

A Review on Implementation of the Smart DoorLock System with Face Recognition Method with IoT using Raspberry Pi

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Abstract - Protection and Security are two general rights and, to guarantee that in our day by day life we are secure, a great deal of examination is going on in the field of home security, and IoT is the defining moment for the business, where we associate regular items to share information for our improvement. House security matters and individuals consistently attempt to make life simpler simultaneously. That is the reason we set up with this task, Face Recognition Door Lock System. Facial acknowledgment is a grounded cycle wherein the face is distinguished and recognized out of the picture. We plan to make a brilliant entryway, which gets the passage based on what our identity is. We need to build up this framework dependent on Raspberry-pi 3, to make the house just open when your face is perceived by the acknowledgment calculations from Open CV library and then you are permitted in by the house proprietor, who could screen entrance distantly. Thusly, the framework is less inclined to be hoodwinked: since the proprietor can check every guest in the distant support, getting perceived by the camera utilizing a photograph will not work. I need to add password work for entrance in the event that that face acknowledgment part adulterates.

Keyword - Raspberry Pi, Facial Recognition Door, Home Security, IoT.

I. Introduction :

In this day and age of network and keen gadgets there is a critical need to change our current everyday articles and make them keen, likewise it isn't the time when we can aimlessly believe the old and customary safety efforts, explicitly talking is our entryway locks. To change and modernize any article we need to dispose of its current downsides and add additional usefulness. The significant disadvantages in a typical entryway lock are that anybody can open an ordinary entryway lock by copying or taking the key and its just unthinkable on the off chance that we need our loved ones to go into our home, without being really present over yonder. Subsequently why not simply kill these issues. Along these lines, to just change over this typical entryway lock into a keen lock, which can open the entryway at whatever point we turn up before the door or when we need it to open up for another person without being genuinely present, we need to alter the entryway. So a period has come where gadgets can connect with its clients and simultaneously guarantee of their wellbeing and continue to extemporize themselves. Clients could work on a touchscreen to choose going into the house by perceiving the face or engines or potentially adding an advanced number cushion to take contributions from the client or adding Infra-Red or Bluetooth modules to work these gadgets. or on the other hand face acknowledgment, a picture will be caught by a pi camera and pre-prepared by Raspberry pi like changing over, re-estimating and editing. At that point face discovery and acknowledgment are performed. When the face is perceived by the classifier dependent on a pre-put away picture library, the picture will be shipped off a distant support hanging tight for house proprietor's choice.

II. Literature Survey:

Harshada B. More(2017) is proposed face identification and acknowledgment which is led to examine the consequence of various methodologies regarding acknowledgment precision and some of them are talked about for limiting handling time perspective. The objective of this paper is to introduce a basic study of existing writing on human face acknowledgment. This paper is having two level security which makes the security more grounded and solid. Thus, this give the client more control. In past days, the examination is gone on different entryway lock security frameworks like customary security frameworks which give sign utilizing alerts. Because of the progression in ongoing procedures, some entryway lock security frameworks depend on PROTEUS, GSM, GPS, numerous sensors, iris acknowledgment, programming like MATLAB, microcontroller, biometrics like face acknowledgment, face discovery, RFID and brilliant cards. This paper is essentially involved three subsystems – Face identification, Face acknowledgment and programmed entryway access control.

Anjali Patel (2017) et al. proposed at creating secure locking mechanization using IOT for entryway opening framework to give fundamental security to our homes, bank storage spaces and related control activities and security alert through the GSM module .It utilizes a picture catching strategy in an implanted framework dependent on raspberry pi worker framework. RPi (Raspberry pi) controls the camcorder for getting it for turning on a hand-off for entryway opening. The module contains a got face recognizer for programmed entryway opening. The camera gets the facial picture and contrasts it and the picture which is put away in the data set .If the image is found in the information base then the entryway lock opens else it will deliver a SMS that an obscure individual is attempting to obtain entrance.

Dayasagar V. Ballal (2016) et al. proposed Secure locking Automation utilizing Raspberry Pi for Door opening to give fundamental security to our homes, bank storage spaces and related control tasks and send security alert through the GSM module. Raspberry Pi works and controls the camcorder for catching it for turning ON a hand-off for entryway open. The module contains a got face recognizer for programmed entryway opening.

Karan Maheshwari (2017) et al. proposed Privacy and Security are two general rights and, to guarantee that in our day by day life we are secure, a ton of examination is going on in the field of home security, and IoT is the defining moment for the business, where we associate regular items to share information for our advancement. Facial acknowledgment is a grounded cycle wherein the face is recognized and distinguished out of the picture. We intend to make a shrewd entryway, which gets the door based on what our identity is. In our verification of idea of a savvy entryway we have utilized a live HD camera on the front side of arrangement joined to a presentation screen associated with the camera to show who is remaining before the entryway, additionally the entire framework will actually want to give voice yields by preparing text them on the Raspberry Pi ARM processor utilized and show the appropriate responses as yield on the screen. We are utilizing a bunch of electromagnets constrained by the miniature regulator, which will go about as a lock. So an individual can open the keen entryway with the assistance of facial acknowledgment and simultaneously likewise have the option to connect with it. The facial acknowledgment is finished by Microsoft face API however our cutting edge work area application working over Microsoft Visual Studio IDE decreases the computational time by distinguishing the face out of photograph and giving that as the yield to Microsoft Face API, which is facilitated over Microsoft Azure cloud support

