FACIAL EMOTIONS RECOGNITION SYSTEM USING MACHINE LEARNING ALGORITHMS

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ABSTRACT - With the rise in Media and Visual Communications, the concept of Facial Recognition and Facial Emotion recognition are assuming priority and is evolving as an emerging and trending field. Facial Emotions Recognition are finding applications in almost all domains. Military consignments, Law Enforcements, Attendance Marking systems using Facial recognition, Emotion Recognition systems using Facial markings are the innovating and emerging fields with reference to Facial recognitions. Concept of Face Emotion recognition is not a novel idea, but the practical implementation of the same with reference to the recent algorithms and more accurate classifications are new. In this paper, we implement the Face Emotion Recognition – a data driven analysis system using Python, Computer Visions and Machine Learning Algorithms.

*Keywords***: -***OpenCV, numpy module, python IDE, Facial Emotion Recognition*

I. INTRODUCTION

Humans are characterized with their unique facial attributes.
The need of face identification owing to security frameworks is a very big business market and thus the advancement of affirmative innovations in the emerging field of facial recognition is of great market and business potential. Significant applications of facial recognition involves bio science, law requirement and observation, human-PC collaboration, identification check, Criminal examinations ,identification of a particular person among a bunch of person photos and much more ..
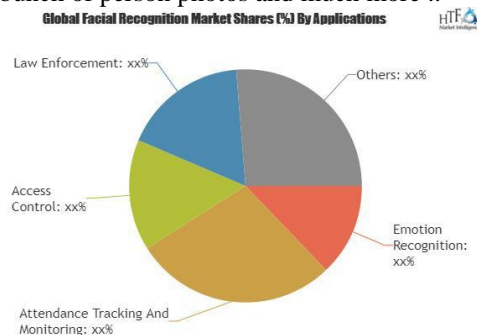

Fig 3. Facial Biometric Revenue region wise

The above figure details the applications of Facial recognition and the worldwide market potential in this field of emerging science. Unlike specialized applications, the concept of Facial Recognition has a huge potential worldwide, thus illustrated from the figure below.
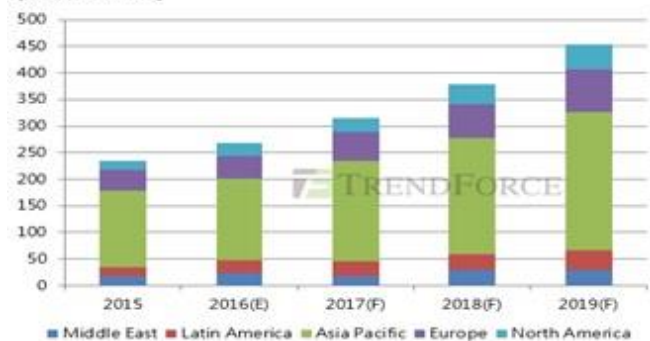

Fig 3. Facial Biometric Revenue region wise

Starting from 130M, the potential of Facial Biometrics is predicted to be closed to 1000M in the 2022, with the region of Asia Pacific leading with the segment. (Fig 3).
. In the Facial Emotion Recognition and person identification approach, human faces are taken, data processed, trained and stored in the database. The Person to be identified image is captured with the camera and the attributes are compared with the test dataset. The point is to look out a face in the database, which has the most similar attributes with the given face. In the field of bio science, face acknowledgment innovation is one among the quickest developing fields. The need of face acknowledgment in security frameworks is defined to the business intrigue and thus the advancement of affirmative innovations helps the advancement of face identification. Significant applications of facial recognition involves bio science, law requirement and observation, human-PC collaboration, sight and sound the board (for instance, programmed labeling of a specific individual inside a col-lection of advanced photos) brilliant cards, identification check, Criminal examinations, get to control the board.
     Facial Emotion recognitions can be predicted and monitored using machine learning algorithms. The trending algorithms can classify, test and predict the facial emotions using testing and

prediction models. These models can on the way compare the input data with the existing dataset to perform actions that can be used to detect and predict Face Emotion recognitions on the input dataset. This can also be used to enhance the applications and also the implementation of the same applications in various real time scenarios. Machine Learning Algorithms also can ensure the accuracy of the implementations.
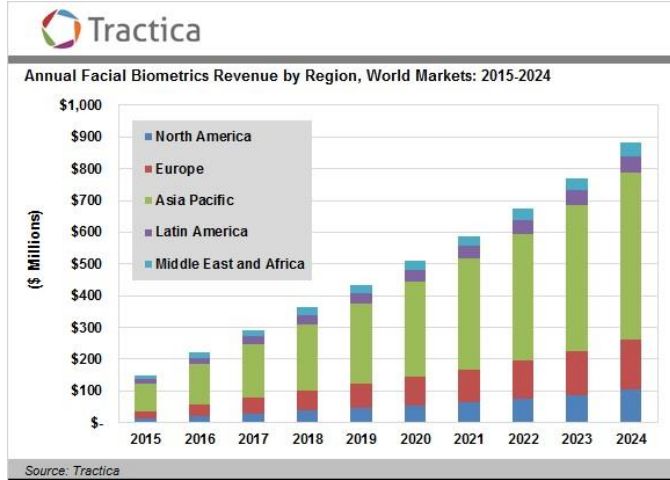

