Face Detection And Recognition

Mr. Parcean Darjee[1], Mandeep Subba[2], Karma Tashi Sherpa[3]
[1, 2, 3] Dept of Computer Science and Technology
[1, 2, 3] Centre for Computers and Communication Technology, South Sikkim, India

Abstract- *There are different facial recognition techniques in use, such as the generalized matching face detection method and the adaptive regional blend matching method. Most facial recognition systems function based on the different nodal points on a human face. The values measured against the variable associated with points of a person's face help in uniquely identifying or verifying the person. With this technique, applications can use data captured from faces and can accurately and quickly identify target individuals. Facial recognition techniques are quickly evolving with new approaches such as 3-D modelling, helping to overcome issues with existing techniques.*

Keywords- 3D modelling

I. INTRODUCTION

A facial recognition system is a technology capable of identifying or verifying a person from a digital image or a video frame from a video source. There are multiple methods in which facial recognition systems work, but in general, they work by comparing selected facial features from given image with faces within a database. It is also described as a Biometric Artificial Intelligence based application that can uniquely identify a person by analysing patterns based on the person's facial textures and shape.

It has seen wider uses in recent times on mobile platforms and in other forms of technology, such as robotics. It is typically used as access control in security systems and can be compared to other biometrics such as fingerprint or eye iris recognition systems. Although the accuracy of facial recognition system as a biometric technology is lower than iris recognition and fingerprint recognition, it is widely adopted due to its contactless and non-invasive process.

II. ANACONDA

It's a free and open-source distribution of the Python and R programming languages for scientific computing (data science, machine learning applications, large-scale data processing, predictive analytics, etc.), that aims to simplify package management and deployment. Package versions are managed by the package management system conda.

2.1 Biometric Artificial Intelligent

Artificial intelligence is finding a home inbiometric security, especially as it pertains to behavioural and multimodal biometrics. Take, for example, typing behaviour biometrics, or handwriting. In a traditional system, initial enrolment in the biometric system attains the basic samples and a given tolerance for error is implemented.

III. STUDY AREA

We have collected information of face detection and recognition, provided by the article [3], and some of the data from web search, software and also from other sources.

IV. OBJECTIVES

The objective of this software is to locate facial characteristics using neural network.

- The main objectives of our software is to extract the features of the face, where those features will be basically storeas a template that will be used for recognition.
- Basically, to store the features as a template that will be used for recognition.

V. LITERATURE SURVEY

The technique for real time human face detection and tracking using a modified version of the algorithm suggested by Paul viola and Michael jones [1]. This developed algorithm computes data and produce results in just a fraction of seconds. Using the technique like integral image and AdaBoost learning classification function which when given a set of features and a training set of positive and negative images, to learn a classification function any number of machine learning approaches could be used. AdaBoost is used to train the classifiers as well as to select a small set of features and integral image simplifies the calculation of sum of pixels involving just four pixels which makes thing super-fast. The system also describes the localizing and extracting the face region from the background .it also has several applications in areas such as content-based image retrieval video coding, video conferencing, crowd surveillance and

intelligent human computer interfaces [2]. A wide variety of techniques have been proposed, ranging from simple edge-based algorithms to composite high level approaches utilizing advanced pattern recognition methods. The various author aims for an automatic face recognition or facial expression recognition using the three proposed method which has the three stages: (a) face detection, (b) feature extraction and (c) facial expression recognition. Skin colour is used as a feature for detecting human faces and the output of the first phase is used for extracting the facial features like eyes, nose, and mouth using Active Appearance Method (AAM) [3]. The automatic facial expression recognition involves simple Euclidean Distance method. For real time detection of face in sequential frames containing face and complex object in background with less processing time for detection and recognition process. To reduce human intervention and increase overall system efficiency the system is segregated into three stages-motion detection, face detection and recognition [4]. Motion detection reduces the search area and processing complexity of system. Video processing is used to detect movement of multiple object in static and dynamic background in a near real time change or motion detection is accomplished with background. Motion detection is done using background subtraction model [4] to localized moving object. In order to aim at security and surveillance using raspberry pi kit making the system cost effective and easy to use with high performance. This paper aims at taking face recognition to a level in which the system can replace the use of passwords and RFI cards for access to high security system and building. Object Detection [5] using Haar feature-based cascade classifiers was also used which is an effective method which was proposed by Paul Viola and Michael Jones. It is an adaptive machine learning based approach in which a cascade function is trained from several positive and negative images. This is then used to detect objects in other images. Initially, this algorithm requires plenty of positive images (images of faces) and negative images (images without faces) to train the classifier. Then Features are extracted from the images.

