ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Detection and Tracking of Human Faces with an Active Camera

Kenda Srinivas
M.Tech(Embedded Systems)
Sindhura College of Engineering & Technology,
Godavarikhani
Karimnagar(Dt), India.

Konda Suresh
Assistant Professor
Sindhura College of Engineering & Technology,
Godavarikhani
Karimnagar(Dt), India.

ABSTRACT:

An image capture system with embedded computing can extract information from images without need for an external processing unit, and interface devices used to make results available to other devices. The choosing of an embedded platform is very unique and easy to implement. The paper proposed an image capturing technique in an embedded system based on Raspberry Pi board. Considering the requirements of image capturing and recognition algorithm, Raspberry Pi processing module and its peripherals, implementing based on this platform, finally actualized Embedded Image Capturing using Raspberry Pi system (EICSRS). Experimental results show that the designed system is fast enough to run the image capturing, recognition algorithm, and the data stream can flow smoothly between the camera and the Raspberry Pi board. Face recognition is a widely used biological recognition technology. In comparison with other identification methods, this type of recognition has direct, friendly and convenient features. The embedded face recognition system is based on ARM development board, using Linux operating system, detecting face and then recognizing face.

Keywords ***–Image capturing, Face Recognition, Embedded system, RFID, Biometrics, Sensors, Raspberry Pi board, USB camera.***

I. INTRODUCTION

Humans are highly possessive of their belongings. As a result demand for accesscontrol security system is high in this modern age. In access control users are identified and granted certain privileges to information, systems, or resources. Thereare different types of access control security systems like smartcards, tokens, encrypted keys, passwords and biometric systems. Main disadvantage of these conventional access control security system like smartcards, tokens, encrypted keys and passwords is that they depend only on data given to system and provide no information about the person who is accessing. Biometric systems are most modern and sophisticated access control security systems. They are, considered fail- safe, because it may be easy to hack a password, easy to get ack information embedded on a circuit, easy to decrypt ncrypted data, but it is almost impossible to make a replica of distinctive human characteristics. There are different biometric technologies like voice recognition, signature recognition, retinal scanning, iris recognition, finger print.

Traditional ways for personal identification depend on external things such as keys, passwords, etc. But such things may be lost or forgotten. One possible way to solve these problems is through biometrics, for every person has his special biometric features definitely. Biometric identification has gained increasing attention from the whole world [1]. Biometrics

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

features that can be used for identification include fingerprints, palm prints, handwriting, vein pattern, facial characteristics, face, and some other methods such as voice pattern, etc [2]. Compared with other biometric methods, the face recognition has the following advantages: The face image acquisition requires no physical contact, so face identification system is non-invasiveness since the face is created in a nearly random morphogenetic process during the gestation; it has little probability to find two people in the world whose face textures are identical.

II. RELATED WORK:

2.1 BLOCK DIAGRAM:

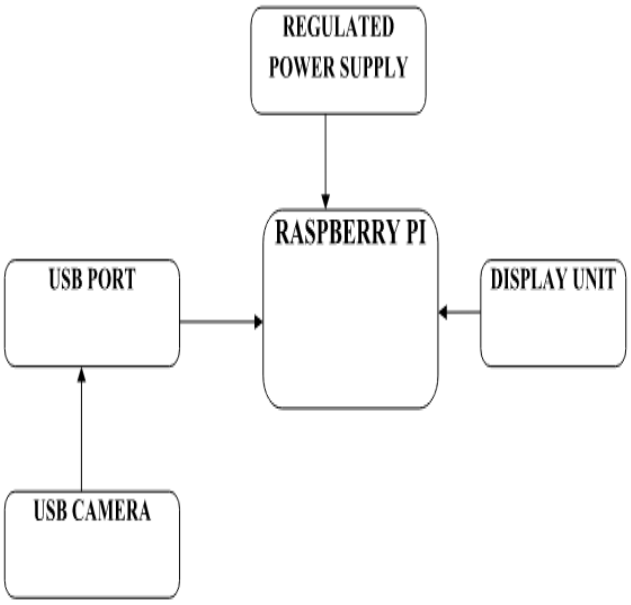

Figure-1: block diagram of the project

2.2. EXISTING SYSTEM:

In the existing method door can be controlled by using RFID module and sensors like PIR or IR sensors. In RFID method if any person wants to open the door, the RFID will read ID number from the person based on that the door will open otherwise we can control the door by using sensors. But in two methods we are not recognize the person. The person may be known person or unknown person. This is the main drawback present in existing system. There many intrinsic disadvantages to the existing system in terms of its practicability and effectiveness.

