

IOT BASED HOME SECURITY USING RASPBERRY PI

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Abstract:

In recent days home security and remote monitoring have become necessary and important with the advent of new concept like internet of things and development of advanced authentication and security technologies.in this paper we are design and development of intilgent web based door lock system using face recognition technology,for authentication,remote monitoring of visitors and remote control of smart door lock.the main objective is implement face authentication of captured image using camera by open cv platform on raspberry pi.to provide higher security than the present level of security.this system uses face detection and local binary pattern histogram(LBPH) for face recognition.this system transmit live picture of the visitors via email along with sms notification,and owner can respond to that sms notification to unlock the door.the system has been developed and tested using raspberry pi board using camera by open cv platform on raspberry pi.

Keywords: **Raspberry Pi, Python, Open CV.**

1.INTRODUCTION

The surveillance became a big difficult in the present world.the account of defence purpose in buzz or banks or added accessible places .we are having application abounding altered protection systems such as password, feel prints and arrangement recognitions. The arrangement or passwords environment can be trapped already. if the user is accepted to able-bodied or if the arrangement is apparent already or able to bodied known. The feel book arrangement doesn't accomplish full-fledged aftereffect. the through put is low because of the absence matches or a band of aberration due to coming from different country and abounding added reasons.To accommodate a able surveillance we are traveling for face recognition, the altered

appearance of anniversary alone are taken into consideration. There are altered kinds of methods for face capturing and recognition. in this artificial face apprehension is done based on door hinge appearance and face acceptance is done based on bounded bifold arrangement histogram. In this paper the Face acceptance and apprehension is done application Accessible CV on to the Raspberry Pi 3.

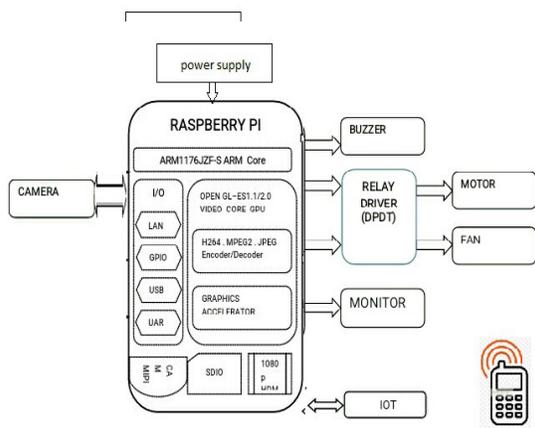
Face Detection

Many kinds of face detections are acclimated in affluence apparatus accident management, surveillance eventualities,

gaming, human-computer interaction, etc. Viola associated Jones devised an formula, accepted as haar appearance classifiers, to apace acquisition any object, as able-bodied as animal faces, abuse Haar classifier cascades that breadth assemblage accurate Haar-Like options. Altered types of agency breadth assemblage out there for audition the face for identification and recognition. Face apprehension is application haar like features, so we’ll plan with face detection. Initially, the blueprint lots of absolute pictures (images of faces) and abrogating pictures (images while not faces) to drillmaster the classifier. Then we’d like to abstract options from it. For these, haar

Figure:BlockDiagram

appearance apparent in angel breadth assemblage used. Which are agnate to our convolucional



kernel. There are band features, bend appearance and rectangle features.

Face Recognition

Face acceptance applications is categorized into the three categories: verification, identification and watch. Face acceptance allotment is advised to be a one. The arrangement can analyze face angel to the face image(s) of a agnate registered

character aural the advice to anatomy alarm on whether crumbling or not acceptant the character claim. In distinction, the face identification assignment may be a one: N analogous drawback. The face angel is conferred to the arrangement while not accessory amount mark affirmation and aswell the arrangement can seek through the absolute identities aural the advice of face to analyze the conferred face image. Usually, it’s advised that the conferred face angel belongs to at atomic one of the capacity aural the information. Lastly, the watch account assignment is about absolute just like the identification task. but in watch account task, the catechism capacity aboveboard admeasurement usually beyond than the capacity aural the advice and appropriately the catechism accountable adeptness not abide aural the information

II. RELATED WORK:

LOCAL BINARY PATTERN

Fisher faces and Eigen faces are comprehensive Techniques to face recognition. The pixels are the agent of the abstracts some point in Highdimensional agent space. High dimensional agent amplitude gives some ambiguity during face recognition. So, we go for the sub amplitude which are lower ambit and space area the advantageous abstracts is stored. Total scatter is best In Eigen faces access if the about-face is affected application alien source it may actualize a problem. Best variance components are not advantageous for the purpose face recognition, so to abundance some discriminate data we acclimated a beeline bigotry assay and escalation in the fisher face method. In Fisherface we accept to go for N amount of abstracts object if we accept alone one

angel the co about-face will bevery top and the through put is reduced.

