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IOT BASED SMART DOOR LOCK SYSTEM USING OPENCV

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Abstract: Smart home security and remote monitoring have become vital and indispensable in recent times, and with the advent of new concepts like Internet of Things and development of advanced authentication and security technologies, the need for smarter security systems has only been growing. The design and development of an intelligent web-based door lock control system using face recognition technology, for authentication, remote monitoring of visitors and remote control of smart door lock have been reported in this paper. This system uses Haar-like features for face detection and Local Binary Pattern Histogram (LBPH) for face recognition. The system also includes a web-based remote monitoring, an authentication module, and a bare-bones embedded IoT server, which transmits the live pictures of the visitors via email along with an SMS notification, and the owner can then remotely control the lock by responding to the email with predefined security codes to unlock the door. This system finds wide applications in smart homes where the physical presence of the owner at all times is not possible, and where a remote authentication and control is desired. The system has been implemented and tested using the Arduino Uno Board, Python along with OpenCV are used to program the various face recognition and control modules.

Key Words: Arduino Uno, Face Module Camera, Motion Sensor, Wire.

1.INTRODUCTION

A ubiquitous property of human perception is our ability to tell apart between different faces even once they look similar and recognize many different Individuals with almost no effort. Automated face recognition is vicinity within Computer Vision inspired by this ability. Biometric identification systems specialize in extracting faces from static images and video sequences and deciding whether or not they belong to a database of known individuals. Fig - 1: Various applications of face recognition. The face recognition system is that the hottest process of identification of a known person by his various image data. During this system, the pc will compare the person standing before the camera with its storage image files. If the face matched with the database files, then it'll recognize the person by its ID or name. If it doesn't then match, then the person is going to be unrecognized. For creat

2. LITERATURE REVIEW

Ramadan Zebari Amira Bibo Sallow[1], This paper presents the main OpenCV modules, features, and OpenCV based on Python. The paper also presents common OpenCV applications and classifiers used in these applications like image processing, face detection, face recognition, and object detection. **Jayanth Vadlapati, S. Senthil Velan, Ewin Varghese[2],** In this research paper, we are going to see the profound scientific use of computer technology applied in the fields of AI and Machine Learning primarily focused on Image Processing and Pattern recognition. **Chowdhury Md. Mizan, Aritra Ghosh, Sudeep Ghosh, Tridib Chakroborty, Sayan Sarkar, Spandan Ghosh[3],** Face recognition is a technique that an electronic device like a computer can determine and recognizea human face by comparing the given sample of facial attributes of that person. This subject or topic, using unbiased facial data, computer-based face recognition as an analysis is a largely unexplained part of research study

3. PROPOSED METHODOLOGIES

Existing System:

OpenCV accompanies a coach just as identifier. In the event that you need to prepare your own classifier for any article like vehicle, planes and so on you can utilize OpenCV to make one. Its full subtleties are given here: Cascade Classifier Training.

Proposed Solution:

After preprocessing like resizing and cropped images, Haar cascade classifier is used to detect whether there is a single face detected or not. Figure 3 demonstrates the flow chart for the proposed system. Edge, line, and center surround are the features of Haar which are acting as inputs. By these cascade features the test of the image is done. The features of Haar are divided into various different stages. Stage by stage the window will be tested. Usually, initial stages will have less Haar-like features. If the first stage window fails, then it is to be discarded and the next stages will not be tested. If all the stages successfully passes then it is considered to be face is detected and checks with the images already stored in database of raspberry Pi. The advantage of Haar cascade classifiers is fast detection speed compared to other classifiers.

