Face Recognition Door Lock Using Raspberry pi with AWS Recognition

1Shaikh aisha, 2Arbaz khan

1This Project is using AWS Rekognition service for face recognition. All the Face Recognition Part is performed on AWS Cloud.., 2This Project is using AWS Rekognition service for face recognition. All the Face Recognition Part is performed on AWS Cloud..

1Pes college of engineering,
2Pes college of engineering

Abstract - **This paper deals with the idea of a secure face recognition door lock system that covers several aspects of security issues. This face recognition door lock provides essential security to our homes, bank lockers, office sectors. this facial recognition door lock uses AWS Rekognition Services and Raspberry Pi and electronic door lock. Through the Raspberry Pi Camera module, images are going to be captured when the doorbell button is going to be pressed that will forward to AWS Rekognition Services. Analysis and comparison of images will take place through AWS Rekognition, after analysis and comparison door will successfully unlock for an authorized person else will not be open for an unregistered person.**

keywords - **Face Recognition Door Lock, Smart Door Lock, IoT, Face Recognition, Security.**

I. INTRODUCTION

In modern days, individual needs highly secured environment at their home, banking sector, and essential workplaces where valuable data and asset are stored for that purpose we came up with the solution of face recognition door lock by using AWS Rekognition service. The home security is a vital and most sensible factor. In previous cases, people were using traditional ways to achieve security by using keys and Pincode based lock but which easily led to robberies and fraud, and in the case of Pincode, there is a threat of shoulder surfing, one can look up to pin over your shoulder while you are typing your pin code in the same way keys can be a clone and intruders and robbers get easy access to the main door by using cloned keys and Pincode with the help of this project we are making impossible for intruders to get access of main entrance. With face recognition technology we can provide strong security service to people, so one can be stress- free for their valuable asset. There are many technologies such as biometric fingerprints and retinal scans. A retinal scan is not too safe for your eyes and cannot be recommended to use on daily basis, it can harm your eyes, and a fingerprint may cause issues and is not proven that accurate and costly too. Meanwhile, fingerprint biometric false positives, bias inaccuracy like false rejects, and accepts can still occur preventing select users from accessing systems or place. Biometrics like facial recognition systems can limit privacy for the user.

In this project, we have created our own Face Recognition Door Lock using Raspberry Pi and AWS Rekognition Service provided by AWS Cloud to improve the security. This Project works using a Raspberry Pi Camera to capture the image of the person at the door only if the button is pressed of the doorbell and after that, the image captured and send to AWS Rekognition Service for recognizing the face of the person at the door with the authorized user's faces stored in AWS S3Bucket and if the face is recognized successfully then the electronic door lock connected to Raspberry Pi is Unlocked for a given period of time so that the authorized user can enter the place. In case if a person is not recognized then the captured image of that person is sent to the authorized user through email instantly.

II. LITERATURE SURVEY

In this section, we briefly survey the various existing works for Face Recognition System using Raspberry Pi and other micro-controllers that were using Open-CV for the recognition part. We found that Open-CV is inaccurate and not reliable for Raspberry Pi and face recognition. As compared to open-cv, AWS provides a more accurate and reliable service called AWS Rekognition using which face recognition technology can be implemented essentially. AWS Recognition uses AWS Cloud computing for the processing of the images for face recognition and it analyzes and compares the bulk of images and videos on daily basis. It has many features like text detection, in which it detects distorted text over images and detects the name of the store, street sign, etc. Face detection analysis contains facial expressions, gender, age, facial hair, and glasses, etc. It also identifies so many objects like a bike, telephone, and buildings and scenes like a parking lot, beach, city and so on. By using Aws Rekognition you also can identify a popular person like a well-known celebrity in videos. You also can capture the path of people while using AWS Rekognition in the video.

III. METHODOLOGY

This Project is using AWS Rekognition service for face recognition. All the Face Recognition Part is performed on AWS Cloud.. Amazon Rekognition Service is faster and accurate face recognition, allowing you to recognize a person in a photo or video using your private repository of face images in AWS S3 bucket. You can also verify identity by analyzing a face image against images you have stored for comparison which we are using for comparing stored faces to recognize authorized users and open the door lock.