VI. LIMITATIONS

After going through papers of different authors the limitations which need to be consider in further implementation of Face detection and recognition system is, it can only track up to fifty faces. No comprehensive comparative evaluation has been done and need to be implemented new algorithm. The system can detect only six universal expression, the method has less computational complexity and it is not popularly used due to unreliability and in ability to handle minute variations in the features. Add feature like recording time and date for a person whose image has been recognized and also keep it on a database for making system more useable. Cost factor can be reduced by implementing the cheaper system like face detection and recognition for making more authentic and comprehensive system for the users.

Table 1: (Comparative of various system on Face Detection and Recognition)

SL No	Author and publication house	Title of the paper	Techniques used	Limitation
1	Jatinchatrath, Et.al 2014 International Conference on Signal Processing and Integrated Networks (SPIN)	Real time human face detection and tracking	Human face detection, Integral Image, AdaBoost.	This system can detect and track up to 50 human faces
2	Ishita Gupta, Varsha Patil, Chaitali Kadam, Shreya Dumbre. 2016 IEEE International WIE Conference on Electrical and Computer Engineering (WIECON-ECE) 19-21 December 2016, AISSMS, Pune, India	Face Detection and Recognition using Raspberry Pi	-Face recognition, face detection,Haar Detection, PCA, and Raspberry Pi.	We can add feature like recording time and date for a person whose image has be recognized and also keep it on a database
3	Nawaf Yousef Almudhahka , Mark S. Nixon, Jonathon S. Hare	Automatic Semantic Face Recognition	Soft biometrics labelled face in wild dataset	Add some gesture movements for automatic reorganization of face

4	Erik Hjelmas , Boon Kee Low Received October 23, 2000; accepted April 17, 2001	Face Detection: A Survey	face detection; face localization; facial feature detection; featurebased approaches; image-based approaches.	No comprehensive comparative evaluation.
5	Md. SyadusSefat, Abdullah Al Mamun Khan, Md. Shahjahan ,3rd international conference on informatics, electronics and vision 2014	Implementation of vision based intelligent home automation and security system	Autonomous system, Counting mechanism, Image processing, OpenCV. I	The system can also count the number of people in the room by using image processing algorithm and will automatically turns off the entire load in the room when no one is present
6	S. V. Tathe, A. S. Narote , S. P. Narote 2016 Intl. Conference on Advances in Computing, Communications and Informatics (ICACCI), Sept. 2124, 2016, Jaipur, India	Human Face Detection and Recognition in Videos	Video Processing, Motion Detection, Face detection, Face Recognition	The method has less computational complexity .it is not popularly used due to unreliability and inability to handle minute variations in the features
7	Tian Xuehong School of Education Science Hangzhou Normal University Hangzhou, China	Face Recognition System and It's Application	Face recognition; Image Processing; Discriminant Analysis	There must be adequate test image to do feature extraction
8	Qianqian Zhao, Hualong Cai, 2010 2nd International Conference on Future Computer and Communication	The Research and Implementation of Face Detection and Recognition Based on Video Sequences	Kalman filter; face detection and recognition	The input sequences used for this researched in this paper is the video sequences with static background
9	Markus mathis, RadrigoBenenson,MarcoPedersoli,Lu e Van Gool	Face detection without bells and whistles	Integral channel features detector, FDDB dataset	This research they did not focused on face quality and high performance which remain un explained
10	AnaghaS. Dhavalikar,Dr.R.K.Kullarni, 2014 International Conference on Electronics and Communication System (ICECS -2014)	Face Detection and Facial Expression Recognition System	Face detection, Feature extraction, AAM, Expression recognition, Euclidean Distance, ANFIS	It can detect only six universal expression

VII. CONCLUSION

Theabove information has exclusive list of various methodologies that imply on finding out various features of face and facial extraction that can be of use for detection and recognition.

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