Venkatesh Bhutra (2018) et al. proposed head part investigation assumes the significant part. It is considered as the best methodology as it decline computational intricacy as well as help smaller information dissemination. Despite the fact that the PCA productivity is affected by variety of light forces, expanding the quantity of preparing pictures with variety can kill the change. Care should be taken in expanding the quantity of preparing pictures as the balance impact is conceivable simply up as far as possible. The proposed work functions admirably with various picture design yet variety in picture size restricts the work. The communication between the PCA calculation and the equipment hushes up estimable. Consequently, the foremost segment approach gives an answer that fits best in the proposed work

Thulluri Krishna Vamsi (2019) et al. introduced confronting security issues in each perspective. So we need to determine these issues by utilizing refreshed innovation. In this task, we are utilizing the Face acknowledgment module to catch human pictures and to contrast and put away data set pictures. In the event that it matches with the approved client, the framework will open the entryway by an electromagnetic lock. The requirement for facial acknowledgment framework that is quick and precise that persistently expanding which can identify gatecrashers and limits all unapproved clients from profoundly got regions and helps in limiting human mistake. Face acknowledgment is quite possibly the most Secured System than biometric design acknowledgment strategy which is utilized in a huge range of uses. The time and precision factor is considered about the serious issue which determines the presentation of programmed face acknowledgment continuously conditions. Different arrangements have been proposed utilizing multicore frameworks. By thinking about the current test, this gives the total structural plan and proposes an investigation for a continuous face acknowledgment framework with LBPH Algorithm. In this calculation, it changes the picture from shading over to greyscale picture and partitions into pixels and it will be dispensed in a framework structure and those pictures will be put away in the data set. Assuming a picture is distinguished, microcontroller will send capacity to the engine driver unit then the electromagnetic lock will open the entryway and it will bolt again when there is no force supply to that unit. At last, this paper closes for the high level executions accomplished by coordinating inserted framework models against the show.

A. R. Syafeeza (2020) et al. introduced The home security framework has gotten imperative for each house. Already, most entryways can be open by utilizing conventional ways, like keys, security cards, secret word or example. Nonetheless, occurrences, for example, a key misfortune has prompted a lot stressing cases like burglary and personality misrepresentation. This has become a huge issue. To conquer this issue, face acknowledgment utilizing profound learning method was presented and Internet of Thing (IoT) additionally been utilized to perform proficient entryway access control framework. Raspberry Pi is a programmable little PC board and utilized as the fundamental regulator for face acknowledgment, youth framework and locking framework. The camera is utilized to catch pictures of the individual before the entryway. IoT framework empowers the client to control the entryway access.

Nourman S. Irjanto (2020) et al. introduced Security of house entryways is vital and turns into the reason for the most straightforward and least demanding security and adequate to give a conviction that all is good to property holders and alongside innovative turns of events, particularly in the IoT field, which makes mechanical improvements in locking house entryways have built up a great deal like locking house entryways with countenances and others. The advancement of facial acknowledgment frameworks has likewise evolved and has been carried out for home entryway locking frameworks and is an alternative that is very basic and

simple to utilize and is very exact in perceiving the essence of mortgage holders. The improvement of the CNN strategy in facial acknowledgment has gotten one of the face acknowledgment frameworks that are not difficult to carry out and have great precision in perceiving faces and has been utilized in object acknowledgment frameworks and others. In this investigation, utilizing the CNN Alexnet facial acknowledgment framework which is executed in an entryway locking framework, information assortment is finished by gathering 1048 facial information on the essence of the property holder utilizing a framework which is then used to prepare AI where the outcomes are very exact where the precision is the outcome is 97.5% which is very acceptable contrasted for certain different examinations. The end is the CNN Alexnet strategy can perform facial acknowledgment which is very exact which can be executed on the IoT gadget, specifically, the Raspberry Pi

Ketki Prasade (2018) et al. proposed - Security portrays insurance of life and property. The fundamental reason for this framework is to give better security by utilizing face acknowledgment strategy. Eigen face calculation is a reason for face acknowledgment that gives high precision and moderate affectability to varieties in the power of light. It is one of the quickest method to recognize faces. This undertaking works in two modes: disconnected and on the web. First and foremost, the PIR sensor detects the individual remaining external the entryway. At that point camera gets guidance to catch picture of individual remaining before the entryway. This caught picture is contrasted with the pictures put away in the information base. The individual remaining before the entryway will be allowed admittance, if his/her picture is perceived. In the event that it's not the approved individual gets a warning through GSM. In the event that the approved individual awards consent, just the entryway will open. Or, in all likelihood it will stay shut for additional activity. This undertaking utilizes Laptop as a handling unit. It utilizes MATLAB programming to complete the face acknowledgment technique. The framework takes input picture by catching a continuous picture for online cycle. For disconnected cycle the info picture is given physically

