FACE DETECTION TECHNIQUE USING THE CASCADE OBJECT DETECTION ALGORITHM

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Abstract: Face Detection is the greatest technology in the Artificial Neural Network to identifying and validating the important features of Human faces in a few second. Face Detection is the fundamental technology to identifying the criminals, to Recognize faces and to analysis of faces. Face detection technology in Artificial Neural Network makes possible to protect our private data by strong security and authentication process in our mobile phone through the Face detection lock. Face detection system used at all authenticated places for the strengthen security measures. In this paper, proposed algorithm Cascade Object Classifier strongly detect each and every Object, more than one faces of people with its position and angle at all location and detect face with and without mask accurately. In this paper the proposed methodology detect faces very fast and identify correct features of image.

Index Terms -Cascade Object Classifier, Face Detection, Strengthen Security

I. INTRODUCTION

Face detection is one of the greatest technologies in Artificial Neural Network and Machine Learning. Face detection or Facial detection process in Image Processing or Video surveillance can be identify correct human Faces in each location by using Artificial algorithm. Face Detection technology is used for security purpose in our mobile phone or any Authenticated place and used for biometric process and social media also. Face Detection is the biggest area in the methodology of Object detection. Recognition of the image pattern and recognition of the face firstly proceeding through the important step of the object detection. Face Detection improved security and helps to track down criminals and terrorists. Face detection technique allow to save time and increasing accuracy in Identification process to be automated. In this work, Face Detection process executed by using the cascade object detector uses the Viola-Jones Algorithm to detect faces. This algorithm also can detect people's Faces, noses, eyes, mouth or upper body.

II. RELATED WORK

Wang, Yi-Qing [1] Fast and accurate face detection process possible using VIOLA-JONES algorithm. The first ever real-time face detection methodology working with three ingredients: The Integral Image algorithm applied for feature computation, Adaboost for feature selection and Attentional cascade algorithm applied for efficient computational resource allocation. Al-azawi, F. S. T., & Abdulrahman, A. A. [2] Face Detection and tracking process highlighted by approached of two different algorithms in MATLAB program to created simple system. CAMShift method used to track head movement and prevent from losing tracking information during movement. Kanade Lucas Tonasi(KLT) this method used to detect the face automatically .used methodology in this paper detected faces in camera also even when a person moves his head. Tawaniya, J., Singh, R., Sharma, N., & Patidar, J. [3] Face Detection process executed simple and easiest way for human-computer interaction and criminal identification. In this research work find a mean image of all the images to detect faces properly. Shahad laith abd al_galib [4] In this paper new algorithm used to detect Faces in digital Image as well as video process and segmenting the colour image into RGB to detect face area of person by using cascade object detector

methodology. Fathema, B., Lakshmi, A. D., Ravali, B., & Dokku, R. R [5] In this research work, Researcher used viola-Jones approach to detect faces.Voila-Jones is very fast and accurate technique to enhance the focus on face. Haar and Adaboost feature detected Faces in fraction of second. Cascade classifier used to combine many features efficiently. Jones, M., & Viola, P[6] In this paper ,Researcher extended Viola-Jone Framework to rotated and profile faces. Multiview detection made possible with two stage approach. New set of rectangle features detected faces and subtracting white rectangles space of image. Complex cascade classifier, classified the image with truth classifier and move to next cascade classifier to detect faces very fast.

III. METHODOLOGY

The purpose of this paper is to achieve the face detection process easily on any color image using Fast Facial algorithm. Faces of the people   can be capture by camera with different type of location area in the digital image form then this methodology made it possible to detect faces with all type of location area as well as all type of occluded faces feature. Figure (1) shown the pipeline of Face Detection process.
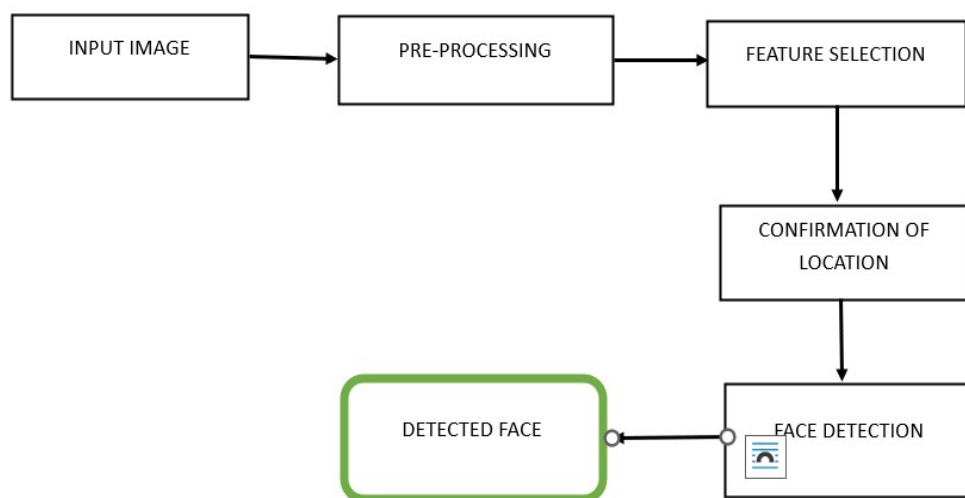

