Face Recognition and Spoofing Detection System Adapted To Visually Impaired People by Using Open CV

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Abstract - Computer vision is a field of computer science that works on enabling computers to see, identify and process images in the same way that human vision does, and then provide appropriate output. It is like imparting human intelligence and instincts to a computer. This project is implemented using Computer vision in Python program using OpenCV module in it. The project aim is to guide blind people to identify the person at the door. First a local database of the known persons is made in order to compare and identify the person at door. Second using OpenCV with Haarcascade frontal face algorithm to detect the face of any person in the frame and with Fisherfaces method which uses the Principal Component Analysis (PCA) which finds a linear combination of features that maximizes the total variance in data to predict the person at the door, image of the person will be captured and compared with the database if the person is matched with the database, person name will be given as the audio output and if it is not then an audio of unauthenticated person will be given as output at the same time. Also SMS API using Twilio website with more secure authentication is programmed in python programming language which will send the status through SMS to the respected person automatically with an E-MAIL using SMTP protocol which is programmed using python to send the image of the guest at the door. This project aims at visually impaired people to help them in identifying the person entering into their house.

Keywords: Raspberry pi, Face recognition , spoofing and open cv

I. INTRODUCTION

The project aims at planning an intelligent security system victimisation Face Recognition technology for characteristic the user. The Intelligent system projected makes use of Open CV code to realize the task. In our social interaction, the external body part plays a very important role for transference people's identity. It uses the external body part as a key to security for recognition of face, face recognition technology has received important attention within the past many years because of its potential for a good sort of applications in each social control|enforcement} and non-law enforcement. This technology could be a laptop application for mechanically police work, characteristic or confirmative someone from a digital image or from a video frame supply. There ar many

ways to try to to this. one in all them is being comparison of hand-picked options of the face from the given supply and a information. It is, now-a-days, generally utilized in security systems. Spoofing could be a criminal deception or extralegal observe, within which act info is shipped from a disguised unknown supply faking as a notable supply to the receiver. Spoofing is most harmful in communication system that needs a high level of security. The projected system observes the face victimisation the Open CV code and additionally has the aptitude to detect spoofing. we'd like to store the image of the face that must be detected within the laptop. The code checks the predefined image keep with the present image taken from the laptop. The result's proclaimed by the speaker that is interfaced to the microcontroller. The captured pictures are sent to the predefined email.

II. LITERATURE SURVEY

[1] presents anti-spoofing solution for distinguishing between 'live' and 'fake' faces . in this approach it focused mainly on face detection by using Viola-Jones algorithm and active shape models with Stasm for locating landmarks. To extract the features in each region of the image it uses Local Binary Pattern(LBP) operator. finally, we use a nonlinear Support Vector Machine(SVM) classifier with kernel function for determining wheather the input image is live face or not.

[2] presents an efficient facial image representation based on local binary pattern (LBP) texture features. The image of the face is divided into several regions from which the LBP feature distributions are extracted and concatenated into an enhanced feature vector to be used as a face descriptor. The performance of the proposed method is taken in the face recognition problem under different challenges. Other applications and several extensions are also discussed.

III.   HARDWARE DESCRIPTION

Raspberry Pi Core Module

The core module of the system is realized using a Raspberry Pi 2 board; it's a $ 35 bare-bones computer designed and developed by the Raspberry Pi Foundation, the Pi 2 features a BCM 2836 System-on-Chip which includes a Quad-Core 32-Bit ARM Cortex A7 CPU clocked at 900 MHz paired with 1 GB of RAM. It also has VideoCore IV GPU for graphical processing applications, it also includes four USB ports for peripherals and 40 Pin General Purpose Input Output (GPIO)

pins for interfacing the Pi with external electronic circuits, these GPIO pins are used to interface the Pi to the door lock module. The Raspberry Pi is designed to run various Linux based operating systems and has Raspbian as its official operating system and Python as its official programming language.
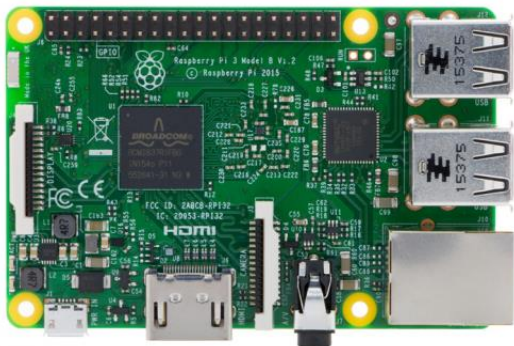

