Smart Door controller for handicapped people based on face recognition and voice command technique

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ABSTRACT: There are a few houses that indicate an application for various implementations, they can indicate all types of systems that direct any door lock as well as many other apparatuses. Facial identification that can be considered as a significant section for safety and monitoring, specifically for the handicapped, has the ability to be a way which treats with biometrics and employed for identifying any facial image by employing basic face characteristics. A system of face recognition based on Raspberry Pi utilizing recognition mechanisms as well as conventional face detection will be provided. Thus, the approach that image-built biometrics utilizes a Raspberry Pi has been depicted. The goal here could be to transfer face recognition towards a level where the system has the ability to change RF I-Cards' use and a password for getting access into all security systems, and reviving the system as well as keeping the door safe hacking people, specifically via utilizing an authorized person's photo, we turn raspberry pi off and do not turn it on just by an order from cell phone of the authorized person. The presented proposal's outcome can be a system which utilizes face recognition via employing Raspberry Pi and OpenCV, and it works on Android, and its percentage can be 99.63%. It ought to be secured cost-effective, easy to use and of high performance, that is employed in all applications of smart homes.

Keywords: Face recognition, Smart home, Raspberry Pi, face detection, handicapped people.

1. INTRODUCTION

It can be handy enough for many individuals like the handicapped people as well as elders to get appliances in hand via employing a smart technique. A lot of those devices are not manufactured for physically disordered people. Everybody agrees that "the handicapped struggle from many everyday situations in and out of the house, especially they live alone" [1]. Monitoring and controlling more than one task in the house gives the highest possible safety [2]. Hence, frameworks along with accurateness and safety in exceeding ways have to be summarized crucially. Open CV 'open-source PC vision library' has conveyed as an open library belongs to a source picture preparation kind. OpenCV needs a specific kind of compilers like code squares, visual C++, Dev C++.

Raspberry pi could be depicted as a Mastercard measured computer, the Model B of Raspberry Pi3 is depicted as a computer similar as small as a credit card that is connected with a TV, besides a keyboard and mouse [3].

The Camera Module is depicted as a tiny PCB which provides connecting for cameras attached by wire to capture constant photos or videos, and voice commands, that is appropriate for real-time [4], smart home apps [5].

2. Related Work

A number of previous related researches clarify the following:

A few related literature reviews: Hana'a Salman (2006) [6] provided information related to automatic speech recognition via machine for every man-machine communication by voice command. Olegs Nikisins et al (2015) [7] gave a face recognizing system originated on computers of a Raspberry Pi's single board quality. The proposed face recognizing system was under test on FERET collection of information and achieved accuracy for CMC: 99.33%, and

EER: 1%. Ishita Gupta et al (2016) [8] presented recognizing of faces, furthermore, they claimed that it used to be an important section can be employed in monitoring as well as security.

Their goal has been to explore the potentiality for executing Raspberry Pi originated on the system of face recognition by employing conventional face detection besides techniques of recognition such as PCA and Haar detecting. Shrutika V. Deshmukh et al (2017) [9] submitted the total number of robberies committed over there besides forging identity cards that became significant. Identification and exercising have been performed in Raspberry Pi. Shakir Fattah Kak et al (2019) [10] utilized the smart home app in an effective way to enhance the house security control management. Alina Munir et al (2019) [11] visualized a smart home type originated on arising and separate technologies by face recognizing, to achieve security, besides speech recognizing, to automate.

The system here builds a real-time face recognition system to assist the handicapped people in their door locks, by employing the hardware as well as software, and system reaches 99.63 percent if it detects faces rightly. This ought to be cost-effective, of high-performance, simple and secured, and we can use this in every smart home app.

3. Proposed System

It may build a real-time face recognition system that benefits the handicapped people regarding door locks by employing hardware as well as software, the system can reach 99.63 percent if it detects the face rightly. it could be worthy besides its skillfulness, simplicity, we can use it for all apps dealing with a smart home.

The design of the system consists PI camera modules employed for instant video streaming, frame capturing of input and forwarding every frame to the Raspberry PI, see Fig. 1. The work of the system is as follows:

FIGURE 1. Flow chart the open CV classifier

- 1- Raspberry PI camera attached to the Raspberry PI live stream video.
- 2- The Raspberry PI detects faces from captured frames, compute the number of face embeddings, and performs a matching between the vector output and the renowned database besides labeling the mostly matched face.
- 3- If the identifying is impossible, an unknown label can be shown for detected faces.

4. Experiment and results

To estimate how the suggested approach of face detection & recognition performs, a lot of checking has been done, as a command from the mobile of the authorized person opens raspberry & no one else. If the recognition is done rightly, the lock door opens and reads the name. every result has been as follows:

Stage 1: - The raspberry pi's camera exercised with owner's face, see Fig. 2.

FIGURE 2. - Exercised with Owner's

Stage 2: - The person takes a look at the camera to be identified. the position of a face's detection is effective, the following process may be face recognition, see Fig. 3.

FIGURE 3. - Face detection

Stage 3: - During the detecting and recognizing algorithm, it gets to know people whether they are strangers or house owners.

Stage 4: - If the people recognized as house owners, the door unlocks and a voice message is heard, if not, precede to Stage 5, see Fig. 4.

FIGURE 4. - Face recognition

Stage 5: - If the people recognized as strangers, the door does not unlock, and a warning message will be heard, see Fig. 5.

FIGURE 5. - Stranger person, the face is not recognized

Stage 6: - The system can be integrated on Raspberry Pi 3 via employing a camera that is connected with it.

5. Conclusions

The system recognizes faces in the video stream in a real time manner, so labelling them can be done in the correct way. By embedding Raspberry Pi with image processing approaches, illustrating the position by getting LED of the area of variation open in which face locating is feasible.

In the future, the android application has to illustrate back up in getting extra windows, doors, and domestic gadgets in hand. A report which is triggered automatically for the attempt to break in can report the residency details the closest police department. That technique has to be regarded to develop the system.

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