Fig 3. Facial Biometric Revenue region wise

Be that as it may, face emotion recognition is all the more testing due to some unpredictable attributes, for instance, glasses and facial hair will brings about recognizing viability. various sorts and edges of lighting will cause recognizing face to produce lopsided splendor on the face, which will have impact on the discovery and acknowledgment process. Anger or sorrow or happiness attributes show in with various

II.   EXISTING SYSTEMS

Facial emotion recognitions have been done earlier and our concept of implementation is to analyze the existing work done and improvise it by using latest trending algorithms and methods to derive at a solution that is more accurate comparatively. To conquer the issues, the existing frameworks are essentially utilizing face acknowledgment framework using SVM and Random Forest Algorithms.

Other methods propose to save the images as datasets and process them using Python IDE, the Image Processing Open CV tool. These methods are time consuming and not cost effective. Moreover, Face detection in these methods are not pose variant and are not effective during various luminant and illuminant conditions. We require a cost effective face recognition solution, that is more accurate in predictive technologies and marking systems.
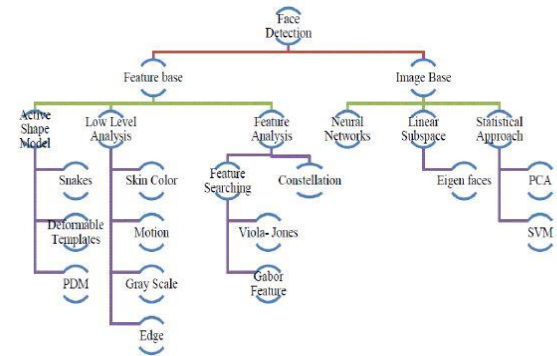

Fig 4 . Existing Method of Face Detection

III.   PROPOSED METHODOLOGY

We propose to detect facial emotions recognition via computer vision based statistical analysis. The proposed system is built using open cv model which runs on an open source framework called python. Initially, the python open cv detects the nearness of human at the camera. As and when the Person is identified and captured, we can take around 40-50 samples of face. Edges of the face such as Eyes, chin and mouth are identified and photo captured automatically and stored in the database.
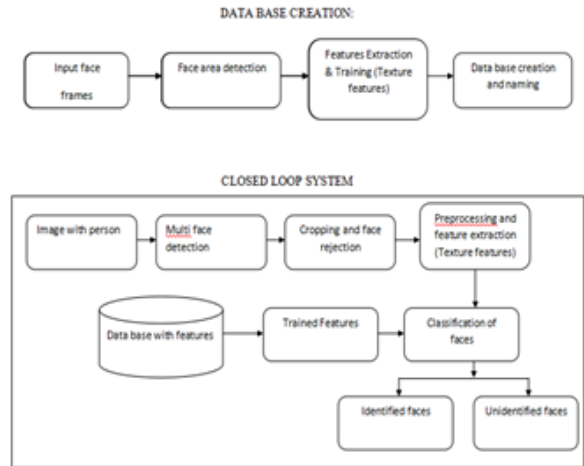

Fig 5. Block Diagram of Proposed Method of Face Emotion Recognition

Similar database capturing on N number of persons can be done in the similar way. SVM Algorithm is applied for face edge detection is an efficient tool to analyses the edge detection in the person face. The process is simple and accurate.

Attendance marking system is done using comparative analysis in Open CV Technique. The Face image of the person to be compared is taken. It is then compared to the existing database for similarities in attributes. Once the matching record is found,

the name of the person is automatically stored in the Database. This precision statistical analysis is within milliseconds and the results are 98% accurate. Pose alignment and variant illuminating photographs of the same can be stored in the database and attributed compared.

If the face is recognized then it infers that an approved individual is pursuing for the entryway get to and subsequently, the emotions are recognized. Off chance that the face isn't perceived, at that point the remote client checks the picture of the individual and displays that the person is not recognized.

IV.   SYSTEM REQUIREMENTS

A.*Hardware Requirements:*

Camera: Camera is nothing but a camera module. Specially designed cameras also can be used, but the webcam from the laptops / systems also can be employed. It can also be used for HD video recording and to capture photographs.

B.*Software Requirements:*

Python : It is an android application used for instant messaging services. It allows exchanging of messages, photos, video files, audio files, etc., it assures end-to-end encryption between the users communicating with each other. It can be installed and used on any android devices. It is a fast, secure and an easy application.

OpenCV (Open Source Computer Vision): OpenCV is an open platform for programmers for real time computer vision and computations. It supports many libraries of programming capacities It is based on C++ and has ties with Java, Python and MATLAB. It runs on an enormous assortment of stages like Windows, Linux, Android, iOS, macOS, and some more. Picture what's more, video preparing is two of the principle uses of Open CV.