IV. PROPOSED SYSTEM

Fig (1) and Fig(2) shows the diagram for Face Recognition Door Lock, Raspberry Pi and AWS Rekognition Service. The project consist of software and hardware components. The hardware components used in the projects are Raspberry Pi, camera module, power bank, push button, electronic door lock, jumper wires. The software consist of Raspberry Pi OS, python and boto3 library provided by AWS is used. Python programming language is for developing the code for the project.

V. SYSTEM ARCHITECTURE OF RASPBERRY PI 3

The Raspberry Pi is a series of small single-board computers with a builtin micro-controller which makes it a combination of micro-controller as well as micro- computer. It is used to teach students about programming, hardware integration with sensors, and IoT- based projects. Developed by the Raspberry Pi Foundation located in the United Kingdom and the first version of Raspberry Pi was released on 29 February 2012. It became very popular among the enthusiast and became the most selling single-board computer. Raspberry Pi 3 B used in the Project has builtin WiFi and Bluetooth with 4 USB, 1 LAN, 1 HDMI output, and Quad-core 1.2Ghz processor.

The Raspberry Pi is low in cost,it comes in size of credit- card, credit-card sized computer that plugs into a computer monitor or Television and uses a usual standard keyboard and mouse. It has capabilities of little device that let people to explore computing, and to make them learn how to program in languages right from scratch in Python. Any age of people can explore it easily because it came up with flexibility and quiet portable in size as well.
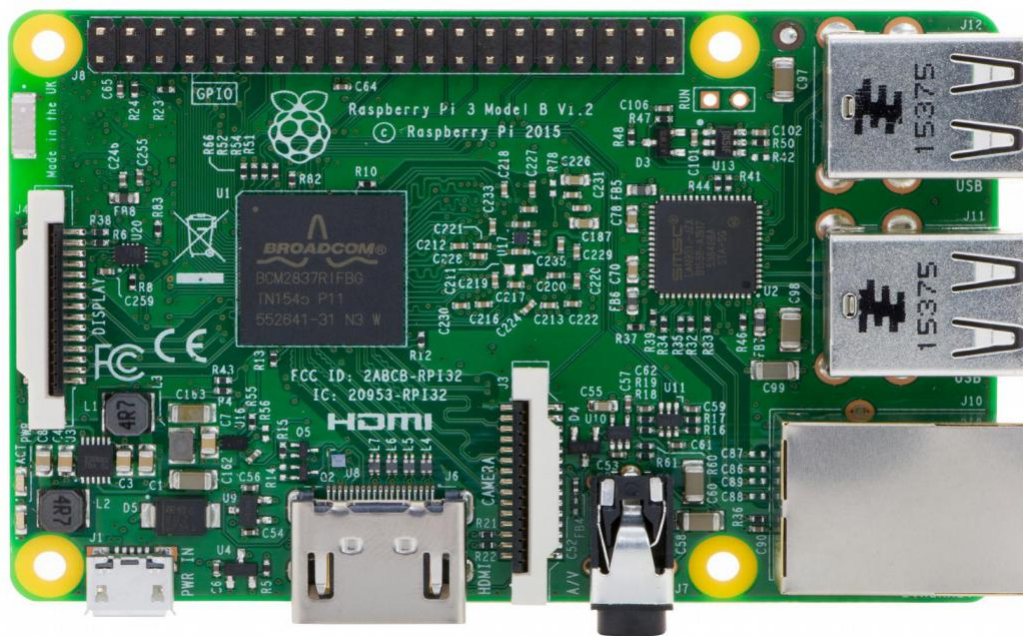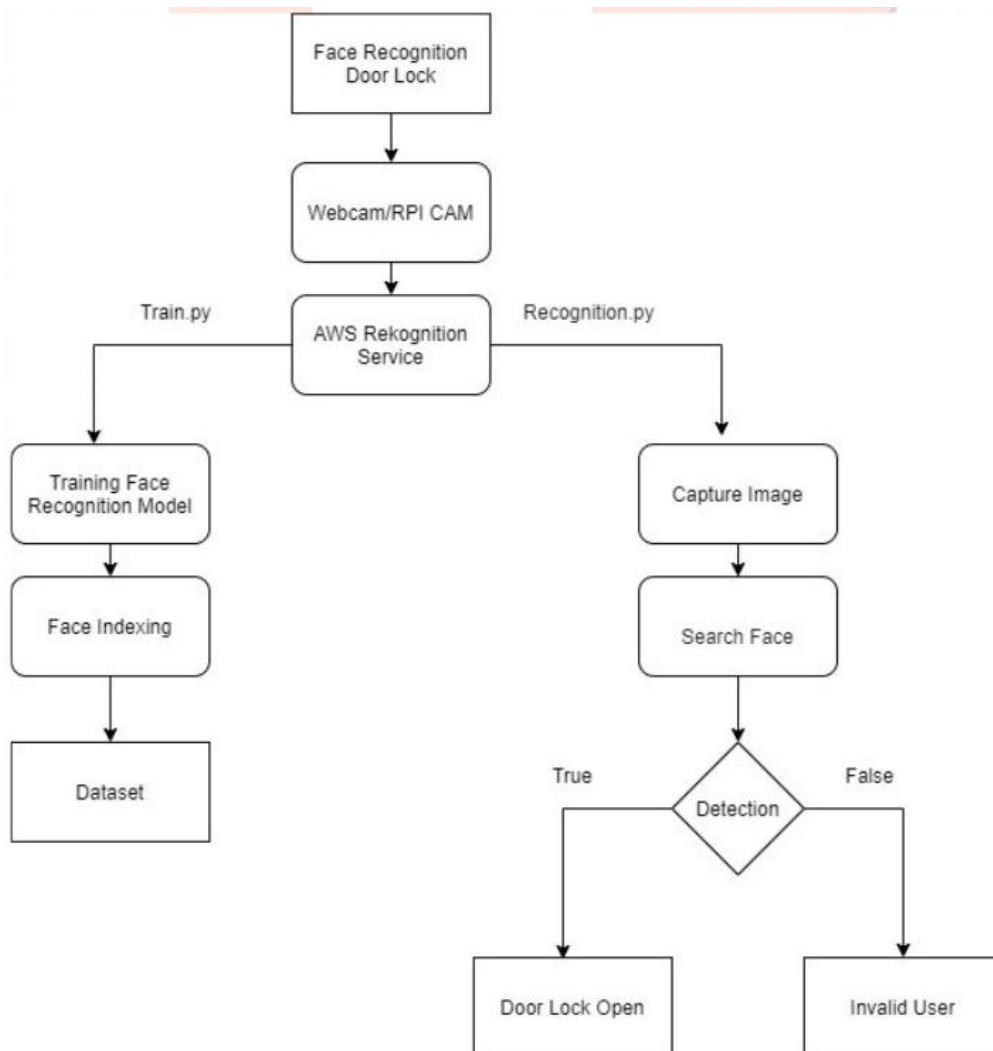

