

Smart Door Bell with facial recognition and RFID

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Abstract - The Smart Door Bell features an on board camera, a processor(Ordroid), Numerical keypad and an additional RFID. The Door Bell Features the primary feature of facial recognition for door access. The system is designed to increase the security system for the home. The bell features access to the authorised person with the help of dynamic database that is designed to store all the facial features of different persons and then compares it with the real life situation. The selection of access can be switched by using different systems.

Keywords— Smarthome; IOT; Door-bell.

I. INTRODUCTION

In our day to day life with security being major concern every day, the need to increase the level of security for personal apartments and homes are a major concern for everyone. The security of general locks and handles are not at all according to the future needs. Modern ways to set up security system is one of our most important needs. The machines that are available in the market require better features and practicality for their usage. The existing intercoms do not feature mechanisms that allow them to be connected to the internet and communicate with the user in a better way. The system can be upgraded to allow courier facility to give limited access of the home mail box to the authorized person. OTP System can be added to have special key lock and patterns generated for the mail box. The facility to allow courier person will trigger an additional compartment with fitted sensor to detect the presence of the parcel .Further addition of money transaction machine will help us making the doorbell even more effective. The visual output for the person on the ring light can be seen by the color on the ring light. The system can be used as an intercom also with an external display.

II. PROBLEM

The technicality of the existing system in the world are not enough to secure our homes in a smarter and communicable way . The existing applications should be upgraded to smarter applications that allow usage of IOT, since IOT applications have better user experience and the feature to communicate with other devices and application.

III. SOLUTION

The approach to make the system communicate with humans in a better way will allow us to solve this problem.

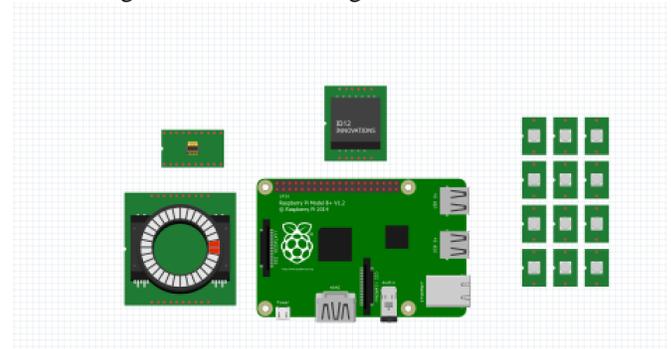
The smart Door Bell being the primary way for a home to interact with the outside world . We focused on making the door bell smarter with the integration of camera and a processor to recognize the face of the person who pressed the button. The application of such kind of facial recognition can be seen in our smartphones where user can Log-in using their face. In this case we are using the same concept to Log-in into our homes.

IV.MECHANISM OVERVIEW

The Structure is made of Stainless Steel and features a numerical pad , camera , led ring and RFID Reader.

A. The outer structure and circuit

The Casing offers a curved design and with all the



electronics fitted inside. the casing is made up of stainless steel and numerical pads made of rubber . The camera being used is a wide angle camera with the ring light outside the ring. The RFID System being fitted on the top can be used to give access in case of emergency using the smart keys .

B. Working with Ordroid

1) Ubuntu MATE

Ubuntu MATE is the operating system which is running on ordroid. The code is written in python and it helps us to import different libraries for the purpose of image processing



Fig. 2 Launching Ubuntu Mate

2) Providing the necessary packages

- OpenCV for Raspberry Pi
- Object Detection using Haar-like features
- Face Detection using Haar Cascades, Haar-like Features
- Object Detection using Haar-cascades Classifier
- OpenCV Documentation

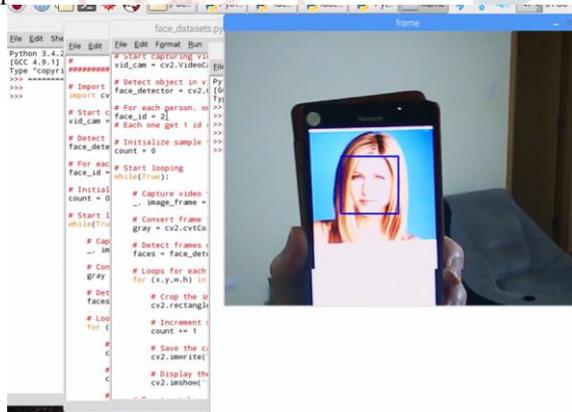


Fig. 3 Setting up output pins

3) Initializing the camera

Since we are using a microcontroller this means we have great control over the use of the inbuilt timers.

```
# show the frame
cv2.imshow("Frame", image)
key = cv2.waitKey(1) & 0xFF

# clear the stream in preparation for the next frame
rawCapture.truncate(0)

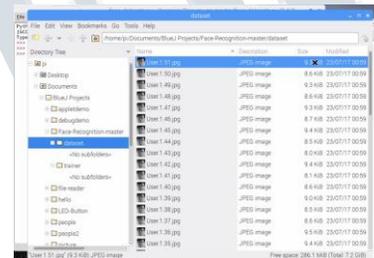
# if the `q` key was pressed, break from the loop
if key == ord("q"):
    break
```

Fig. 4 Running the camera

The above code shows the code for the frame capturing from the camera. The loop allows us to capture the dataset and thus helps us to train the code

3) The Dataset

The dataset is the databank of all the multiple faces and helps us to train the machine for accessing the recognition pattern



C. Logical Layout of the system

The system is running multiple timers at a time so we are basically using a hard coded code to follow up every time for the user, the code is deigned to help us with the desired output settings and values when needed, the code also helps us to eradicate the need of multiple microcontrollers linked together.

1)The Ring light

The outer ring of the camera features a full spectrum RGB programmable LED mechanism. This ring LED is used to display the access condition of the person and also to display the present state of the system.



Fig. Different colours of the led ring at different situations.

2) Numerical pad

The numerical pad basically allows for an alternative to the facial recognition system. This acts like a smart solution if we want to share the passcode or due to any reason the face is not recognizable. The bell offers a 4x3 numerical button, the buttons featured are assigned in a way such that the top 3x3 buttons are basically meant for the passcode and the bottom 3 buttons are assigned for the purpose of visit to ring the bell. The bottom buttons offer a translucent rubber to have diffused light coming out of the bell with the written scheme on it. This makes it easy to read in the dark.

3)The RFID reader

The RFID is mounted on the top of the system to have a quick or easy access of system. RFID stickers can be fixed in phone cases, ID cards or any other card for the purpose of authentication.

D. Implementing the design

With the objective to have a smart system it becomes necessary to design the box effectively such that the electronic components are placed properly and is portable. In order to do that the design was built in SOLIDWORKS'17.

1)Working on SOLIDWORKS'17

SolidWorks is a solid modeling computer-aided design and computer-aided engineering computer program that runs on Microsoft Windows. In our project SolidWorks helps us to design the Smart Door Bell with the required Design and Pins for the electronics. The circuit

compartment, the camera and all the input and output mechanism are fitted into the enclosure.

2)Designing

The system offers a compact design and all the access controls for the system. The system is always connected to a



local connection for the purpose of viewing the display of the android. Additional HDMI Port can be used to act as a monitor for the camera.

V.CONCLUSION

In this paper, we are looking for a better perspective and a vision for the security of the people that enables better user experience and real time security.

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