Fig. 4 Raspberry Pi Module

Introduction:
         In this chapter the block diagram of the project and design aspect of independent modules are considered. Block diagram is shown in fig:
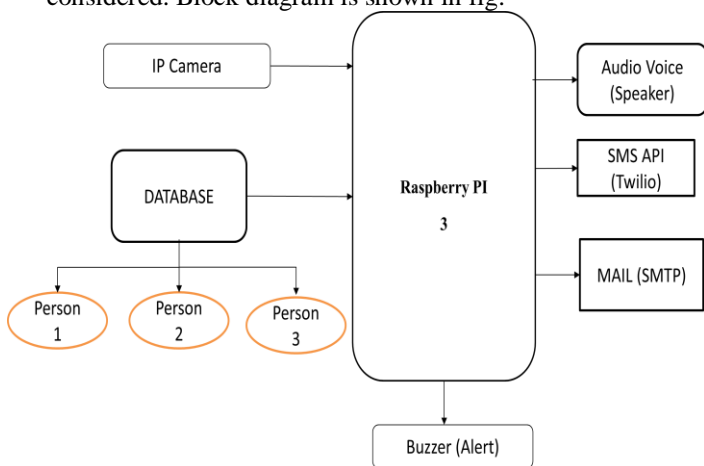

Fig: Block diagram

The above block diagram explains the components used in this project. Here a single board computer i.e. Raspberry pi 3 is used acts as a CPU with a speed 1.2GHz of ARMv8 (BCM2837) microprocessor with 1 GB of RAM. Which will be programmed with the python program. Using the camera a database is made for the identification purpose, f the person is identified or not identified automatically voice output will be given. Also SMS and MAIL will be sent to the respected person with buzzer alert.
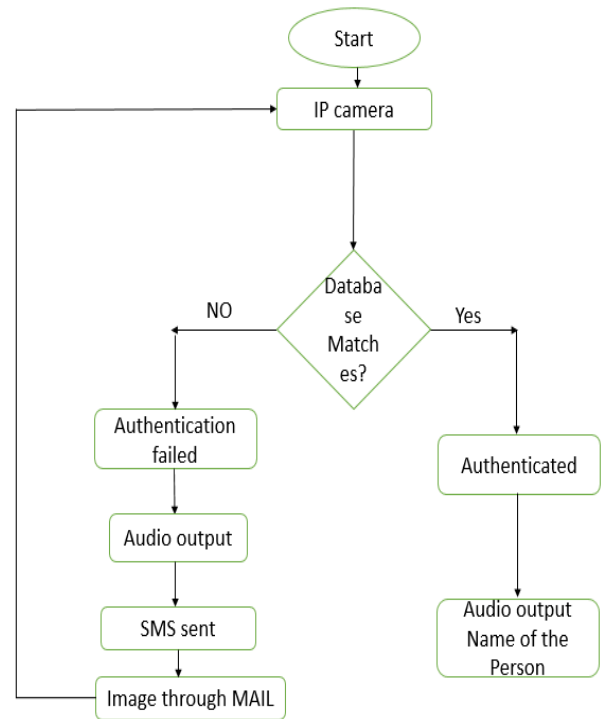
Flow chart:

Fig: Flow graph

The above flow chart explains the program of the project, the program is written in python with Open source Computer Vision (OpenCV) module in python. Now for the face reorganization part first a database is prepared using the IP camera and as the program starts the IP camera will be switched on, in the surveillance mode the camera will detect the face if any person will come in front of the camera, image will be captured automatically and will be compared with the database if the person is identified then audio output will coming with the name of the person identified, if the person is not identified then an audio with unidentified will come out. At the same time a SMS and a MAIL with the image of the unidentified person is sent to the caretaker.

