Face Recognition

Pavan Mishra[1] Mradul Mangolia[2] Poornansh Tailor[3] Kavita Namdev[4]
[1,2,3]Student [4]Sr. Assistant Professor
[1,2,3,4]Department of Computer Science and Engineering
[1,2,3,4]Acropolis Institute of Technology and Research, Mangliya Square, Bypass road, Indore (MP), India

Abstract— As consciousness hits human brain approx 80 thousand years ago from there the whole humanity became an endeavour to find secure and stable way to spend life a sustainable way so that humans can enjoy their logical game to find new philosophies and laws of nature so that it can truly understand himself. Face recognition on the other can became the key resource in that vision of humanity. This paper looks at the possibility of creating a new software which can recognize and understand human expression which will provide a deep understanding over emotion and psychological working of any mammal brain, on the other hand it can became one of the key resource in surveillance system which can trace any harmful human or animal at a lightening speed of it is used properly.

Keywords: Face Recognition

I. INTRODUCTION

The 21st century is a modern and scientific era in which a lot of progress has been achieved as to expedite humans for accomplishing their tasks. In support of above statement, nowadays use of computer technology has been an integral part of life. Computers are being used in pyramids of applications, which range from simple to complex problem solving methods. Among such contributions face recognition technology has emerged as useful tool to recognize features of faces through their inherent traits. And it has been one of the most researched areas in the field of pattern recognition and computer vision. However, due to its wide use in multitude of applications such as in biometrics, information security, law enforcement access control, surveillance system and smart cards. But it possesses many challenges for researcher that needs to be addressed. Face an object depends on facial expressions, which constitute meaningful features. For instance, pose invariance, illuminations and aging which are potential areas that require further investigation over previous work. The result of previous researches reveals that facial expressions are changing with respect to aging; therefore, they could not be permanently modeled in face recognition.

As faces are natural objects so they are very complex multidimensional structure and stand in stark contrast to sine wave gratings. In computer vision research the "block world" and other artificial methods are used.

Many attempts were made in the last to understand and recognize human emotion from facial expressions, as well as many detailed research on perception of the face over the past 30 years are done. Analyzing the emotional expression of a human face requires a number of preprocessing steps which attempt to detect and locate characteristic facial regions, extract facial expression features, and model facial gestures using anatomic information about the face. Although all these steps are equally important, current research mostly concentrates on the facial expression feature detection and description, which is also the focus of this paper.

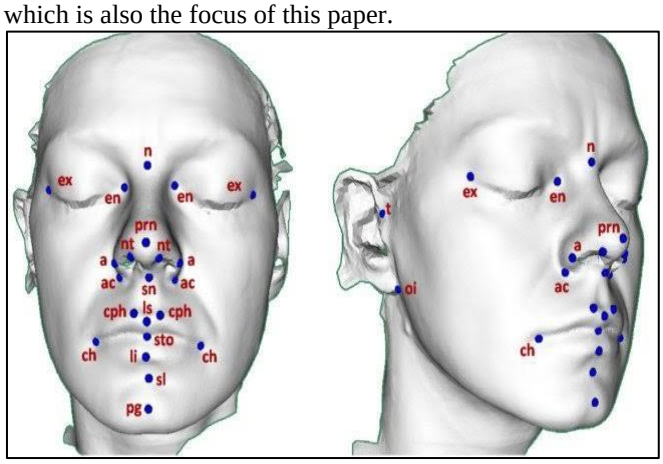

Fig. 1: 3D face detection

Facial expression features are mainly represented by three categories: (1) temporal; (2) analytic; and (3) 2D versus 3D. Most research over the past thirty years has been directed towards temporal, analytic, 2D feature extraction, focusing primarily on two types of features: 2D geometric features and appearance features from 2D static images or video sequences. Geometric features are defined by a set of facial feature points used to calculate facial organs' shapes or expressive regions. Appearance features refer to the features exhibited on the skin or action units Over the past decade, many of the techniques have been developed for facial expression recognition, including optical flow and Gabor wavelets, and FACS-feature based techniques. A good review of new development in this field can be found in. All recent advances have been based on 2D images or videos, and most were primarily concerned with extracting prototypic expressions from frontal or near frontal views of a face.

II. RELATED WORKS

A. 3D Facial Expression Recognition

In this system the researchers were using 3d module instead of using 2d frame or a video frame to understand the constant changing emotion and their intermixing. The research also made an attempt to change the tradition in this field as 3d primitive recognition is not been used that much.

B. Face Recognition Using Eigen faces

In this study detection and identification of human faces and describe a working, near-real-time face recognition system which tracks a subject's head and then recognizes the person by comparing characteristics of the face to those of known individuals. Our approach treats face recognition as a 2D detection problem, taking account of the fact that faces are are normally upfront and thus may be described by a small set of 2-D quality views.