Fig.1 Face Detection system pipeline

The Identification of person is done through the pipeline of Face Detection process shown in **figure 1**. The Methodology of Face detection process firstly accessing the color digital Image even the face either occluded or non-occluded. Filter and adjust the contrast of face images in second step that is preprocessing. Important features of input image like as nose, eyes were selected and set the location of face image. Finally at the last step of above methodology applied face detection algorithm and detected face very fast.

IV. **CascadeObjectDetection Algorithm**

 The Vision.CascadeObjectDetector system comes in pretrained classifiers those are able to detect frontal face, upper body parts like as nose and eyes.
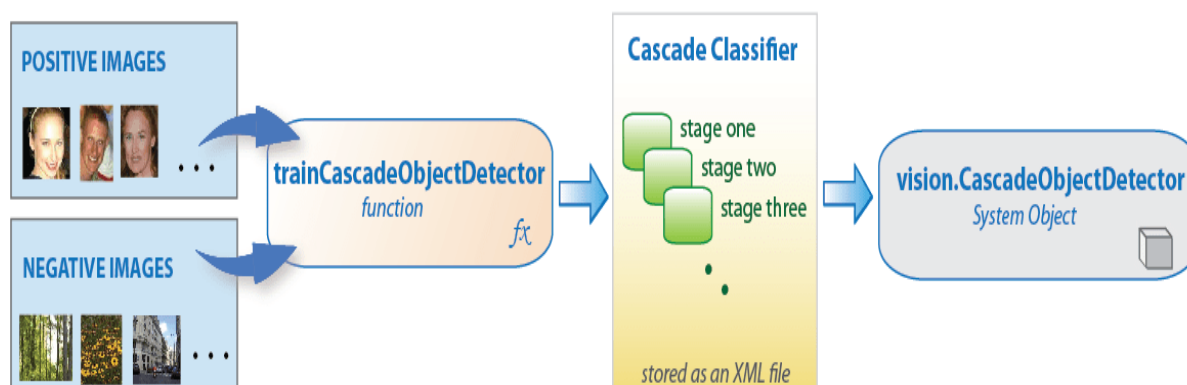

Fig.2 Cascade classifier structure

V. FAST FACIAL DETECTION ALGORITHM STEPS

The following steps show the stages of the face detection of the image Input color Image
Step1: analyses image to 3 layers RGB
Step 2: processed filter 3×3 and then resize image
Step3: In this step, the Vision. Cascade Object Detector is created face Detector = vision. Cascade Object Detector ();
step4: Facial properties is identified and access Location of the Face = step (face Detector, the Image);
step5: Output of the image with detected faces.

VI. EXPERIMENTAL WORK

In the process of Face detection, at the first step of object detection methodology access image as Input object. Whether we are wearing a mask on our face or not, the algorithm still scans our face correctly as image form and detect the face. below **figure-3** and **figure-4** shown the Output image of detected face with mask and without mask. The Vision.CascadeObjectDetector captures the features of integral images, then sets the location of the face and then detected the face.
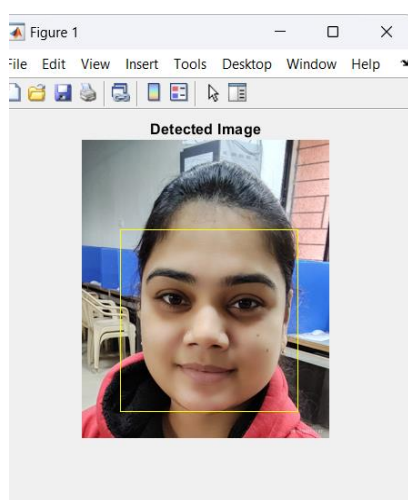

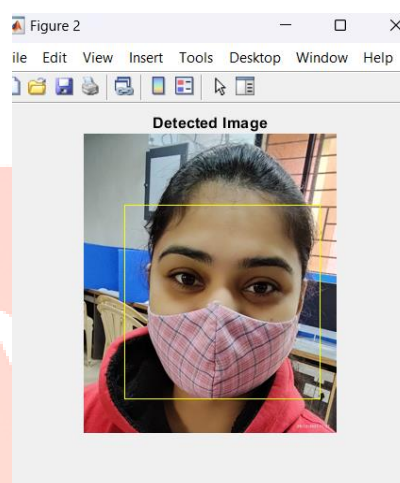**Fig.3** Face detection without mask   **Fig.4** Face detection with mask

