iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** V **Month of publication:** May 2022

DOI: https://doi.org/10.22214/ijraset.2022.42663

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

Face Recognition Door Lock System Using Raspberry PI

Akash Deep Singh[1], Bir Singh Jangra[2], Ruchika Singh[3]
[1, 2, 3]*Department of Electronics and Communication Engineering, KIET Group of Institutions, Delhi NCR, Ghaziabad 201206, UP, India*

Abstract: ***Face recognition is a technique for recognizing or validating an individual's identification by looking at their face. Face recognition software can identify persons in photographs, videos, or in real time. During police stops, officers may use mobile devices to identify persons. Computer vision is a method for understanding how photos and movies are stored, as well as manipulating and retrieving data from them. Artificial Intelligence relies on or is mostly based on computer vision. Self-driving cars, robotics, and picture editing apps all rely heavily on computer vision. The software used is OpenCV Library which is useful to display and process the image produced by webcam. In this paper, we employ Haar Cascade Classifier in an image processing of user face to render the face detection with high accuracy.***
Keywords: OpenCV, Raspberry pi 4, Pi-Cam, Image Processing, Intelligent door lock.

I. INTRODUCTION

Security issues are an imperative portion of life . A crucial connect in security chain is the identification of clients who will enter the room. This paper depicts the model of a secured room get to control framework based on confront acknowledgment. The framework comprises a webcam to distinguish faces and a solenoid entryway bolt for getting to the room. Each client identified by the webcam will be checked for compatibility with the database within the framework. In the event that the client has get to rights at that point the solenoid entryway bolt will open .

A. Raspberry Pi 4 with Pi-Cam



Fig -1: Raspberry Pi 4 and Pi-Cam

We are using raspberry pi (4 model B) which has Wi-Fi and Bluetooth module installed, as the primary handling chip. This raspberry pi module has capability to figure the result like a computer simply in a small-scale size variant. We can in fact interface the mouse and console to this module. We have utilized a 32GB miniature SD card as inward memory to store booting records and introduced the Raspbian OS. The contribution to it is given by ceaseless spilling of pictures by means of pi-Cam. This Pi-Cam is being associated with the raspberry pi module through the CSI port.

B. Solenoid Lock

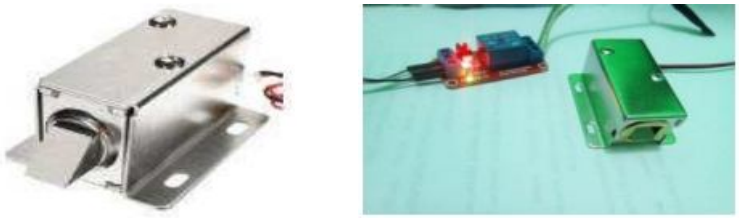


Fig -2: Solenoid door lock.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

For opening and closing door, we are using solenoid lock. The solenoid lock denotes a latch for electrical locking and unlocking. It is available in unlocking in the power-on mode type and locking and keeping in the power-on mode type, which can be used selectively for situations.

II. ARCHITECTURE AND DESIGN

A. Design

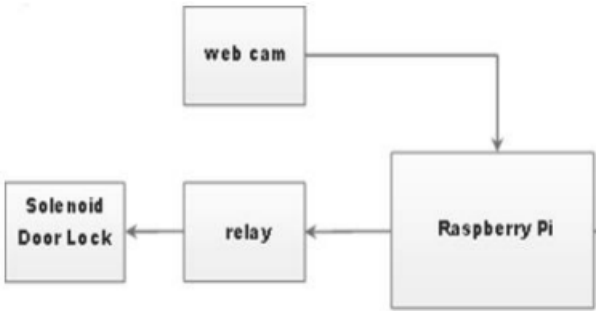


Fig -3: System framework

Figure 2 shows the framework of a protected room access system. When the room's user wishes to enter, a webcam positioned on the entrance captures the user's face. If the face is identified, the Raspberry Pi will send a relay order to open the solenoid door lock on the room's door. If the face is not recognised, it will remain close. The solenoid door lock will automatically close the door once the room user enters.