2.3. PROPOSED METHOD:

In the proposed method we overcome the disadvantage present in existing system by using single camera. When person comes at any security place first his face is recognized by using camera connected to controller through USB. First face is provided as input to controller which compares his faced with predefined images inside controller using face recognition algorithms. Once it finds face of a person is matched it automatically.

III. IMPLEMENTATION:

3.1 PROCESSOR:

This board is the central module of the whole embedded image capturing and processing system as given in figure. Its main parts include: main processing chip, memory, power supply HDMI Out, Ethernet port, USB ports and abundant global interfaces.

The main signal processing chip used in our system is a Broadcom 700MHz Chip in which CPU core is a 32 bit ARM1176JZF-S RISC processor designed by Advanced RISC Machines, Ltd. It has very rich peripheral. This main processing chip connects a camera and display units. Plenty of interfaces are contained on the Raspberry Pi board, including 4 USB ports through which a Keyboard and mouse can be connected, a HDMI out for connecting HD TVs and monitors with HDMI input or HDMI to DVI lead for monitors with DVI input.

Other peripherals like a standard RCA composite video lead to connect to analogue display if HDMI output is not used. Ethernet port is used for networking even though it is optional, although it makes updating and getting new software for Raspberry Pi board much easier. An Audio lead is also provided for getting the stereo audio if HDMI is not used, otherwise HDMI will get digital audio with it.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Figure-2: Raspberry Pi processor

3.2 USB CAMERA:

The camera module used in this project is USB CAMERA BOARD i.e. Raspberry Pi camera board. The camera plugs directly into the CSI connector on the Raspberry Pi. It's able to deliver clear 5MP resolution image, or 1080p HD video recording at 30fps. The module attaches to Raspberry Pi, by way of a 15 pin Ribbon Cable, to the dedicated 15 pin MIPI Camera Serial Interface (CSI), which was designed especially for interfacing to cameras. The CSI bus is capable of extremely high data rates, and it exclusively carries pixel data to the BCM2836 processor. This camera board which has no infrared filter making it perfect for taking infrared photographs or photographing objects in low light (twilight) conditions. Other features of this camera board are Automatic image control functions ,Programmable controls for frame rate 32 bytes of embedded one time programmable (OTP) memory and Digital video port (DVP) parallel output interface Excellent.

3.3 DESCRIPTION OF PROJECT:

This system is designed to identify the person, based on the images stored inside controller. In Face recognition system, two steps are involved one is detection of faces and other is recognition of detected faces. Here the controller performs some image processing algorithms like face detection based on haar features using OPENCV library. By using OPENCV libraries we can detect pedestrians, vehicles, signal detection by taking input image from USB camera connected to controller. Arm controller undergoes with Image processing techniques such that photograph or video streaming is displayed on label designed in GUI. The output of image processing may be either an image or a set of characteristics or parameters related to the image. Owner will train the images and will be stored in data base. Identified person image is displayed on display unit.

It performs the real time user using face recognition, using the Principle Component Analysis -Linear Discriminate Analysis (PCA LDA) algorithm. According to the comparison result (authentic or not), ARM processor triggers certain actions.

3.4 LIMITATIONS OF PROJECT:

- The main limitation of arm controller is clock delay methodology is that the read capture timing is more tightly constrained.
- There is no database maintenance for visitors.
- Privacy is decreasing most people can be found somewhere in front of webcam
- Unable to interact with people across long distances
- The maximum frequency up to which this micro controller can work is **533 MHz.**
- The whole system is very expensive.