C. Face ID

Face ID is a facial recognition system designed and developed by Apple Inc. for the iPhone (X, XR, XS, XS Max, 11, 11 Pro, 11 Pro Max) and iPad Pro (third and fourth generation). The successor to Touch ID, the system allows biometric authentication for unlocking a device, making payments, and accessing sensitive data, as well as providing detailed facial expression tracking for Animoji and other features. Initially released in November 2017 with the iPhone X, it has since been updated and introduced to all new iPhone and iPad Pro models.

III. Literature Survey

A. Proposed work

The task of the proposed system is to capture the face of each object looking for detection and to store it in the database for their recognition. The face of the object needs to be captured in such a manner that all the feature of that objects face needs to be detected, even the expression of the object need to be recognized.

System design some of the interfaces, components, architecture and database to satisfy the requirements. Proposed automated attendance system can be divided into few modules.

B. Image capture:

Camera will capture the image of the students at the beginning after capturing the image the next process is to detect the image it goes to the face detection.
Face Detection:

C. Face Detection:

The face detection algorithm will increase the efficiency of the face recognition. There are some of the algorithms was proposed for face detection as face geometry-based performances.

We observed algorithm gives the better output in different conditions to combine the multiple classifiers for better detection rate. Up to 30degrees angle the image is going to be detected.

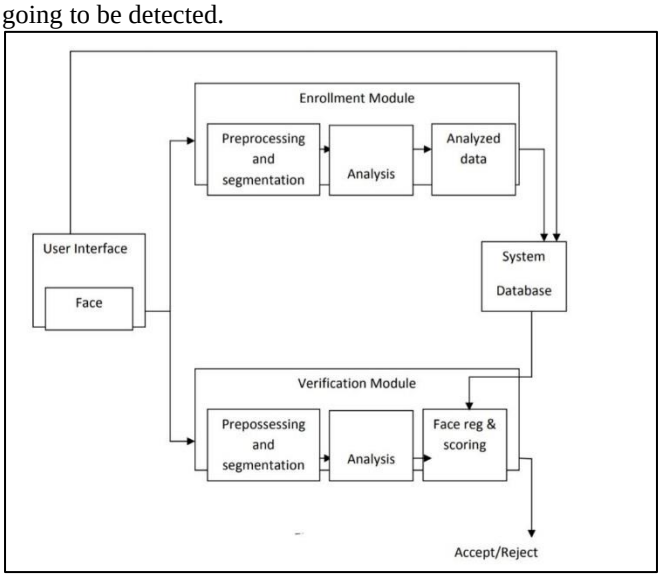

Fig. 2: Activity diagram

D. Database Development:

In every individual requirement biometric based system recognition can be chosen. In this phase we consider the image capture to way person as individual features. We extract the face and store the features in the database after identifying.

E. Proposed Algorithm:

1) The person's image will be captured.
2) Apply detection algorithms for detecting the face.
3) Face recognition is going to be recognized.
4) Apply pre-processing image.
5) If enrollment phase
   Then store in database
   Else
   Apply feature extraction
   Apply for classification
   End if
6) Post-processing.

IV. Research Methodology

Face recognition is that the task of identifying an already detected object as a known or unknown face. Often the matter of face recognition is confused with the matter of face detection Face Recognition on the opposite hand is to make a decision on if the "face" is someone known, or unknown, using for this purpose a database of faces so on validate this input face. face recognition could even be a biometric technology that uses distinguishable countenance to spot a personal. Allied marketing research expect the biometric authentication market to grow Today, it's employed in an exceedingly range of how from allowing you to unlock your phone, undergo security at the airport, purchase products at stores and with just just in case of entertainer and musician Taylor Swift it absolutely was accustomed identify if her known stalkers came through the gate at her Rose Bowl concert. Today, we are inundated with data of every kind, but the plethora of photo and video data available provides the dataset required to make biometric authentication technology work. Biometric authentication systems analyze the visual data and countless images and videos created by high-quality communication systems (CCTV) cameras installed in our cities for security, smart phones, social media, and other online activity. Machine learning and AI capabilities within the software map distinguishable countenance mathematically, hunt for patterns within the visual data, and compare new images and videos to other data stored in biometric authentication databases to work While initially a form of computer application, it's seen wider uses in recent times on mobile platforms and in other sorts of technology, like robotics. it's typically used as access control in security systems and will be compared to other biometrics like fingerprint or eye iris recognition systems.[4] Although the accuracy of biometric authentication system as a biometric technology may be a smaller amount than iris recognition and fingerprint recognition, it's widely adopted due to its contactless and non-invasive process.[5] Recently, it's also become popular as a commercial identification and marketing tool.[6] Other applications include advanced

human-computer interaction, video surveillance, automatic indexing of images, and video database, among others..