B. Image Processing

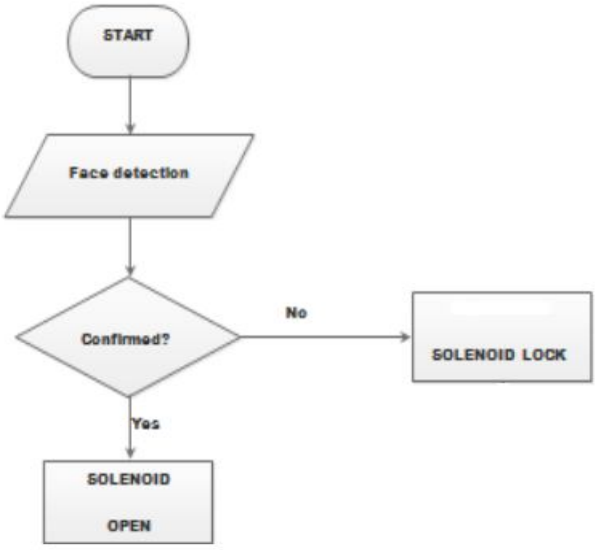


Fig -4: Flowchart of the proposed system.

Image processing is a technique for analysing pictures, extracting relevant information, and performing actions on them. It's a type of signal processing in which the input is an image and the output is an image or qualities/properties connected to it. First, we'll send a stream of photographs from the pi-cam. The OS already has the essential camera libraries loaded. There are computations for photographing, videotaping, and finally computing frames per second. Because OpenCV interacts with BGR images, the final image is converted from BGR to RGB using certain methods. Then we created a Region of Interest (ROI) where the true detection would take place. For proper image analysis, this ROI undergoes transformation changes. Following that, picture thresholding is used to convert the grayscale image captured by the pi-cam into a highly contrasted image.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

III. OUTPUT



Fig -5: Captured image that was recorded and connected to Raspberry Pi.

IV. CONCLUSION

A Secured Door Lock System Based on Face Recognition with the Raspberry Pi and GSM Module is presented in this paper. We created a system that gives users with door security locks, comfort, connivance security, and energy efficiency. This technology can be used to verify identity at home, in banks, and in other public locations. We used a combination of webcam, Raspberry Pi, relay, solenoid door lock, and GSM module to create this system. To detect the face, we employed the Haar Cascade classifier approach, and to recognise the face, we used the Local Binary Pattern Histogram (LBPH). Various operations have been successfully tested, and the results have been documented.

