Accessing ATM using Eye Recognition Technology

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Abstract— Biometric access systems have come a long way. Methods such as voice based access, speaker recognition, finger print recognition, password key systems and face recognition and eye recognition are a few important modes of biometric access systems. Raspberry pi is one of the modern techniques used in many fields. It can be interfaced with any device with which can be coordinated to do any work. Here in this project we developed a system where the system monitors the eyes of humans. The raspberry pi plays the main role of controlling all the peripherals. The camera is used for identifying the iris from the live feed. The outputs from the camera is sent to the raspberry pi. The raspberry pi process the image captured by the camera and match them with the database present in the raspberry pi which in turn analyze the inputs and processes them. Here the output device connected to the monitor through HDMI cable port. This paper presents about the Accessing ATM Using Eye Recognition Technology.

Key words: Biometric, Raspberry Pi, Monitors, Camera, HDMI, Eye Recognition, Irish

I. INTRODUCTION

A lot has been said about ATM Technology in Asian Banking and Finance. The idea of self-service in retail banking developed through independent and simultaneous efforts in Japan, Sweden, the United Kingdom and the United States. The first ATM was put into use in 1959 in the Kingsdale Shopping Center in Upper Arlington, Ohio as an automated deposit device. In simultaneous and independent efforts, engineers in Japan, Sweden, and Britain developed their own cash machines during the early 1960s.The first ATMs were designed to dispense a fixed amount of cash when a user inserted a specially coded card. The first modern ATMs came into use in December 1972 in the UK.ATMs were introduced to the Indian banking industry in the early 1990s initiated by foreign banks. Most foreign banks and some private sector players suffered from a serious handicap at that time- lack of a strong branch network. ATM technology was used as a means to partially overcome this handicap by reaching out to the customers at a lower initial and transaction costs and offering hassle free services. Since then, innovations in ATM technology have come a long way and customer receptiveness has also increased manifold. Public sector banks have also now entered the race for expansion of ATM networks. Development of ATM networks is not only leveraged for lowering the transaction costs, but also as an effective marketing channel resource. Banks across India have started the process of setting up ATMs enabled with biometric technology to tap the potential of rural markets. A large proportion of the population in such centers does not adopt technology as fast as the urban centers due to the large scale illiteracy. Development of biometric technology has made the use of self-service channels like ATMs viable with respect to the illiterate population. Though expensive to install, the scope of biometrics is expanding rapidly. It provides for better security system, by linking credentials verification to recognition of the face, fingerprints, eyes or voice. This paper proposes the eye recognition technology, we use Raspberry pi as a main component that it can be interfaced with any device with which can be coordinated to do any work. Here in this project we developed a system where the system monitors the eyes of humans. The raspberry pi plays the main role of controlling all the peripherals. The camera is used for identifying the Irish. The outputs from the camera are sent to the raspberry pi. The raspberry pi which in turn analyses the received inputs and processes them. Here the output device connected is the monitor.

II. RASPBERRY PI

The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity and peripheral-device support.

This block diagram depicts Models A, B, A+, and B+. Model A, A+ and the Pi Zero lacks the Ethernet and USB hub components. The Ethernet adapter is internally connected to an additional USB port. In Model A, A+, and the PI Zero, the USB port is connected directly to the system on a chip (SoC). On the Pi 1 Model B+ and later models the USB/Ethernet chip contains a five-point USB hub, of which four ports are available, while the Pi 1 Model B only provides two. On the Pi Zero, the USB port is also connected directly to the SoC, but it uses a micro USB (OTG) port.

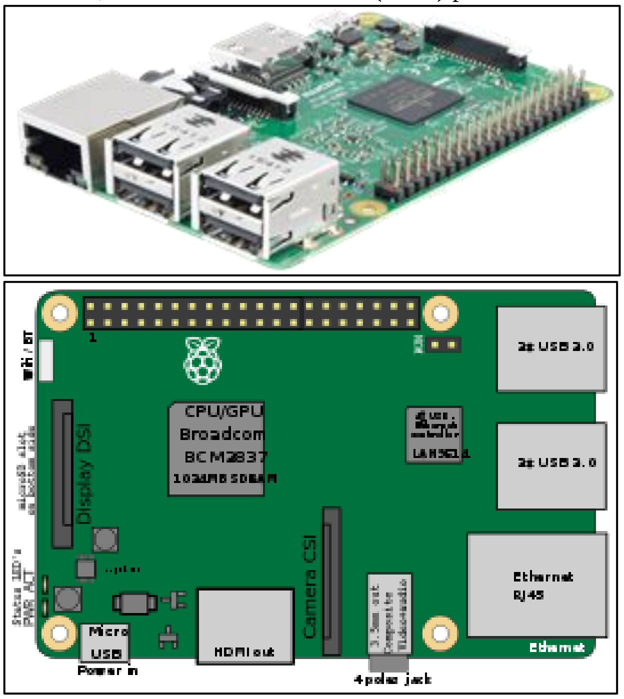

Fig. 1: The Model of Raspberry Pi Board

Raspberry pi is one of the modern techniques used in many fields. It can be interfaced with any device with which can be coordinated to do any work. Here in this project we developed a system where the system monitors the eyes of humans. The raspberry pi plays the main role of controlling all the peripherals. The camera is used for identifying the iris from the live feed. The outputs from the camera are sent to the raspberry pi.