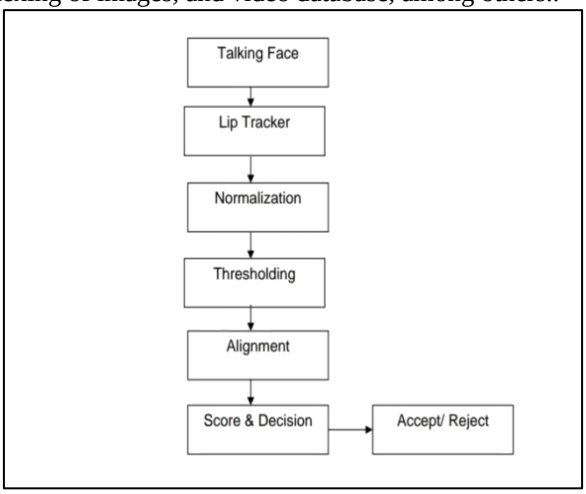

Fig. 3: Face Detection flow diagram

Technical feasibility performs the subsequent tasks. Analyzes the technical skills and capabilities of the software development team members determines whether the relevant technology is stably established. Under different circumstances, different testing methodologies are to be used which is in a very position to be the clincher for software robustness and scalability. The developer of the software conducts testing and if the project is big then there's a testing team: All programmers should test and verify that their results are in step with the specification given to them while coding. The system with manual face detection and automatic face recognition failed to have a recognition accuracy over 90%, due to the limited number of faces that were used for the PCA transform. this method was tested under very robust conditions during this experimental study and it's envisaged that real-world performance are visiting be way more The fully automated frontal view face detection system displayed virtually perfect accuracy and within the researcher's opinion further work needn't be conducted during this area. The fully automated face detection and recognition system wasn't robust enough to appreciate a high recognition accuracy. the sole reason for this was the face recognition subsystem failed to display even a bit degree of invariance to scale, rotation or shift errors of the segmented face image. This was one altogether the system requirements identified in section 2.3. However, if some style of further processing, like a watch fixed detection technique, was implemented to further normalize the segmented face image, performance will increase to levels corresponding to the manual face detection and recognition system. Implementing the watch fixed detection technique would be a minor extension to the implemented system and wouldn't require a beautiful deal of additional research. All other implemented systems displayed commendable results and reflect well on the deformable template and Principal Component Analysis strategies. The most suitable real-world applications for face detection and recognition systems are for mug shot matching and surveillance. There are better techniques like iris or retina recognition and face recognition the thermal spectrum for user access and user verification applications since these need a awfully degree of accuracy. The real-time automated pose invariant face detection and recognition system proposed in chapter seven would be ideal for crowd surveillance applications. If such a system were widely implemented its potential for locating and tracking suspects for enforcement agencies is immense .The implemented fully automated face detection and recognition system (with a watch fixed fixed detection system) are often used for straightforward surveillance applications like ATM user security, while the implemented manual face detection and automatic recognition system is correct of mug shot matching. Since controlled conditions are present when mug shots are gathered, the frontal view face recognition scheme should display recognition accuracy much better than the results, which were obtained during this study, which was conducted under adverse conditions presented an approach and developed an algorithm for detecting malaria, automated malaria detection and quantification of malaria infection. Also, we developed a way to teach with machine learning, to detection of malaria with other styles of parasite and also discuss to extend the predictive value with results.

V. RESULT

The main working principle of the project is that, the video captured data is converted into image to detect and recognize it.Face Detection is the process where the image, given as an input (picture) is searched to find any face, after finding the face the image processing cleans up the facial image for easier recognition of the face. CNN algorithm can be implemented to detect the faces.This program can classify whether images contain which mammal. This is easy for humans, dogs, and cats. Your computer will find it a bit more difficult. But i made it possible with 94.4% accuracy.

VI. CONCLUSION AND FUTURE REMARKS

In this paper we have investigated a new dimension of face recognition which can change our understanding of psyche and body language to a different level as well as will be helpful in predicting complex human behaviour at the same time we can use these techniques in surveillance system in the whole world to possibly achieve the toughest of human dreams. A society of consist of knowledge and stability.

Future development of this technology could be:

- The development trends and achievements in the realm of face recognition shows that a lot of researchers have been carried out in last four decades.
- Currently, face recognition system has been implemented for many real-time applications, but still it suffers from several challenges that need to be addressed in order to design a well-established face recognition system.
- Developed face recognition techniques could be analyzed over varying facial expression i.e. under varying lighting conditions and pose. And evaluation could be performed using benchmark and latest face databases.

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