Face Detection using machine learning Kit on Firebase

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***Abstract*— Everybody has tuned in with regards to the face discovery program constructed utilizing python however here we will make an android application utilizing AI unit on firebase which will do a similar stuff as the python program. It will be a straightforward application with a basic UI in which the client will be welcomed with a camera button on the landing page to open a camera and afterward it will recognize the face and show the outcome in a ready exchange box. Firebase Machine Learning kit:-Back in the days, using machine learning capabilities was only possible over the cloud as it required a lot of compute power, high-end hardware etc… But mobile devices nowadays have become much more powerful and our Algorithms more efficient. All this has led to on-device machine learning a possibility and not just a science fiction theory. Firebase Real time Database is a Cloud-hosted database, i.e. it runs on a cloud and access to the user is provided as a service. It stores data in JSON format(JavaScript Object Notation, a format to store or transport data). All the users connected to it can get access to the data at Real Time. Firebase Real time Database is a Cloud-facilitated information base, for example it runs on a cloud and admittance to the client is given as a service. It stores information in JSON format(JavaScript Article Documentation, a configuration to store or ship information). Every one of the clients associated with it can gain admittance to the information at Constant.**

Keyword:- Machine learning, Firebase, face detection

I. INTRODUCTION

Over the most recent couple of many years, a ton of exploration has been done in face discovery. We can recognize an individual's face without the assistance of any human help. In this paper, a framework is carried out to assess the human face identification. A model that can be utilized in many sorts of gadgets to recognize computerized pictures is called face discovery. It is a particular instance of article class discovery. Isearches for the area and size of all the highlights belonging to a given class. The primary need of this model will be on the front facing face recognition. In this face-recognition model, it initially distinguishes expected natural eye areas by first assessing all the conceivable valley areas in given dim level casing or picture. The wellness worth of a component is not set in stone dependent on its projection on the eigen -faces. After such countless emphases , the symmetry of the still up in the air and the presence of different facial components is tried and affirmed.

FACERECOGNIZATION: DIFFERENT APPROACHES OF FACE RECOGNITION:

There are two predominant approaches to the face recognition problem: Geometric (feature based) and photometric (view based). As researcher interest in face recognition continued, many different algorithms were developed, three of which have been well studied in face recognition literature. Recognition algorithms can be divided into two main approaches:

1. Geometric: Is based on geometrical relationship between facial landmarks, or in other words the spatial configuration of facial features. That means that the main

geometrical features of the face such as the eyes, nose and mouth are first located and then faces are classified on the basis of various geometrical distances and angles between features. (Figure 3) 2. Photometric stereo: Used to recover the shape of an object from a number of images taken under different lighting conditions. The shape of the recovered object is defined by a gradient map, which is made up of an array of surface normals (Zhao and Chellappa, 2006) .

II. LITERATURE REVIEW

Face identification is an incredible report in the PC vision. In days of yore i.e.(before 2000) many investigations also, down to earth exhibitions of the face identification was not good until Viola and Jones proposed a work. These Viola and Jones are the primary who are applying rectangular boxes for the face. Yet, it has parcel of downsides as its element size was enormous. In a 24 × 24 picture, the complete number of Haar_like highlights is 160,000 and furthermore it isn't taken care of for wild faces and front facing faces. In the wake of tracking down the above issue, individuals have invested part of energy to present with more muddled highlights (Hoard, Filter, SURF, and ACF). In presented the new element NPD which will separate the two pixels power. Another notable strategy is Dlib[7] which took support vector machine as a classifier in the face identification. Extending the heartiness in the identification is another extraordinarily concentrated on theme. One of the straightforward strategy is to consolidate various location that ought to be prepared independently in various perspectives. Zhu et al. It is applied various deformable models to take faces in various views. Shenet al given a recovery based model joined with various learning. These models require preparing and testing where it will require some investment and its presentation is less. In 2002 Garcia et al.It is presented a neural organization to track down the semi - front facing human appearances in the complicated pictures. In 2005 Osadchy et al. prepared a convolutional neural organization for the face recognition. Throughout the most recent couple of years, a great deal of face location and face acknowledgment work has been finished. As it is the most ideal way for perceiving an individual. Since itdoesn't need any human work to perceive faces. Since a ton of techniques developed for face acknowledgment and face location.

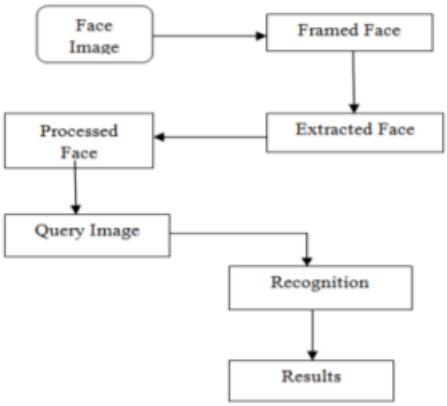

Figure.1 Flow Chart of Face Detection Model

III. METHODOLOGY

PROBLEM SCOP AND SYSTEM SPECIFICATION

The following problem scope for this project was arrived at after reviewing the literature on face detection and face recognition, and determining possible real-world situations where such systems would be of use. The following system(s) requirements were identified 1 A system to detect frontal view faces in static images 2 A system to recognize a given frontal view face 3 Only expressionless, frontal view faces will be presented to the face detection&recognition 4 All implemented systems must display a high degree of lighting invariency. 5 All