Fig.(1)Raspberry Pi Model 3

Fig.(2) Flow Diagram

VI. CONCLUSION

As a conclusion, security system by using Face Recognition Door Lock combined with AWS Cloud is successfully done. It sends the image if Unknown person is detected at the door over authorized users email. With the use of AWS Rekognition service the processing of the image for face recognition is faster as well as accurate and this makes the project fast, reliable, cheap as well as highly secured as compared to other existing projects.

This development scheme using Raspberry Pi is less power consuming as it can be also powered by power bank or 5V power supply and flexible as the size of Raspberry Pi is compact so it can be installed in a small space.

VII. FUTURE IMPROVEMENTS

[1] Adding night vision camera.

[2] Creating Virtual Assistant so it is user-friendly.

[3] A PIR sensor can be added to avoid touching button.

[4] D3 camera can be added to check depth in the image to improve the security.

REFERENCES

[1] Januzaj, Y., Luna, A., Ramaj, V. 2015 Real time access control based on Facial Recognition.

[2] Lwin, H., Khaing, A., Tun, H. 2015.Automic door access system using face recognition.

[3] Comparative Analysis for a Real Time Face Recognition System Using Raspberry Pi
 Muhammad Kashif Shaikh, Syed Annas Bin Mazhar, 2017.

[4] Secured Room Access Module Suchit Shavi ,2017.

[5] Automatic Semantic Face Recognition": Mark S.Nixon University of Southampton Southampton, United Kingdom, 2017.

[6] M. R. Mulla., "Facial image based security system using PCA," pp. 548-553, 2015.

[7] M. H. Jusoh & F. Bin Jamali, "Home security system using internet of things," 2017.

[8] https://www.raspberrypi.org/downloads/raspberry-pi-os/

[9] https://aws.amazon.com/rekognition/

[10] https://aws.amazon.com/