Smart home system by voice command and image processing technique

Satric.D   R.Valan   V.Kabilarasan

EEE departmentEEE departmentEEE department

D.M.I college of engineering   D.M.Icollegeof engineering   D.M.Icollege of engineering

satric10@gmail.comvalan.fernando@gmail.comkabilarasan03@gmail.com

Mr.SURESH M.E

Asst professor EEE department

D.M.I college of engineering

Abstract—**Security is one the very pinnacle of necessities of homes and organizations which require biometric recognizable proof. This paper expects to distinguish a man through face acknowledgment. Face acknowledgment is extremely perplexing and multidimensional issue. A MATLAB based Principal Component Analysis is utilized for confront coordinating choice. The framework is planned in MATLAB which changes over facial pictures to include qualities of starting preparing database pictures. Facial highlights are extricated from the face and eigenvalues are computed and spoken to as an Eigen vector. Examination of obscure face picture and database picture is finished utilizing Euclidian separation strategy. The perceived facial picture has least Euclidian separation with the database pictures. At the point when confront is perceived by MATLAB Code it will give the relating sign to Arduino, if its approved then the individual use his voice to open Gate, on the fan and light generally do nothing. Security framework utilizing MATLAB and Embedded framework configuration is savvy, dependable and exceedingly exact.**

Keywords—MATLAB, euclidian distance ,eigen values

INTRODUCTION

Security is one the very pinnacle of necessities of homes and organizations. In the present high innovation utilization of data, especially individual information, the dangers to data frameworks from culprits and fear based oppressors are expanding quickly. As a component of their arrangement of inner control, numerous associations will distinguish data as a territory of their task that should be secured. This paper expects to recognize a man through face acknowledgment. Keeping in mind the end goal to separate some valuable data from an upgraded picture, picture handling is a strategy to change over a picture into advanced frame and play out a few activities on it. It is a sort of flag conveyance in which input is picture (video edge or photo) and yield might be picture or

attributes related with that picture. While applying officiallyset flag handling techniques to them, picture preparing framework incorporates regarding pictures as two dimensional signs. One of the motivations behind picture preparing is confront location and acknowledgment.

Face discovery is broadly utilized as a part of intelligent UIs, promoting industry, amusement administrations, and video coding. It is likewise fundamental first stage for all face acknowledgment frameworks, and so forth. Face recognition issue is about how to discover, in view of visual data, every one of the events of faces paying little respect to who the individual is.

A face acknowledgment framework is a PC application, which is fit for recognizing or confirming a man from a computerized picture or a video outline, acquired from a video source. One of the approaches to do this is by looking at chose facial highlights from the picture and a face database. Here security frameworks which comprise of face acknowledgment, home computerization has been manufactured. For identification we utilize viola-jones calculation and a prepared order show. Face acknowledgment is finished by PCA calculation. Correlation is finished utilizing Euclidean separation technique and in the event that we got a base an incentive in this method, it implies two pictures are extraordinary. That is access by unapproved individual is distinguished. After confirming the face the arduino got the signal to receive voice through an application and it uses the voice to control the house hold appliances.

PROPOSED SYSTEM

In this proposed framework displayed a MATLAB based Principal Component Analysis is utilized for confront

coordinating choice. The framework is planned in MATLAB which changes over facial pictures to highlight qualities of introductory preparing database pictures. Facial highlights are separated from the face and eigenvalues are ascertained and spoken to as an eigen vector. Examination of obscure face picture and database picture is finished utilizing Euclidian separation technique. The perceived facial picture has least Euclidian separation with the database pictures. At the point when confront is perceived by MATLAB Code it will give the flag to Arduino to open Gate, on the fan and light utilizing voice. Security framework utilizing MATLAB and Embedded framework configuration is financially savvy, dependable and exceedingly precise..
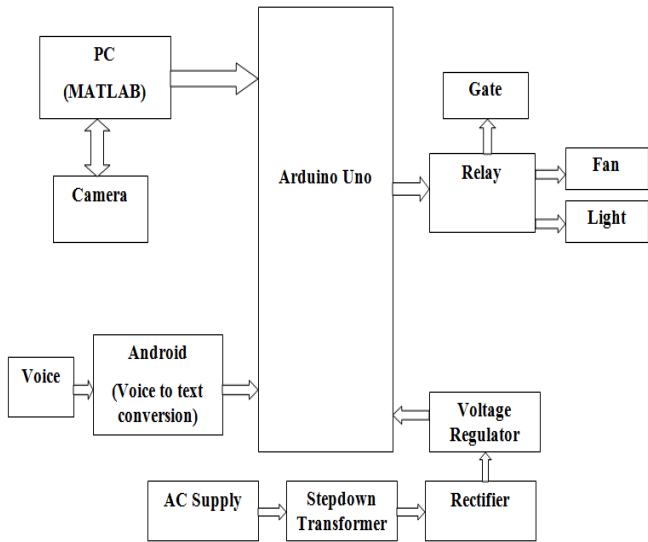
MODULES

The accompanying figure speaks to the frameworks design outline. It incorporates distinctive modules.