systems must posses near real-time performance. 6 Both fully automated and manual face detection must be supported 7 Frontal view face recognition will be realised using only a single known image 8 Automated face detection and recognition systems should be combined into a fully automated face detection and recognition system. The face recognition sub-system must display a slight degree of invariency to scaling and rotation errors in the segmented image extracted by the face detection sub-system. 9 The frontal view face recognition system should be extended to a pose invariant face recognition system. Unfortunately although we may specify constricting conditions to our problem domain, it may not be possible to strictly adhere to these conditions when implementing a system in the realworld.

Proposed System

Based on low level visual features like color, intensity, edges, motion etc.Skin Color BaseColor is avital feature of human faces. Using skin-color as a feature for tracking a face has several advantages. Color processing is much faster than processing other facial features. Under certain lighting conditions, color is orientation invariant. This property makes motion estimation much easier because only a translation model is needed for motion estimation.Tracking human faces using color as a feature has several problems like the color representation of a face obtained by a camera is influenced by many factors (ambient light, object movement, etc .

Conclusion

The computational models, which were implemented in this project, were chosen after extensive research, and the successful testing results confirm that the choices made by the researcher were reliable.The system with manual face detection and automatic face recognition did not have a recognition accuracy over 90%, due to the limited number of eigenfaces that were used for the PCA transform. This system was tested under very robust conditions in this experimental study and it is envisaged that real-world performance will be far more accurate.The fully automated frontal view face detection system displayed virtually perfect accuracy and in the researcher's opinion further work need not be conducted in this area. The fully automated face detection and recognition system was not robust enough to achieve a high recognition accuracy. The only reason for this was the face recognition subsystem did not display even a slight degree of invariance to scale, rotation or shift errors of the segmented face image. This was one of the system requirements identified in section 2.3. However, if some sort of further processing, such as an eye detection technique, was implemented to further normalise the segmented face image, performance will increase to levels comparable to the manual face detection and recognition system. Implementing an eye detection technique would be a minor extension to the implemented system and would not require a great 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 mugshot matching and surveillance. There are better techniques such as iris or retina recognition and face recognition using the thermal spectrum for user access and user verification applications since these need a very high 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 law enforcement agencies is immense. The implemented fully automated face detection and recognition system (with an eye detection system) could be used for simple surveillance

applications such as ATM user security, while the implemented manual face detection and automated recognition system is ideal of mugshot matching. Since controlled conditions are present when mugshots are gathered, the frontal view face recognition scheme should display a recognition accuracy far better than the results, which were obtained in this study, which was conducted under adverse conditions

REFERENCES

Adelson, E. H., and Bergen, J. R. (1986) The Extraction of Spatio-Temporal Energy in • Human and Machine Vision, Proceedings of Workshop on Motion: Representation and • Analysis (pp. 151-155) Charleston, SC; May 7-9 • AAFPRS(1997). A newsletter from the American Academy of Facial Plastic and Reconstructive Surgery. Third Quarter 1997, Vol. 11, No. 3. Page 3. • Baron, R. J. (1981). Mechanisms of human facial recognition. International Journal of Man Machine Studies, 15:137-178 • Beymer, D. and Poggio, T. (1995) Face Recognition From One Example View, A.I. Memo No. 1536, C.B.C.L. Paper No. 121. MIT • Bichsel, M. (1991). Strategies of Robust Objects Recognition for Automatic Identification of Human Faces. PhD thesis, , Eidgenossischen Technischen Hochschule, Zurich. • Brennan, S. E. (1982) The caricature generator. M.S. Thesis. MIT. • Brunelli, R. and Poggio, T. (1993), Face Recognition: Features versus Templates. IEEE Transactions on Pattern Analysis and Machine Intelligence, 15(10):1042-1052 • Craw, I., Ellis, H., and Lishman, J.R. (1987). Automatic extraction of face features. Pattern Recognition Letters, 5:183-187, February. • Deffenbacher K.A., Johanson J., and O'Toole A.J. (1998) Facial ageing, attractiveness, and distinctiveness. Perception. 27(10):1233-1243 • Dunteman, G.H. (1989) Principal Component Analysis. Sage Publications. • Frank, H. and Althoen, S. (1994). Statistics: Concepts and applications. Cambridge University Press. p.110 • Gauthier, I., Behrmann, M. and Tarr, M. (1999). Can face recognition really be dissociated from object recognition? Journal of Cognitive Neuroscience, in press. • Goldstein, A.J., Harmon, L.D., and Lesk, A.B. (1971). Identification of human faces. In Proc. IEEE, Vol. 59, page 748 • de Haan, M., Johnson, M.H. and Maurer D. (1998) Recognition of individual faces and average face prototypes by 1- and 3- month-old infants. Centre for Brain and Cognitive • Development, Department of Psychology, Birkbeck College. • Hadamard, J. (1923) Lectures on the Cauchy Problem in Linear Partial Differential Equations , Yale University Press