The raspberry pi process the image captured by the camera and match them with the database present in the raspberry pi which in turn analyze the inputs and processes them. Here the output device connected to the monitor through HDMI cable port.

III. BLOCK DIAGRAM & OBJECTIVE OF PROPOSED SYSTEM

In the existing ATM machines we use magnetic strip cards for transactions. This existing system has some limitations such as person should carry cards while accessing and now-a-days lot of thefts by using cards. In order to overcome these limitations we use iris recognition instead of using cards for better safety & No need to carry cards to ATM. This type of recognition cannot be forged or modified. Only the account holders can access his account so it has high level of productivity.

The block diagram of proposed system is shown in the figure.2. The Proposed System consists of Power Supply, Camera, Raspberry Pi, and Monitor. The output is view on the Personal Computer.

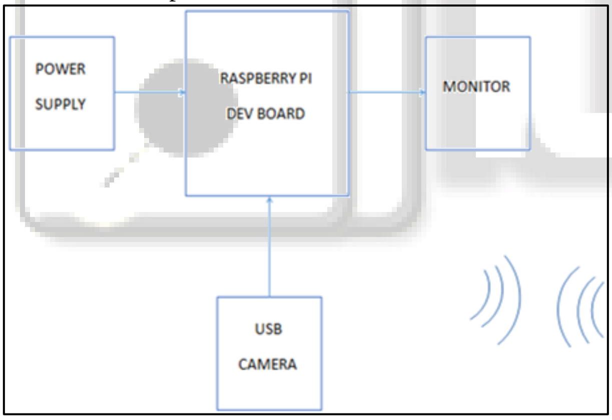

Fig. 2: Block Diagram of Proposed System

IV. HARDWARE & SOFTWARE DESCRIPTION

The Hardware circuit consists of Raspberry Pi, Camera, Power Supply, and Monitor. The output is viewed Through Personal Computer. The general circuit diagram is shown below in the figure 4.