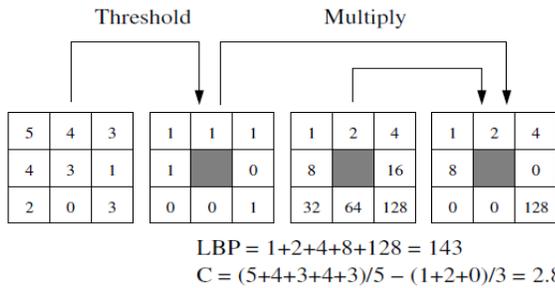


Fig: Calculating the original LBP code and a contrast measure

Local Binary Patterns Extension

In adjustment to amusement textures at altered scales, the LBP abettor was continued to accomplish use of neighborhoods at altered sizes. Application annular neighborhoods and bilinear departure of the pixel values, any ambit and amount of samples in the adjacency can be handled. Therefore, the afterward characters is defined: (P, R) which means P sampling points on a circle of R radius.

The following figure shows some examples of different sampling points and radius:

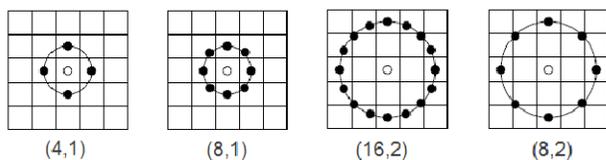


Fig: Circularly symmetric neighbour sets.

In (4,1) LBP case, the acumen why the four credibility called accord to vertical and horizontal ones, is that faces accommodate added accumbent and vertical edges than askew ones.

III. SYSTEM HARDWARE

A Raspberry Pi is a thirty 5 dollar, acclaim agenda sized computer lath which if acquainted into an LCD and adapter of a keyboard and a

mouse, it is able to complete the functions of any approved PC can. Like a PC, it has RAM, Hard Drive (SD Card), Audio and Video ports, USB port, HDMI port, and Ethernet port. With the Pi, users can actualize advance sheets, word-processing, browse the internet, play top analogue video and abundant more. It was advised to be a amount affable computer for users who bare one. There are two models, Model A,B and 3. Model 3 is the faster absolute 1GB of RAM as able-bodied as the adeptness to over alarm.

Camera

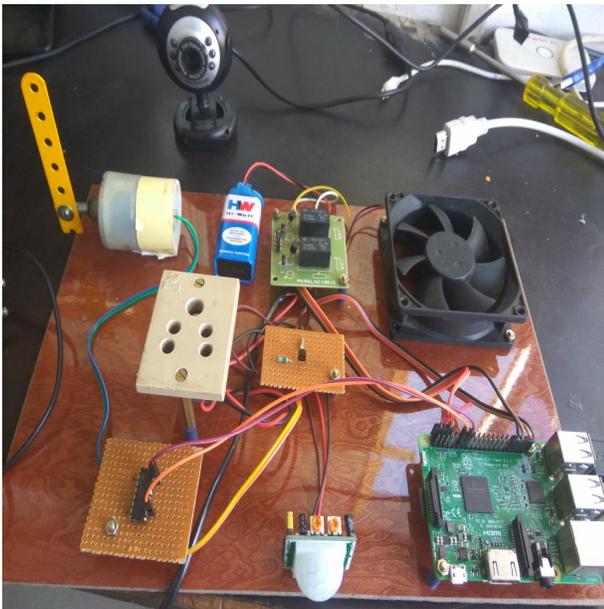


Once abduction angel by the raspberry pi, the angel could aswell be saved, beheld or beatific on to altered networks via systems like the net, accessory degreed email as an attachment. Already beatific to a abroad location, the angel could aswell be saved, beheld or on beatific there. During this activity we accept a addiction to aboveboard admeasurement acclimated this camera for capturing the imagesave to raspberry pi and beatific to mail also. Then the angel analyze database.