The Cascade classifier is able to detect the Face even in occluded form and each angle of Face. This algorithm can detect in few second to any faces from the image dataset or from the real time image.
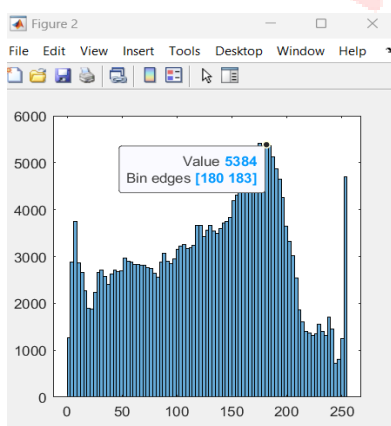
VII. HISTOGRAM OF DETECTED FACES

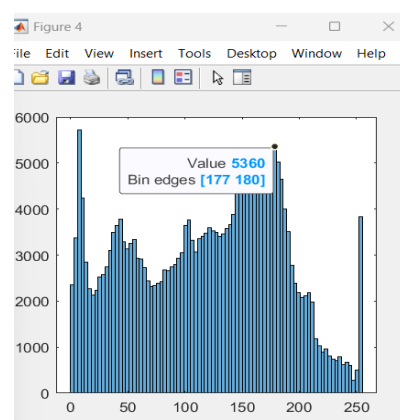**Fig.5** Histogram of without Mask Face   **Fig.6** Histogram of with Mask Face

Histogram shown the distribution of pixel in an image of face with the intensity value of that image. **figure -5** and **figure -6** both are represented different distribution of pixel value for the same person of face image at two different type of Face pattern area.
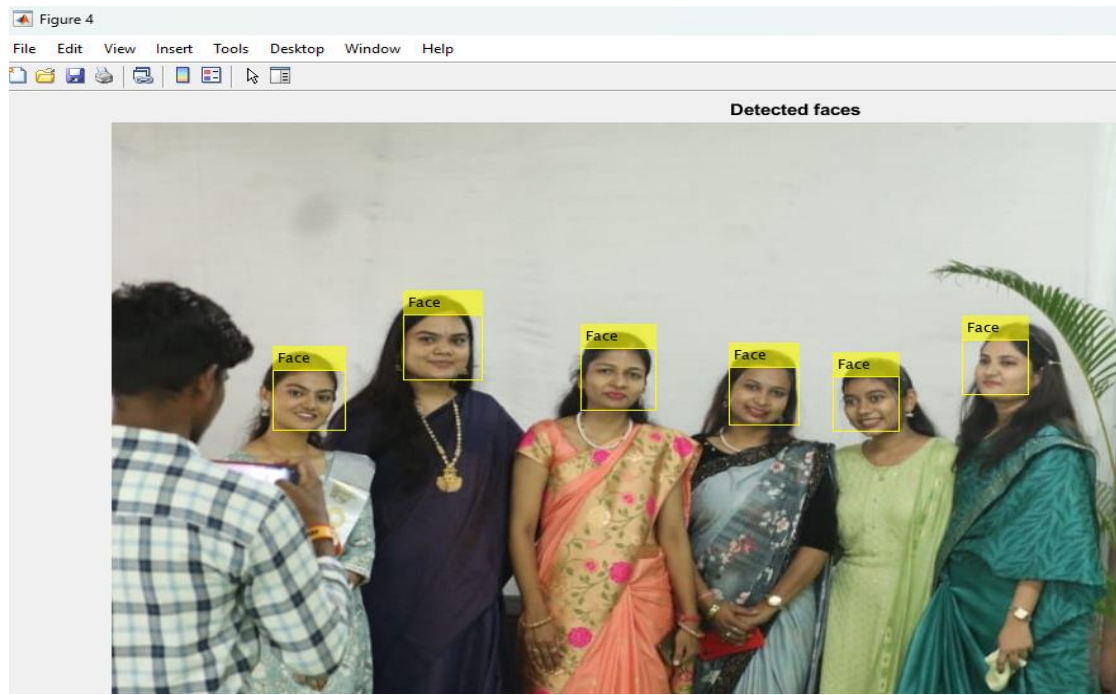
Fig.7 More than one face detected

VIII. CONCLUSION

Face detection technology in Artificial Neural Network makes possible to protect our private data by strong security and authentication process in our mobile phone through the Face detection lock. Face detection system used at all authenticated places for the strengthen security measures. Cascade Object Classifier strongly detect each and every Object, all type of Face with its position and angle at all location and detect face with and without mask accurately. In this paper the proposed methodology detect faces very fast and identify correct features of image. This technology is the fundamental step for the Recognition of Face and an alysis of face.

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