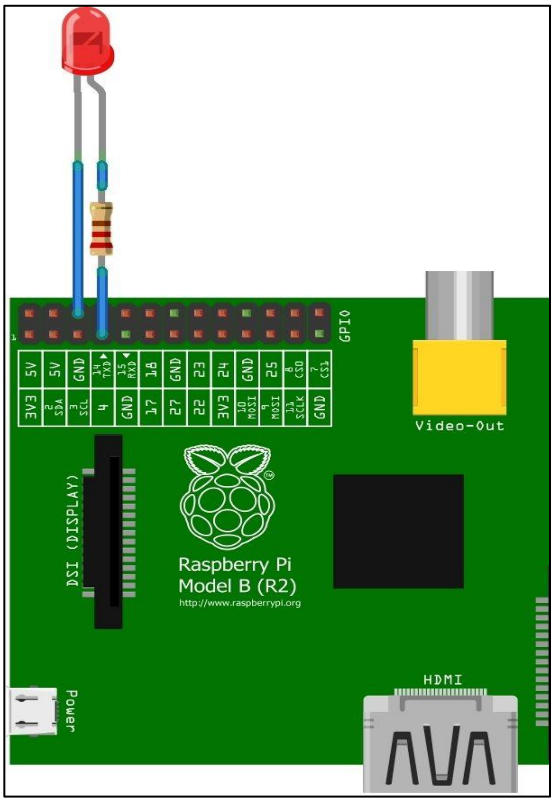

Fig. 3: Blinking LED Connection

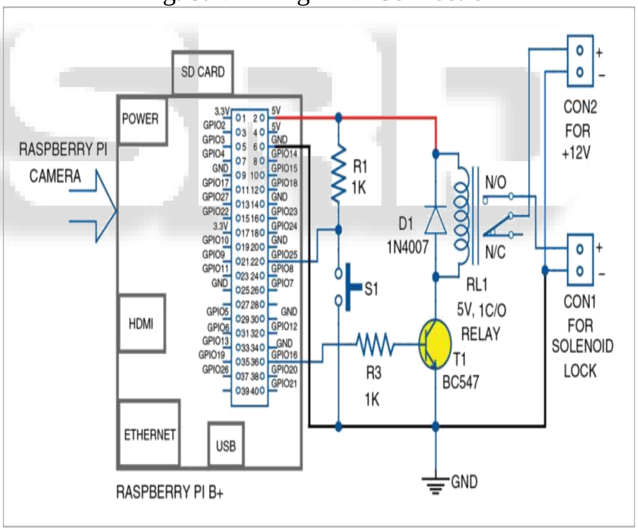

Fig. 4: Circuit Diagram of Hardware Implementation

A. Power Supply

A power supply unit is required to deliver power to the load. The power supply may be electrical, mechanical or other means of energy. The main function of the power supply unit is to provide required power for the operating devices without any interruption.

B. WEBCAM

A webcam is video cameras that feeds or stream its image in real time to or through a computer to a computer network. A webcam is generally connected by a USB cables, or similar cables built into computer hardware such as laptop. Popular uses include security surveillance, computer vision and recording video etc.

Fig. 5: Webcam

C. *Rasperry Pi 3 – Model B*

The Raspberry Pi 3 will cost the same as its predecessor, but feature much more powerful hardware. Bluetooth will be built into the board for the first time, and is powered by a Quad Core Broadcom BCM2837 64bit ARMv8 processor.

The Raspberry Pi 2 uses a 32-bit 900 MHz quad-core ARM Cortex-A7 processor. The Broadcom BCM2835 SoC used in the first generation Raspberry Pi is somewhat equivalent to the chip used in first generation smart phones (its CPU is an older ARMv6 architecture), which includes a 700 MHzARM1176JZF-S processor, Video Core IV graphics processing unit (GPU), and RAM. It has a level 1 (L1) cache of 16 KB and a level 2 (L2) caches of 128 KB. The level 2 cache is used primarily by the GPU. The SoC is stacked underneath the RAM chip, so only its edge is visible. The Raspberry Pi 2 uses a Broadcom BCM2836 SoC with a 900 MHz 32-bit quad-core ARM Cortex-A7 processor (as do many current smart phones), with 256 KB shared L2 cache. The Raspberry Pi 3 uses a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-core ARM Cortex-A53 processor, with 512 KB shared L2 cache.

PROGRAM FOR RASPERRY PI

```
# import the necessary packages
import numpy as np
import argparse
import cv2
# construct the argument parse and parse the arguments
ap = argparse.ArgumentParser()
ap.add_argument("-i", "--image", help = "path to the
image")
args = vars(ap.parse_args())
# load the image
image = cv2.imread(args["image"])
# define the list of boundaries
boundaries = [
([17, 15, 100], [50, 56, 200]),
([86, 31, 4], [220, 88, 50]),
([25, 146, 190], [62, 174, 250]),
([103, 86, 65], [145, 133, 128])]
# loop over the boundaries
for (lower, upper) in boundaries:
# create NumPy arrays from the boundaries
lower = np.array(lower, dtype = "uint8")
upper = np.array(upper, dtype = "uint8")
# find the colors within the specified boundaries and apply
# the mask
mask = cv2.inRange(image, lower, upper)
output = cv2.bitwise_and(image, image, mask = mask)
# show the images
cv2.imshow("images", np.hstack([image, output]))
cv2.waitKey(0)
```

V. HARDWARE IMPLEMENTATION WITH OUTPUT SAMPLE

Embedded eye recognition system based on Raspberry Pi single-board computer is introduced in this paper. Paper is divided in two parts - the software part and the hardware part. Software part describes the algorithms for eye detection, localization, feature extraction and recognition. Hardware part describes how the system was built and what modules does it use. System was built with an option to connect with other biometric systems such as palm print and palm vein biometric system, which is described combining several biometric parameters we can obtain higher accuracy of identification of authentication and also higher resistance to counterfeiting, because it is always harder to falsify 3 or more parameters than just one. We have also developed a smart card applet that can store and compare biometric data. If biometric data is compared on the card (Match on Card principle) and it is also encrypted we can ensure that the original data is always kept on the card and won't be set outside, therefore, eliminating the chance of data interception.

