

Human Face Detection System for Door Security

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ABSTRACT

Face detection is challenging problems up to date; there is no technique that provides a robust solution to all situations. This paper presents a new technique for human face detection. Face detection is concerned with finding real image. Most face detection algorithms are designed in the software domain and have a high detection rate, but they often require several seconds to detect faces in a single image, a processing speed that is insufficient for real-time applications. This describes a simple and easy hardware implementation of face detection system using Raspberry Pi, which itself is a minicomputer of a credit card size. The system will program using Python programming language. Both real time face detection and detection from specific images, i.e. Object Recognition, will be carried out and the proposed system will test across various standard face databases, with and without noise and blurring effects.

Keywords: Face detection, Raspberry Pi, Door security, Python

I. INTRODUCTION

Traditional security systems require the user a key, a security password, an RFID card, or ID card to have access to the system. However, these security systems have deficiencies; for example, they can be forgotten or stolen from unauthorized people. As a result, there is a need to develop software that guarantees a higher security level. Face recognition is one of the most popular methods of biometric technology.

In this we come up with a new hardware system for human face detection which makes use of Raspberry Pi. It is a credit-card sized computer with the components mounted on a credit card sized motherboard, running a dedicated version of Linux. It plugs into TV and a keyboard. It is a capable little computer which can be used in electronic devices and for much functionality that a desktop computer can perform. It comes at a very low price use OPEN CV library that can be formulated as given images of a scene identify or verify one or more persons in the scene using a stored database of faces. The basic flow of the face recognition system is the image captured by camera. The algorithm detects the face and extracts its features. After the extraction, system matches the captured images with data base images. In the decision box the result of the matching is decide which is face match or the no face match. After that SIM300 GSM module sends an security alert to the authorized person which is entry successful or unauthorised person trying to unlock. Tools used are normal and widely applied for current applications and python as the main programming language &Linux based operating system. The system may be implemented in real time systems requiring user authentication such as attendance systems, ATM security, Network security, In Bank locker, Home automation.

II. LITERATURE SURVEY

As From the rigorous review of related work and published literature it is observed that many researchers have designed different techniques for human face detection.

L. Ma, Y. Xiao, and K. Khorasani [1]. In this paper researcher is proposed a new technique for facial expression, which uses the two-dimensional (2D) discrete cosine transform (DCT) over the entire face image as a feature detector and a constructive onehidden-layer feed forward neural network as a facial expression classifier. According to this paper by using constructive feed forward neural network facial expression recognition has done.

J. Nagi [2]. This paper has presented a novel face recognition technique that uses features derived from DCT coefficients, along with a SOM-based classifier. The system was evaluated in MATLAB using an image database of 25 face images, containing five subjects and each subject having 5 images with different facial expressions. According to this paper efficient High-speed face recognition system has design.

Keun-Kwak and W. Pedrycz,[3]. This paper is concerned with an enhanced independent component analysis (ICA) and its application to face recognition. Typically, face representations obtained by ICA involve unsupervised learning and high-order statistics. In this paper, develop an enhancement of the generic ICA by augmenting this method by the Fisher linear discriminate analysis.

Chen [4] This paper is concerned Most face detection algorithms are designed in the software domain and have a high detection rate, but they often require several seconds to detect faces in a single image, a processing speed that is insufficient for real-time application. According to this paper by using enhanced independent component analysis approach for face recognition are to be used.

L. Ma and K. Khorasani [7]. In this paper researcher is proposed the discrete cosine transform is an algorithm widely used in different applications. The most popular use of the DCT is for data compression, as it forms the basis for the international standard loss image compression algorithm known as JPEG. The DCT has the property that, for a typical image, most of the visually significant information about the image is concentrated in just a few coefficients. Extracted DCT coefficients can be used as a type of signature that is useful for recognition tasks, such as face recognition. According to this paper using 2D DCT and k-means algorithm are used for a new facial recognition technique.

A. Abdallah, M. Abou El-Nasr, and A. Lynn Abbott [5] In this paper researcher is proposed The last decade has shown dramatic progress in this area, with emphasis on such applications as human-computer interaction (HCI), biometric analysis, content-based coding of images and videos, and surveillance. In their survey, they describe a pre-processing step that attempts to identify pixels associated with skin independently of face-related features. This approach represents a dramatic reduction in computational requirements over previous methods since skin colour in humans varies by individual, research has revealed that intensity rather than chrominance is the main distinguishing characteristic. The recognition stage typically uses an intensity (greyscale) representation of the image compressed by the 2D-DCT for further processing. According to this paper using 2D DCT and self-Organizing feature map for face detection purpose.

D. Kumar, C.S. Rai, and S. Kumar [6]. In this paper researcher is proposed the self-organizing map also known as a Kohonen Map is a well-known artificial neural network. It is an unsupervised learning process, which learns the distribution of a set of patterns without any class information. It has the property of topology preservation. There is a competition among the neurons to be activated or fired. The result is that only one neuron that wins the competition is fired and is called the "winner. According to this paper face recognition has been done using Self organizing Map.

E. Ifeachor and B. Jervis [9]. In the first stage, the 2D-DCT for each face image is computed, and feature vectors are formed from the discrete cosine transform (DCT) coefficients. The second stage uses a selforganizing map (SOM) with an unsupervised learning technique to classify vectors into groups to recognize if the subject in the input image is "present" or "not present" in the image database. If the subject is classified as present, the best match image found in the training database is displayed as the result else the result displays that the subject is not found in the image database. The rest of this paper is organized as follows: Section II discusses DCT computation on face images. Section III describes the design and architecture of the SOM neural network. Section IV shows experimental results, and discusses possible modifications and improvements to the system. Section V presents

concluding remark. According to this paper signal processing approach for face detection are to be used.

From the rigorous review of related work and published literature it is observed that many researchers have designed different techniques for human face detection in MATLAB. Raspberry Pi is very much in demand, from the study of literature work it is observed that our proposed systems can be efficient and improving for face detection even from poor quality images and shows excellent performance efficiency and for real time application.

III. METHODOLOGY

The aim is to provide a high security system using face detection on Raspberry Pi board and send an alert to the authorized person via GSM module; this will increase the security. By using this research methodology proposed work follow.

1) Interfacing of camera module to capture live Face image.

2) Create a database of authorized person

3) Capture current face, save it and compare with data base image.

4) Interface GSM module to send security alert to Authorized person.

5) Interface relay as an output module.



Figure 1. Basic Block diagram of Raspberry pi based face detection.

A. Camera module

Camera module is Pi camera interfacing to the raspberry pi module. It is used for captures an image and send captured image to the Raspberry pi module.

B. Raspberry pi module

Raspberry pi B+ module is small computer board. When image taken by the raspberry pi. It is compared with Eigen face image.



Figure 2. Raspberry pi model B

At the first time when we capture the image to create a data base raspberry pi module capture six types of the images to create a data base in the system and this data base is compared with the live captured image. After comparing two images output is positive/negative then it gives commands to GSM module.

C. GSM module

GSM module is used to sending a message to the authorities after comparison output is positive or negative. If output is positive then "Person Identified" message send to the authority person otherwise send "unknown person is trying to unlock the door".

IV. CONCLUSION

We have studied some literatures and observed that our proposed system by using Raspberry Pi can improve system result. This system can be used in several places like banks, hospitals, labs and other sophisticated automated systems, which dramatically reduce the hazard of unauthorized entry. Evidence can be given to the security department if any robbery issue occurs. For improve efficiency reduce complexity.

V. REFERENCES

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