IV. RESULTS:

Figure-3: Camera with processor

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

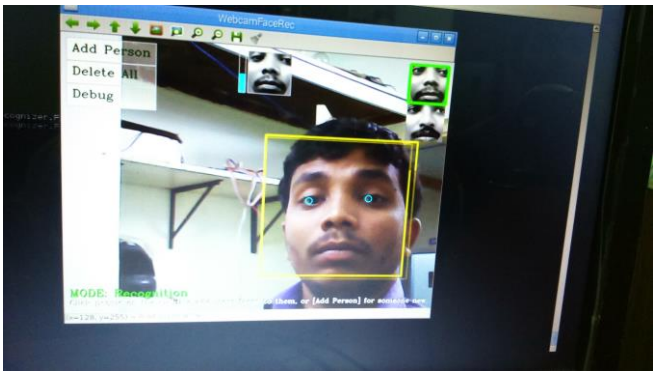

Figure-4: Face Recognition (1)

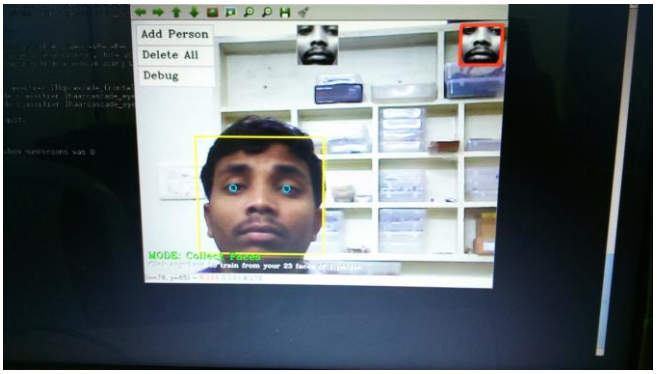

Figure-5: Face Recognition (2)

V. FUTURE SCOPE:

In the present method the camera captures owner's image only. If the owner's relatives or friends want to start the vehicle it will not start. To overcome this one, we can extend this project by storing multiple faces into the memory. If any person wants to start the vehicle, the camera compares the person's image with the all stored images. If the result is matched the motor will start otherwise, the unknown person's image will go to the owner's mobile. In the present method if the results are unmatched, the unknown person's image will goes to owners mobile only. We can extend this by sending the information to police control room for taking immediate action.

VI. CONCLUSION

It's a progress of realizing embedded image capturing system. We describe our design method in this paper. Based on these methods, we design the experimental prototype of the embedded image capturing system with Raspberry Pi system. This system is smaller, lighter and with lower power consumption, so it is more convenient than the PC-based face recognition system. Because of the open source code, it is freer to do software development on Linux. Experimental results show that it's an effective method of using Raspberry Pi board to actualize embedded image capturing system.

VII. REFERENCES

[1] David Zhang, Joseph P. Campbell, DavideMaltoni, Ruud M. Bolle, "Guest Editorial Special Issue on Biometric Systems", IEEE Transactions on Systems, Man, and Cybernetics-Part C: Applications and Reviews, VOL. 35.

[2] XIE Yonghua, LIU Chuancai, YANG Jinyu(2008). Thealgorithm based on DDCT and TCSVD of humanface feature extraction and recognition".THE COMPUTE ENGENIERING, Vol. 08, No. 1.

[3] G. Yang and T.S Hung, Human face detection in complex back ground, pattern recognition, vol.27,no.1.1994.

[4] M.S. Bayhan and M. Gokmen,‖Scale and pose invariant real time face detection and tracking,Proc.the23rdInt.Symposium on Computer and Information Science,pp.1-6,October 2008.

[5] ZHANG Rui, YU Zhongtang (2008).The method Of human-face recognition based on analyzed of two ranks and doubles two dimensions THE COMPUTER ENGENIERING, Vol. 08, No.5

[6] Raspberry Pi – www.raspberrypi.org

[7] FriendlyARM - www.friendlyarm.net/