•Detection Module utilizes Viola-Jones Object Detection. At the point when a man goes into a limited region, the camera catches the picture and distinguishes the face.

•Comparison Module is utilizing PCA Algorithm. The distinguished face picture will contrast and the reference picture put away in the database.

•Home Automation Module utilizes Arduino. On the off chance that the identified picture and reference picture are coordinated, home mechanization will begin quickly using voice control.

A. VIOLA-JONES OBJECT DETECTION

The Viola jones confront recognition is a generally utilized technique for constant protest discovery. Despite the fact that it can be prepared to identify an assortment of protest classes, it was persuaded essentially by the issue of face recognition. The course question location utilizes the viola-jones calculation to distinguish human faces, nose,

eyes, mouth, or abdominal area. The qualities of Viola–Jones calculation which make it a decent identification calculation are: Robust – high discovery rate and low false-positive rate dependably. Constant – For handy applications least 2 outlines for each second should be handled. Face identification just (not acknowledgment) - Distinguish faces from non-faces (location is the initial phase in the acknowledgment procedure). The calculation has four phases:

• Haar Feature Selection

• Creating an Integral Image

• Adaboost Training

• Cascading Classifiers

B. PCA ALGORITHM

a) Primary Component Analysis (PCA) is a straightforward and helpful direct change system that is utilized as a part of various applications. The PCA contrast caught picture and the approved individual's picture. PCA Algorithm Standardize the information. Acquire the Eigenvectors and Eigen esteems from the covariance lattice or connection network, or perform Singular Vector Decomposition.

Stage 1: Image of preparing set is changed over into picture vectors

• This preparing set comprise of aggregate M pictures

Stage 2: Face vectors are standardized

• Average confront vectors are figured

• Subtraction of normal face vector from each face vector

Stage 3: Eigenvectors are figured (It speaks to the variety in the countenances)

Stage 4: Calculation of Eigen vectors from decreased covariance framework

Stage 5: Selection of K best eigenfaces with the end goal that K<=M. It can speak to the entire preparing set

•Selected K eigenfaces must be in the originaldimensionality of the face vector space

Stage 6: Conversion of lower measurement k eigenvectors to unique face dimensionality

Stage 7: Representation of each face picture a direct mix of all K eigenvectors

•Calculation of weight of each eigenface

•An obscure face is perceived

LITERATURE SURVEY

Viola-Jones calculation is the one which is utilized for discovery in this paper[1].Although there are different identification strategies, this calculation introduced by Paul Viola and Michael Jones is all the more quick and vigorous. In [2], they utilized the idea of Haar include. Haar highlight based Adaboost calculation is applying for identifying eye,

nose and mouth districts. Here facial component focuses are separating utilizing Haar highlight technique. Likewise, the picture preparing systems, for example, format coordinating can be utilized for a similar reason.

This paper center around confront detection[3]. A segment of face is recognized by separating the highlights and circles it. Face design is imperative for confront recognition and along these lines a strategy for design redesign is utilized. Face acknowledgment should be possible by PCs effectively as it can register the rationale comparing to the facial structure.

Face location is the essential stage in all face acknowledgment systems[4]. Haar like element remains in the main position for its speed of estimation over the other existing highlights in consistent time. Taking in the Haar highlights utilizing the Adaboost calculation is said to be a best approach.

A movement sensor, PIR sensor is utilized here and it is associated with a microcontroller for recognition. In this reconnaissance system[5],the microcontroller utilized is Arduino Uno. For informing by means of twitter, this is joined with a web browser.PIR is the most ordinarily utilized sensor because of its ease and low power utilization. Infrared beams discharging from the human is gets and examined for promote strategies.

Denoting the participation is a noteworthy errand in the greater part of the associations. This should be possible by perceiving the substance of a person[6].In this paper, a database of the considerable number of understudies in a class is predefined. Every day the picture of understudies is caught by the camera which is set in the classroom. So this picture is contrast and the pictures in database of the understudy. Along these lines participation stamping is done and a message is send utilizing GSM module.