OPENCV
OpenCV was started at Intel in 1999 by city Bradsky, and additionally the initial unhitch came get in 2000. VadimPisarevsky joined city Bradsky to manage Intel's Russian code OpenCV team. In 2005, OpenCV was used on Stanley, the vehicle that won the 2005 administrative unit Grand Challenge. Later, its active development continued beneath the support of Willow Garage with city Bradsky and VadimPisarevsky leading the project. OpenCV presently supports an oversized variety of algorithms regarding portable computer Vision and Machine Learning and is increasing day by day. OpenCV supports an oversized kind of programming languages like C++, Python, Java, etc., and is on the market

on all completely different platforms additionally as Windows, Linux, OS X, Android, and iOS. Interfaces for high-speed GPU operations supported CUDA and OpenCV ar beneath active development. OpenCV-Python is that the Python API for OpenCV, combining the best qualities of the OpenCV C++ API and additionally the Python language.
OpenCV-Python

OpenCV-Python may be a library of Python bindings designed to unravel portable computer vision problems. Python may be a general purpose language started by Guido van Rossum that became highly regarded very quickly, chiefly as a results of its simplicity and code readability. It permits the mortal to specific ideas in fewer lines of code whereas not reducing readability. Compared to languages like C/C++, Python is slower. That said, Python are going to be merely extended with C/C++, that allows U.S. to jot down down computationally intensive code in C/C++ and build Python wrappers which is able to be used as Python modules. this offers U.S. a pair of advantages: initial, the code is as fast as a result of the first C/C++ code (since it is the explicit C++ code operative in background) and second, it easier to code in Python than C/C++. OpenCV-Python may be a Python wrapper for the initial OpenCV C++ implementation.

OpenCV-Python makes use of Numpy, that would be a extraordinarily optimized library for numerical operations with MATLAB-style syntax. All the OpenCV array structures unit of measurement converted to and from Numpy arrays. This together makes it easier to integrate with completely different libraries that use Numpy like SciPy and Matplotlib. OpenCV (Open provide portable computer Vision) may be a library of programming functions for real time portable computer vision. it's developed by Willow Garage, that's in addition the organization behind the notable automaton package (ROS). presently you'd say MATLAB may also do Image method, then why OpenCV? expressed below unit of measurement some variations between every. Once you bear them, you will decide for yourself.

IV.   RESULTS
The project **"FACE RECOGNITION AND SPOOFING DETECTION SYSTEM ADAPTED TO VISUALLY-IMPAIRED PEOPLE BY USING OPEN CV "** was designed an Image based authentication for visually impaired people with voice module interfacing provides voice alert security system, which can be installed all kinds of domestic and industrial applications. The main aim of this project is to provide a security system for visually impaired people. This system provides user-friendly environment for the users with a kind of image interaction.
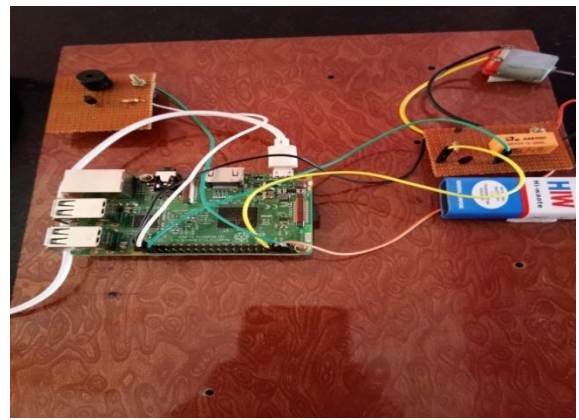

Fig: top view of hardware kit

V.   CONCLUSION
Integrating options of all the hardware parts used are developed in it. For the contribution to the simplest operating of the unit , presence of each module has been reasoned out and placed fastidiously. Secondly, the project has been with success enforced by exploitation the extremely advanced IC's with the assistance of growing technology. so the project has been with success designed and tested.

Future Scope
Our project "FACE RECOGNITION AND SPOOFING DETECTION SYSTEM adapted TO VISUALLY-IMPAIRED people using OPEN CV" was designed a picture primarily based authentication for visually impaired individuals with voice module interfacing provides voice alert security system, which might be put in all types of domestic and industrial applications. the most aim of this project is to supply a security system for visually impaired individuals. this method provides easy surroundings for the users with a form of image interaction.

The planned system conjointly makes use of Face Recognition technology for distinguishing the user victimisation OPEN CV software system. The Intelligent system planned makes use of each Embedded and python language to attain the task.
The project may be extended victimisation GSM and GPRS electronic equipment victimisation that it will send the alerting messages to the predefined internet link of individual authorities just in case of emergency times.

VI. REFERENCES
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