FACE DETECTION AND RECOGNITION USING RASPBERRY Pi.

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Abstract: *In Today's world, the security frames the most essential segment of our lives. Face Recognition is an important part for the purpose of security and surveillance field. A small project which does face detection using OpenCV library on Raspberry Pi. Face Recognition/Facial Recognition is a category of biometric software which identifies people by their faces. Face is captured by digital camera and the system is trained and then it is capable of identifying the person.*

Keywords: **Face recognition, Raspberry Pi, PI Camera.**

1. INTRODUCTION

The Concept of image processing through python OpenCV platform has been used for human identification through face detection. Human Identification means to recognize a particular people through his unique structure like fingerprint, palm, and face detection. This is based on the implementation of face detection and recognition system.

The concept of image processing through python OpenCV platform has been used for human identification. Open Command Visualization (Open-CV) is an open source library in which the source code is open and it is useful in visual field such as image processing and identification. The main motto of this work is to take image and identify using face recognition. The testing of this technique has been proceed through raspberry Pi devices.

Face recognition has been an active research topic. Given an input image with 1 faces, face recognition systems typically first run face detection to isolate the faces. Each face is preprocessed and then a low-dimensional representation (or embedding) is obtained.

2. Literature Survey

In the proposed system, we use the camera to accomplish the pictures when a motion detect via PIR sensor. Subsequently, we will apply computer vision module to the caught pictures to discover the faces. This system is extremely helpful and vital if we want to protect an area. The application can be divided into two parts which are motion detection and face detection. The system will not go to face detection if there is no motion discovered in system. But, if a movement has detected, then the detected movement of the current frame will be processed by the algorithm. A Review of Face Recognition System Using Raspberry Pi A. K. Jain algorithm of face detection. To explicitly define a low-dimensional face representation based on ratios of distances, areas, and angles An explicitly defined face representation is desirable for an intuitive feature space and technique. However, in practice, explicitly defined representations are not accurate. Statistical techniques such as Principal Component Analysis represent faces as a combination

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of eigenvectors. However, these deep neural network-based techniques are trained with private datasets containing millions of social media images that are orders of magnitude larger than available datasets for research system.

3. Methodology

Raspberry PI is a small computer which has been used to develop an embedded system to perform a specific particular task. This electronic module has been operated with the use of raspbian operating system and is based on LINUX platform.

This module has SD card slot, Inbuilt WIFI and Bluetooth Connectivity, 40 GPIO pins for Input output operations, PI Camera Port, PI Display port, Audio Port, HDMI cable Port, 4 USB port for connecting pen drive, Mouse, Keyboard, USB Camera etc. It also has Ethernet port for data sharing as well as network sharing between computer and raspberry PI.

The Functionality of this system is mainly categorized as follows:

a. To identify and detect faces using camera connected to the Raspberry Pi .

b. To display the match status on the LCD as well as the terminal running on the VGA (Video graphics array) monitor .

c. To program for the system using python language.

d. The code imports certain modules that enable functions such as face recognition, GPIO modules.

e. The identification and authentication technology operate using the following four stages:
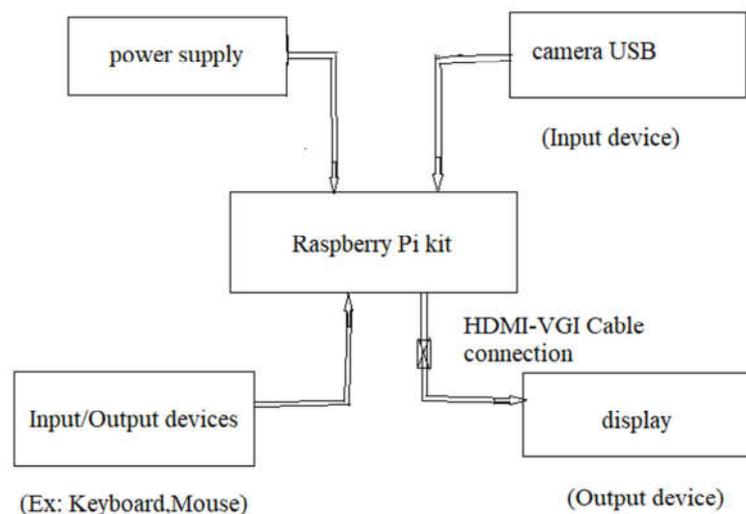

Fig1: Block diagram of Implementation of face detection and recognition system using Raspberry Pi.

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a. Capture: A physical or behavioural sample is captured by the system during enrolment and also in identification or verification process

b. Extraction: Unique data is extracted from the sample and a template created.

c. Comparison: The template is then compared with an existing sample.

d. Match/non match: The system decides if the features extracted from the new samples are a match or a non match and accordingly accept/reject.
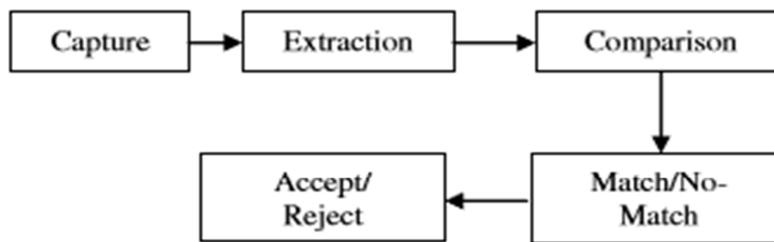

Fig2: Flow of Opeararion.

4. Conclusion

Efficient human Identification through face detection has been carried out relevant information. The performance of the system is based on three steps which are datasets, trainer and detector python script. An algorithm that has been used for image processing is Open CV and especially for face detection. As we talk about future modification of this project, It will be used in high security system and face detection based attendance system. Also we can develop projects based on image processing,
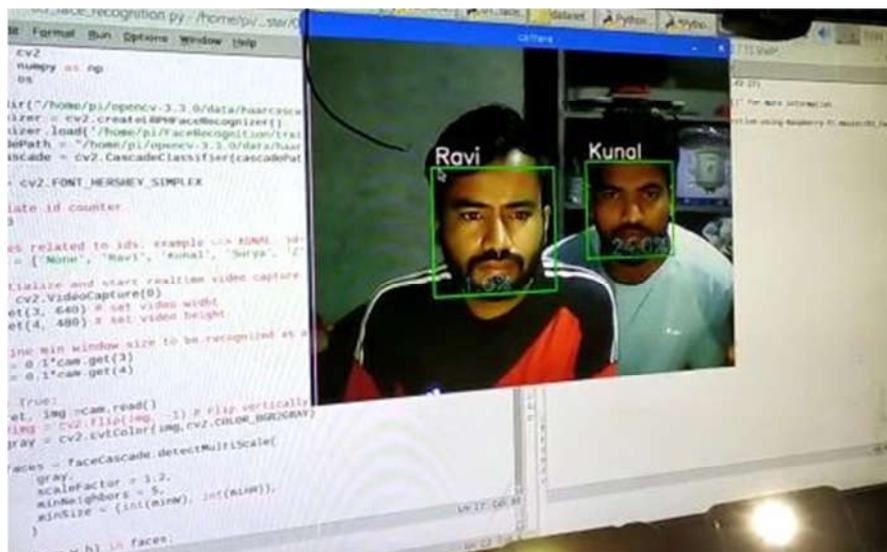
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