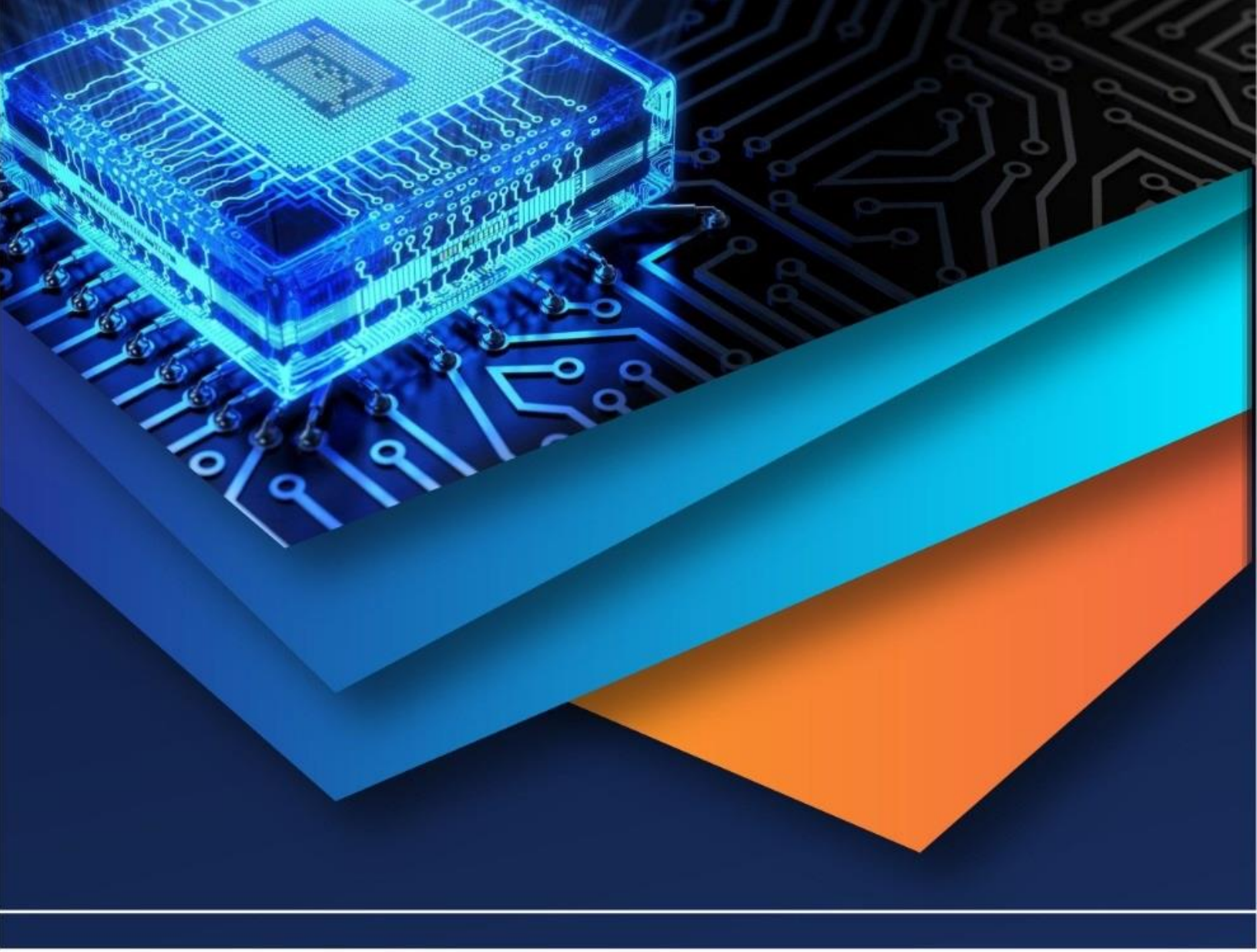
V. FUTURE SCOPE

Our project also expands in the field of security. We can implement this project in military establishments. This can also be used as a smart door lock system for house, and it will work fantastic. We can also use face recognition in colleges, for the use of taking attendance.

REFERENCES

[1] J. Gu, H. Hu, H. Li, IEEE/CAA J. of Auto. Sinica 5, 2 (2018)
[2] B. A. Patel, R-EYE: An Image Processing-Based Embedded System for Face Detection and Tracking, (Electrical Engineering, California State University, Long Beach, Master Thesis 2016)
[3] S. Z. Li, A. K. Jain, Handbook of Face Recognition 2nd, (Springer Verlag, 2011)
[4] A. Pal, A. Mehta, H. Goonesinghe, D. M. Syahkal, H. Nakano, IEEE Trans. Antennas Propag. 66, 2 (2018)
[5] S. E. A. Filho, A. M. F. Burlamaqui, R. V. Aroca, L. M. G. Gonçalves, IEEE Access 5, 16297-16313 (2017)
[6] G. Pasolini, A. Bazzi, F. Zabini, IEEE Signal Process. Mag. 151-157 (2017)
[7] I. Gupta, V. Patil, C. Kadam, S. Dumbre, Proc. WIECON-ECE, 83-86 (2016)
[8] K. Pulli, A. Baksheev, K. Kornyakov, V. Eruhimov, Comm. of the ACM 55, 6 (2012)
[9] O. Green, IEEE Trans. Image Process. 27, 5 (2018)
[10] Y. Shen, M. Yang, B. Wei, C. T. Chou, W. Hu, IEEE Trans. Mobile Comput. 16, 6 (2017)
[11] S. U. Sharma, D. J. Shah, IEEE Access 5, 347-358 (2017)
[12] I. B. Mustaffa, S. F. B M. Khairul, Proc. ICORAS, 1-3 (2017)
[13] S. Emami, V. P. Suciu, J. of Mobile, Embed. and Distrib. Systems IV, 1 (2012)
[14] P. Viola, M. Jones, Proc. of CVPR, 511-518 (2001)
[15] T. Sutikno, L. Handayani, D. Stiawan, M. A. Riyadi, I. M. I. Subroto, IJECE 6, 3 (2016)
[16] R. E. N. Sisyanto, Suhardi, N. B. Kurniawan, Proc. ICITSI, 239-245 (2017)
[17] G. B. Satrya, P. T. Daely, M. A. Nugroho, Proc. ICTS, 1-7 (2016)
[18] N. A. Othman, I. Aydin, Proc. ICCICN, 108-112 (2017)
[19] J. C. de Oliveira, D. H. Santos, M. P. Neto, Proc. ISCE, 131-132 (2016)
[20] Y. Cheng, L. Jiao, Y. Tong, Z. Li, Y. Hu, X. Cao, IEEE Access 5, 25835-25845 (2017)
[21] S. Kasim, R. Hassan, N. H. Zaini, A. S. Ahmad, A. A. Ramli, R. R. Saedudin, IJASEIT 7, 5 (2017) 22. R. Rahim, T. Afriliansyah, H. Winata, D. Nofriansyah, Ratnadewi, S. Aryza, Proc. InteriOR, 300 (2018)

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)