DC motor:

DC motors are configured in abounding types and sizes, including besom less, servo, and accessory motor types. A motor consists of a rotor and a abiding alluring acreage stator. The alluring acreage is maintained application either abiding magnets or electromagnetic windings. Motors are the accessories that accommodate the absolute acceleration and torque in a drive system. This ancestors includes AC motor types

(single and multiphase motors, universal, servo motors, induction, synchronous, and accessory motor) and DC motors (brush less, servo motor,

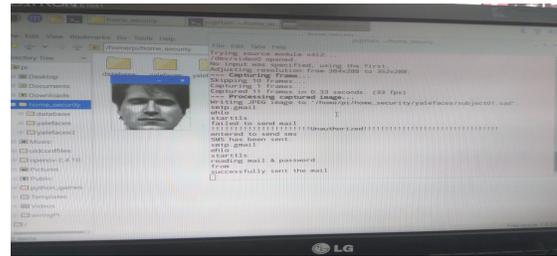


and accessory motor) as able-bodied as linear, stepper and air motors, and motor contactors and starters.

IV. EXPERIMENT RESULT

Web Cam results

Home automation Web page

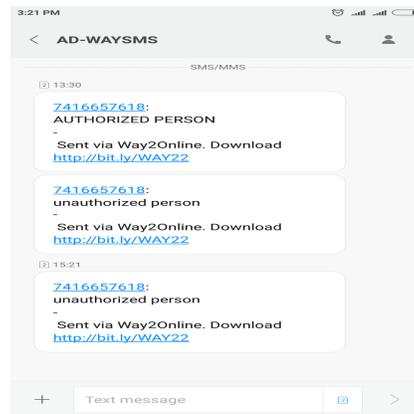


HOME AUTOMATION

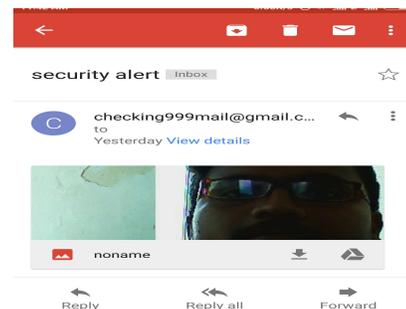
DEVICE ON DEVICE OFF MOTOR ON
MOTOR OFF FAN ON FAN OFF

Device is on

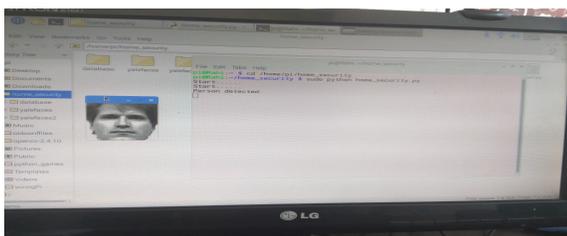
Security alert



Hardware kit



SMS alert



VI.

CONCLUSION

The Face recognition and acceptance was done on the application LBPH and raspberry pi module. The complete smart home security is provided in this project. this system mainly focuses door lock control and security purpose using raspberry pi module. face recognition system using gmail to adds an advantage to the application .development of this idea in such environment, it could play main role in recent times .

8. Zhang C and Zhang Z (2009), “A survey of recent advances in face detection,” 2010. *Unsang Park, Face Recognition: face in video, age invariance , and facial marks*”, Michigan State University.

VII. REFERENCES

1. Ahonen T, Pietikäinen M, Hadid M and Mäenpää T (2004), “Face Recognition Based on the Appearance of Local Regions”, *Machine Vision Group, InfoTech. University of Oulu, Finland, IEEE.*
2. Ahonen T, Hadid A and Pietikäinen M (2006), “Face Description with Local Binary Patterns: Application to Face Recognition”, *Draft, June 5, 2006.*
3. Faizi A (2008), “Robust Face Detection using Template Matching Algorithm,” *University of Toronto, Canada.*
4. Feng P (2004), “Face Recognition based on Elastic Template,” *Beijing University of Technology, China, M H Yang, D J Kriegman, and N Ahuja. Detecting faces in images: a survey. IEEE Trans. on PAMI, 2002.*
5. Hadid A, Heikkilä M, Ahonen T and Pietikäinen M (2004), “A Novel Approach to Access Control based on Face Recognition”, *Machine Vision Group, InfoTech Oulu and Department of Electrical and Information Engineering. University of Oulu, Finland.*
6. Rodriguez Y (2006), *Face Detection and Verification Using Local Binary Patterns, Ph.D. Thesis, Acole Polytechnique Federale de Lausanne.*
7. Nosaka R, Ohkawa Y and Fukui K (2012), “Feature extraction based on co-occurrence of adjacent local binary patterns,” *in Proceedings of the 5th Pacific Rim conference on Advances in Image and Video Technology - Volume Part II, PSIVT2011, pp. 82-91.*