-

4.1.Eigenface-Based:-

- ✓ Eigenface based algorithm used for Face Recognition, and it is a method for efficiently representing faces using Principal Component Analysis.

4.2.Distribution-Based:-

- ✓ The algorithms like PCA and Fisher's Discriminant can be used to define the subspace representing facial patterns. There is a trained classifier, which correctly identifies instances of the target pattern class from the background image patterns.

4.3.Neural-Networks:-

- ✓ Many detection problems like object detection, face detection, emotion detection, and face recognition, etc. have been faced successfully by Neural Networks.

4.4.Support Vector Machine:-

- ✓ Support Vector Machines are linear classifiers that maximise the margin between the decision hyperplane and the examples in the training set. Osuna et al. first applied this classifier to face detection.

4.5.Sparse Network of Winnows:-

- ✓ They defined a sparse network of two linear units or target nodes; one represents face patterns and other for the non-face patterns.
- ✓ It is less time consuming and efficient.

4.6.Naive Bayes Classifiers:-

- ✓ They computed the probability of a face to be present in the picture by counting the frequency of occurrence of a series of the pattern over the training images.
- ✓ The classifier captured the joint statistics of local appearance and position of the faces.

4.7.Hidden Markov Model:-

- ✓ The states of the model would be the facial features, which usually described as strips of pixels.
- ✓ HMM's commonly used along with other methods to build detection algorithms.

4.8.Information Theoretical Approach:-

- ✓ Markov Random Fields (MRF) can use for face pattern and correlated features.
- ✓ The Markov process maximises the discrimination between classes using Kullback-Leibler divergence.
- ✓ Therefore this method can be used in Face Detection.

4.9.Inductive Learning:-

- ✓ This approach has been used to detect faces.
- ✓ Algorithms like Quinlan's C4.5 or Mitchell's FIND-S used for this purpose.

How the Face Detection Works:-

- There are many techniques to detect faces, with the help of these techniques, we can identify faces with higher accuracy.
- These techniques have an almost same procedure for Face Detection such as OpenCV, Neural Networks, Matlab, etc.
- The face detection work as to detect multiple faces in an image.

- ❑ Firstly the image is imported by providing the location of the image.
- ❑ Then the picture is transformed from RGB to Grayscale because it is easy to detect faces in the grayscale.



Fig. Converting RGB image to Grayscale

- ❑ After that, the image manipulation used, in which the resizing, cropping, blurring and sharpening of the images done if needed.
- ❑ The next step is image segmentation, which is used for contour detection or segments the multiple objects in a single image so that the classifier can quickly detect the objects and faces in the picture.

- ❑ The next step is to use Haar-Like features algorithm, which is proposed by Viola and Jones for face detection.
- ❑ This algorithm used for finding the location of the human faces in a frame or image.
- ❑ All human faces shares some universal properties of the human face like the eyes region is darker than its neighbour pixels and nose region is brighter than eye region.

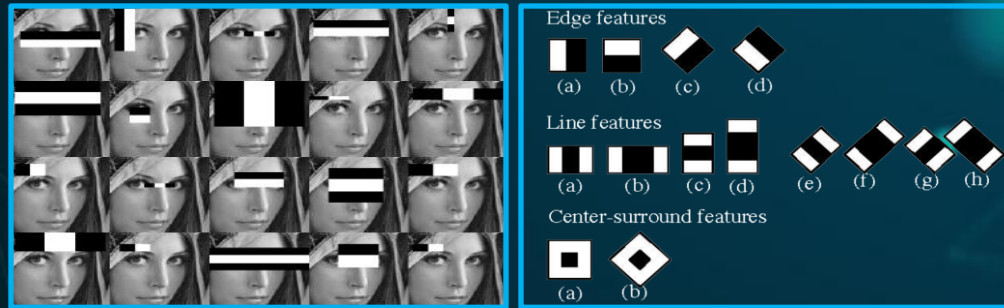


Fig. Haar-like features for face detection

- ❑ The haar-like algorithm is also used for feature selection or feature extraction for an object in an image, with the help of edge detection, line detection, centre detection for detecting eyes, nose, mouth, etc.
- ❑ It is used to select the essential features in an image and extract these features for face detection.

- ❑ The next step is to give the coordinates of x, y, w, h which makes a rectangle box in the picture to show the location of the face or we can say that to show the region of interest in the image.
- ❑ It can make a rectangle box in the area of interest where it detects the face.
- ❑ There are also many other detection techniques that are used together for detection such as smile detection, eye detection, blink detection, etc.

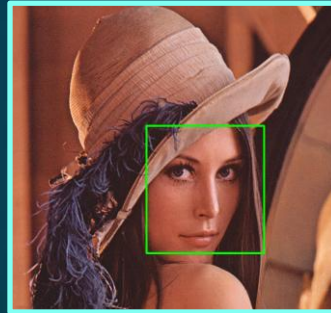
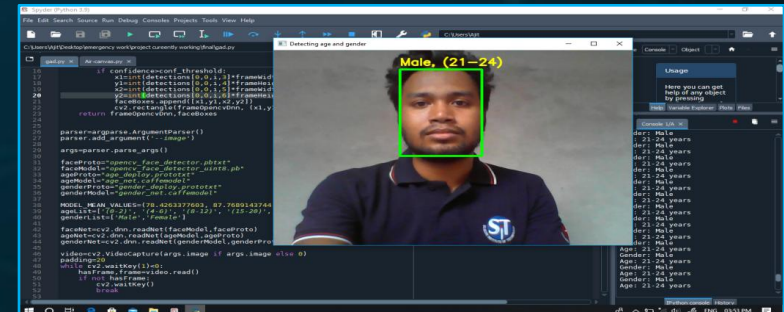


Fig. Successfully detect the face in an image

✳️ So, we can detect age & gender by this face detection technique



CONCLUSION

- ❖ In this work, it is been concluded that detection of age and gender take consideration of research few years ago.
- ❖ In this work, technique of morphological and SIFT is applied to search key features from the images.
- ❖ The key features of the images are the color and texture of the image.
- ❖ The simulation results shows that proposed algorithm performed well in terms of fault detection rate and accuracy.

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THANK YOU



Do you have any questions?

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