A Raghu Prasath (2020) et al. proposed confronting security issues in each viewpoint. So we need to determine these issues by utilizing refreshed innovation. In this undertaking, we are utilizing the Face acknowledgment module to catch human pictures and to contrast and put away information base pictures. The most significant of highlight of any home security framework is to identify individuals who go into or take off from the house. Rather than observing that through passwords or pins, remarkable appearances can be utilized as they are one's biometric attribute. We plan to make a shrewd entryway, which gets the passage based on what our identity is. We need to build up this framework dependent on Raspberry-pi 3, to make the house just open when your face is perceived by the acknowledgment calculations from Open CV library and in the mean time you are permitted in by the house proprietor, who could screen entrance distantly. At whatever point the individual comes before the entryway, it perceives the face and assuming it is enrolled, it opens the entryway, if the face isn't enlisted it will bring an alert up in the portable and snaps an image and send it on the enlisted number.

Shrutika V. Deshmukh(2017) et al. proposed the quantity of burglaries and character misrepresentation has become a significant issue. To stay away from these burglaries and character extortion, a face acknowledgment framework should be set up. The extent of this undertaking is to build up a security access control application dependent on face acknowledgment. The haar-like highlights is utilized for face location and HOG +SVM calculation is utilized for face acknowledgment. To accomplish a higher precision and viability we use OpenCV libraries and python script. Preparing and ID is done in inserted gadget known as Raspberry Pi

III. METHODOLOGY

The working of entryway lock/open framework is finished utilizing open source equipment parts and programming apparatuses, which is accessible in the open market.

Face identification and Data gathering is really an interaction where notwithstanding an individual is caught first prior to busy, that is face recognition of the individual is done first which is the most essential advance in this cycle. Item location utilizing Haar course classifier is a viable strategy for object recognition. The following assignment is to accumulate the information for which the preparation will be done on the classifier gave. The necessary information will be assembled to distinguish the face which will coordinate with the information that is put away in the data set

Preparing recognizer comprises of a recognizer and a coach where during the time spent preparing the new face with their individual characters, which is essentially takes care of the face with their ID's to the recognizer so it can learn and the information which is sent can be adequately prepared by the mentor. Accordingly by this cycle the information which is shipped off the recognizer will adapt viably and effectively.

At first, the calculation needs a ton of positive (pictures of appearances) and negative (pictures without faces) to prepare the classifier. At that point the extraction of the highlights will be done from it. One great component is that OpenCV accompanies a mentor just as an indicator.

When the preparation acknowledgment measure is done it goes to the last phase of face recognition. Here, a new face on the camera will be caught and if this individual had his face caught and prepared previously, the recognizer will make a "forecast" returning its id and a record, shown how sure the recognizer is with this match. In following stage the cycle is rehashed like identify a face, same as its done before with the Haar Cascade classifier.

The framework will catch the picture by raspberry pi cam and on the off chance that it perceives the face as an approved individual, the entryway opens. On the off chance that it is some unapproved individual, the framework will caution by disturbing and the picture will be caught and shipped off the administrator by email. On the off chance that the administrator feels he is threatless, the entryway will open else access is denied.

This way the undertaking is worked and completed by the framework.

IV. COMPARATIVE ANALYSIS

In the past overview papers or the current framework, the strategy they have utilized is perplexing and generally less got. Contrasted with other bio metric attributes face acknowledgment is simple and easy to do.

Downsides:

- Usage of passwords and pins.
- Manual entryway opening strategies utilized.
- Complicated and less safety efforts prompts acts of neglect.

Benefits of the proposed framework

- Usage of secret phrase and pins isn't considered here.
- The straightforward and simple method of bio metric characteristic is utilized here, for example face discovery.
- The current framework issues have been survived and prompts simple approach to use for the clients.
- This framework is likewise time proficient.

V. EXPECTED RESULT

At the point when an individual draws close to the framework, the camera acts first by catching the picture and sending it to the information base. Calculation contrasts the picture and information base pictures and eventually on the off chance that it is a known individual, he will be conceded passage with no limitation.

While, if an obscure individual comes his face will be caught and SMS ready will be shipped off the proprietor. At that point the proprietor will contact to that individual through

Conclusion:

The plan of the face acknowledgment framework utilizing Raspberry pi can make the more modest, lighter and with lower power utilization, so it is more helpful than the PC-based face acknowledgment framework. On account of the open source code, it is more liberated to do programming advancement on Linux. We use HOG+SVM calculation for the face acknowledgment and recognition measure. Additionally send a security ready message to the approved individual. A face location framework utilizing Raspberry Pi was created. The framework was customized utilizing Python programming language. Both Real time face location and face identification from explicit pictures, for example object acknowledgment, was completed. The productivity of the framework was dissected regarding face identification rate. The investigation uncovered that the current framework shows great execution proficiency and can be utilized for face location even from low quality pictures.

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