3.1 BLOCK DIAGRAM

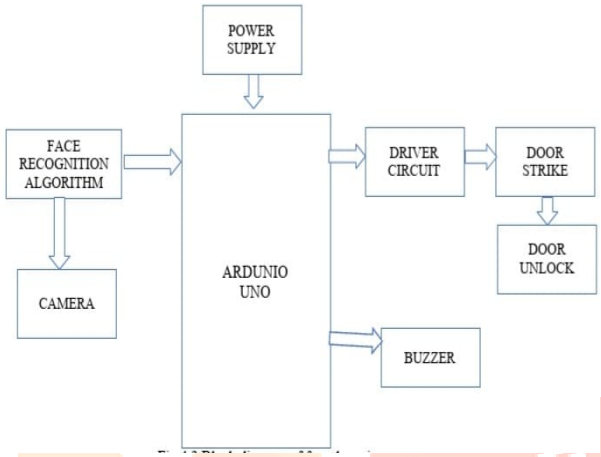

Figure 1: Block diagram

Generally, people lock their doors to be safe from thieves or other people. There are various security access control systems such as keys, Barcode ID, or another system any unauthorized person can still brake in. But with face recognition system there is no such limitation, the face data are stored on Linux operating system-based Arduino uno and it'll compare real-time with the persons before the webcam. Arduino uno has been used because it's a credit card sized computer that work faster than some other huge size computers. The architecture of the Raspberry pi facial recognition system is smaller, easier than the PC-based facial recognition system, and has lower power consumption. It is freer to build applications on Linux due to open-source code. For the face recognition and identification method, the principal component analysis (Eigen faces) algorithm is used. The system is inexpensive, fast, highly durable and offers sufficient versatility to satisfy various system requirements.

Using this technology:

1) Image Processing: This method is used for image capture and recognition compared with database images.

2) Embedded System Design: This approach is used for the module, which combines hardware, software and many other featured components.

3.2 FLOW CHART

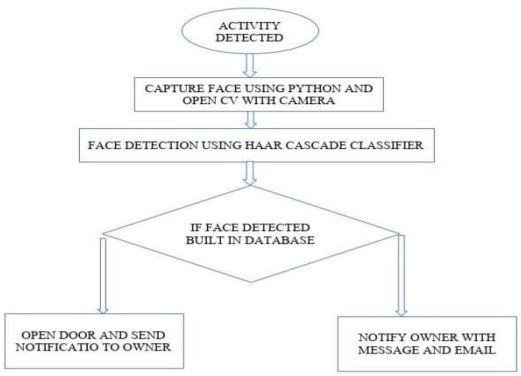

Figure 1: Flow chart

4. SIGNIFICANCE AND SCOPE

Face detection is a crucial task in computer vision applications, and OpenCV provides various tools and pre-trained models to facilitate this process. Thiscode utilizes the Haar Cascade classifier, a popular method for face detection, todetect faces in a live video stream.

Improved security Face detection improves surveillance efforts and helps track down criminals and terrorists. Personal security is enhanced when users use their faces in place of passwords, because there's nothing for hackers to stealor change.

Easy to integrate Face detection and facial recognition technology is easy to integrate, and most applications are compatible with the majority of cyber security software.

Automated identification In the past, identification was manually performed by a person; this was inefficient and frequently inaccurate. Face detection allows the identification process to be automated, saving time and increasing accuracy.

5. RESULTS

After running the dataset code, we will get number of pictures in a folder named dataset. Now these photos will be used to train. The more the pics the greater the accuracy of the trainer

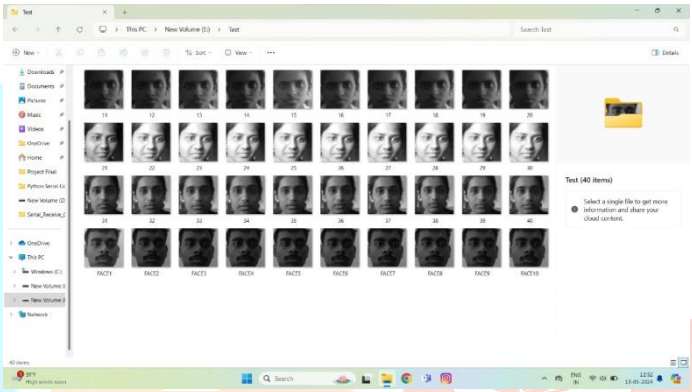

Fig. 5.2 Example of the script storing the dataset

6. CONCLUSIONS

The arrangement of a facial recognition system using raspberry pi had used the Linux operating system that can make the system littler, lighter and work successfully utilizing lower control use, so it is more convenient than the PC-Windows based face recognition system. Also, it triggers the security alarm for unauthorized persons whose faces data doesn't match with the stored data inside its database. The main concern was to create a face recognition-based door access controlling system that would be able to identify knowing persons with their ID, then it will give access to known persons and alarm for the unknown ones.

REFERENCES

[1] https://www.researchgate.net/publication/355886757_Face_Detection_and_Recognition_Using_OpenCV

[2] https://ieeexplore.ieee.org/document/9579712

[3] https://ijsrem.com/download/real-time-face-recognition-system-using-python-and-opencv/

[4] https://www.jetir.org/papers/JETIR2305154.pdf

[5] https://www.jetir.org/papers/JETIR2305154.pdf

[6] https://arxiv.org/ftp/arxiv/papers/2206/2206.05842.pdf

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