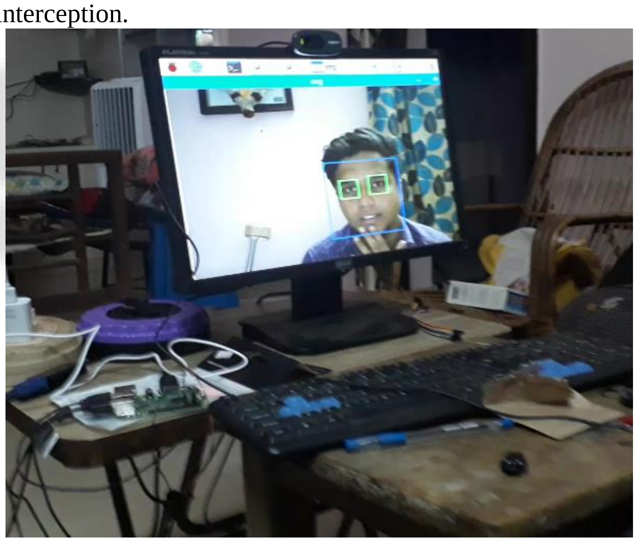

Fig. 6: Hardware Setup

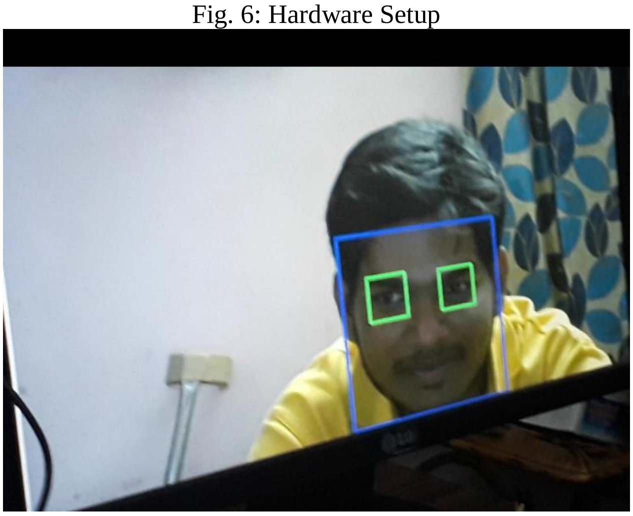

Fig. 7: Output Sample of the Proposed System

VI. CONCLUSION & FUTURE SCOPE

Raspberry Pi development board is a cost effective fully functional computational system can be used for many applications. PIR motion sensor and camera modules are also cost effective and can be used for surveillance systems. Using Python and Open CV in Raspberry Pi, made our project flexible and adoptable to any required future changes. Detected faces can be stored in cloud and can be used for recognizing the face is the future scope.

Using raspberry pi the current project can be modified by an Infrared camera interfacing it can be used in Smart Surveillance Monitoring security system which any type of public security is using Living body detection or spying, Also it can be used in Attendance system of the class, Also some profound applications can be implemented using interfacing of Raspberry pi and Arduino UNO board like sensor application of smartcard swapping, finger detection, alcohol detection, agriculture humidity sensing, Temperature sensing using web server, and many more.

REFERENCES

[1] Shamanth G S ashwin Kashyap ''Face detection using Raspberry pi and python,''.NCPD 2016, July 2016.
[2] S. C. Gaddam, N. V. K. Ramesh and Hema Dhanekula, "Face Recognition Based Attendance Management System with Raspberry PI 2 using Eigen Faces Algorithm,'' ARPN journal, vol -11, NO.13, July 2016.
[3] Subhanishaik, Antomicheal, "Automatic Age and Gender Recognition in Human face Image Data Set Using Convolutional Neural Network Systemm,'' IJARCSMS, Vol 4, issue 2, Feb 2016, ISSN:2321-7782.
[4] Danwei, "Distributed Compressive Sensing Based near Infrared and Visible Images Fusion for Face Recognition,'' IJSP, IPPR vol.9, No.4 (2016), pp.281-292.
[5] R.Chandana, Dr.S.A.K.Jilani, Mr.S.Javeed Hussain, "Smart Surveillance System using Thing Speak and Raspberry Pi", International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 7, July 2015.
[6] Sanjana Prasad, P.Mahalakshmi, A.John Clement Sunder, R.Swathi, "Smart Surveillance Monitoring System Using Raspberry PI and PIR Sensor", (IJCSIT) International Journal of Computer Science and Information Technologies, 2014.
[7] Huu-Quoc Nguyen, Ton Thi Kim Loan, Bui Dinh Mao, Eui-Nam Huh, "Low cost real-time system monitoring using Raspberry Pi", IEEE, 2015
[8] Sarabjit Singh, Amritpal Kaur, T aqdir, "A Face Recognition Technique using Local Binary Pattern Method", International Journal of Advanced Research in Computer and Communication Engineering, 2015.
[9] Sushma Jaiswal, Dr. (Smt.) Sarita Singh Bhadauria , Dr. Rakesh Singh Jadon, "Comparison between face recognition algorithm-eigenfaces, fisherfaces and elastic bunch graph matching ", Journal of Global Research in Computer Science, 2011
[10] https://en.wikipedia.org/wiki/Image_processing