V.   PROCESS FLOW

The process flow of the automated attendance marking system using Facial recognition is explained as in fig 6
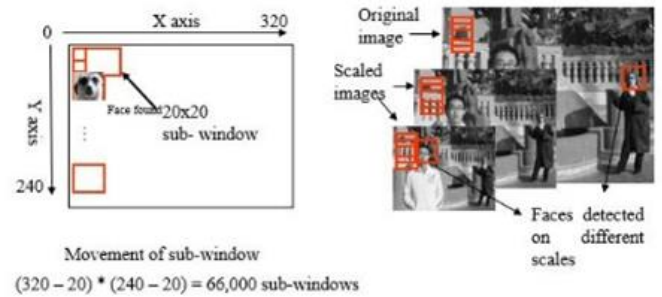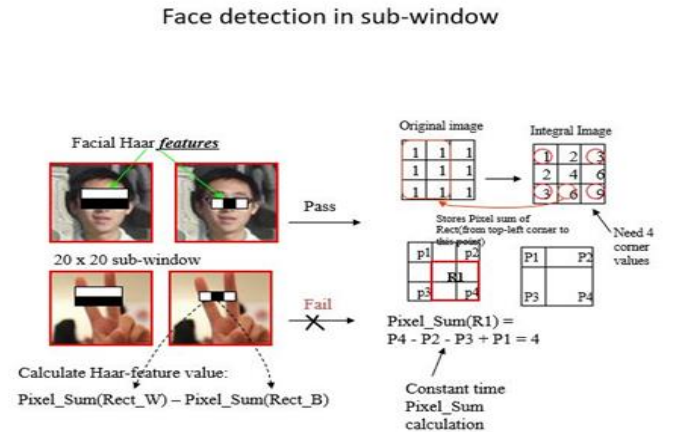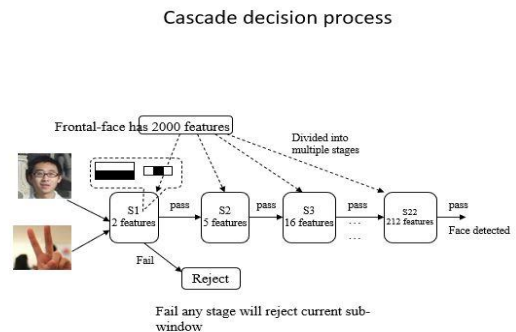

Fig 6 .Performance Diagram of Proposed Method of Face Attendance marking
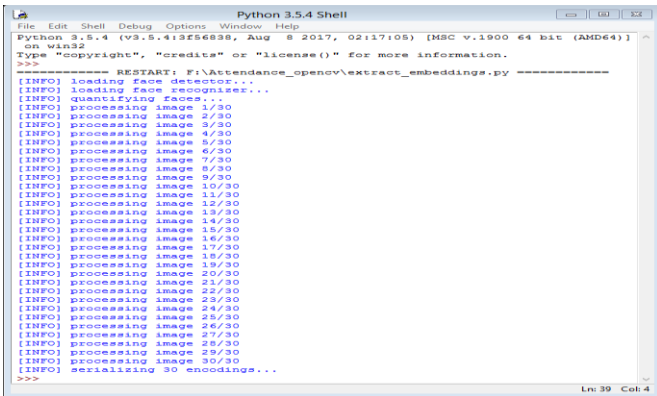

A. Database Creation:

The Process of capturing and storing images of the authenticated persons of a classroom / work environment forms the first step towards this process flow. The captured images are stored in the files as in fig 7

B. Feature Extraction & Comparison

Extracting images from the data base and comparison While we are extracting the files the number of images captured by each student are counted. Processed image is then processed in the

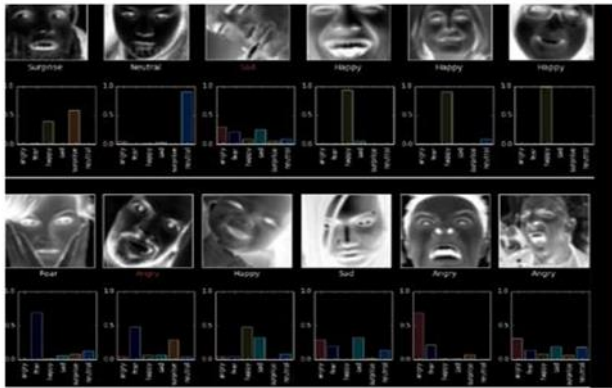python shell and will be displayed with the person's name marked in the attendance.

C. Face Emotion Recognition

Face Emotions Recognition and attendance marking is the final step towards the completion of the implementation.

VI.   RESULTS & FUTURE ENHANCEMENTS

The Results of Facial Emotions Recognition is enabled Enhancements for the implementation can be done via different algorithms and different modes. Video Processing of automated attendance can also be tried to implement.

VII.   REFERENCES

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