In [7], moving item is identified by utilizing the Eigen-protest which is figured from the casings. Human body discovery calculation have the upside of precision. Disposal of shadow of moving item is conceivable. Edge preparing and pre-handling is utilized as a part of this paper. Casing handling is to make video outlines and pre-preparing for enhancing the identification. There is a reference foundation picture and moving locales are distinguished by pixel-by-pixel subtracting of the present picture from reference foundation picture.

The information picture is prepared by confront detection[8]. Simulated Neural Network is utilized as a part of this framework. The framework edits the picture when confront is recognized. Exactness rate and level of execution is recognizable as an element. In [9] ,it depicts a framework which is useful in rush hour gridlock observation. This framework is produced in the stage of MATLAB. Foundation subtraction strategy is a kind of protest location technique which is utilized here.

Methods, for example, picture scaling, parallel Processing are utilized as a part of [10]. The engineering is actualized in Model sim and Verilog HDL is utilized for planning. This paper likewise utilized Adaboost calculation. The framework clarified in this paper utilizes PCA calculation for confront recognition[11]. This paper center around decreasing the burglary rate. In exceptionally secure regions, diminishing the burglary rate by low power utilization is a featuring factor.

The idea of RF transmitters and beneficiaries are utilized here[12]. Transmitters transmit the flag and recipients for identifying the transmission. A flag is changed over in to sound, video by demodulator which is utilized by the RF recipients. Here GSM has a part of bringing data from database and making this to a message. An arduino can be associated with the framework by the RF modem.

Discovery of flame is presented in this paper[13]. In indoor situations observation camera is introduced and the nearness of flame is distinguished by recording the video. A GPS/GSM innovation for giving alarm and to discover the area is utilized. Additionally it is utilized for sending SMS.

his paper predominantly center around a home robotization framework which helps in various ways[14]. The framework clarified in this paper give caution for gas spillage, nearness of criminal and fire. Smoke and temperature indicator and LPG spillage identifier are utilized here. A caution is set for crisis cases and SMS can be send utilizing GSM module to the clients.

The following paper is presented a framework for movement detection[15]. An arrangement of qualities for every pixel is taken and the present pixel esteem is contrasted and the reference esteem. At the point when a gatecrasher enters in to a confined zone the adjustment in closer view achieves a greatest limit esteem. So the GSM associated with the framework is utilized for sending the message to higher specialist..

CONCLUSION

A novel design for a monetary shrewd home framework is proposed and executed in this paper. It gives fundamental thought of how to control different home machines and give a security utilizing Arduino Uno and Matlab GUI. The cost of keen homes innovation is for a few people a contention against the decision of such establishments. This task utilizes minimal effort off the rack parts, and depends on Visual Basic and Arduino stage which both are FOSS (Free Open Source Software). So the general usage cost is exceptionally modest and is reasonable by a typical individual. This ease framework is intended to enhance the standard living in home. The voice control work gives assistance and help particularly to handicapped and elderly. The security framework composed in Matlab GUI likewise guarantees the security of the home and gives a defend from conceivable interlopers.

REFERENCES

[1]   B. K. P. Mehul K Dabhi, Face detection system based on viola - jones algorithm, International Journal of Science and Research (IJSR),Volume 5 Issue 4, April 2016.

[2]   L. D. Hoang Minh Phuong, Extraction of human facial features based on haar feature with adaboost and image recognition techniques, IEEE, 2012.

[3]   D. R. T. Alpika Gupta, Face detection using modified viola jones algorithm, International Journal of Recent Research in Mathematics Computer Science and Information Technology Vol. 1, Issue 2, 2014.

[4]   Z. C. Jie Zhu, Real time face detection system using adaboost and haar-like features, 2nd International Conference on Information Science and Control Engineering, 2015.

[5]   M. G. F. Husni Teja Sukmana, Prototype utilization of pir motion sensor for real time surveillance system and web-enabled lamp automation. IEEE Asia Pacific Conference on Wireless and Mobile, 2015.

[6]   P. S. S. Vadiraj. M, VinayRaghavendra. R, Face recognition based attendance monitoring system, IEEE Asia Pacific Conference on Wireless and Mobile, 2015.

[7]   K. S. B. Sapana K. Mishra, Human motion detection and video surveillance using matlab, International Journal of Emerging Research in Management and Technology, vol:5,issue:5, 2016.

[8]   K. J. E. Ma. Christina D. Fernandez, "Simultaneous face detection and recognition using viola-jones algorithm and artificial neural networks for identity verification," IEEE, 2014.

[9]   Chin Hong Low, Ming Kiat Lee, Frame based object detection - an application for traffic monitoring, IEEE, 2010.

[10] M.Gopi Krishna, A. Srinivasulu, Face detection system on adaboost algorithm using haar classifiers, International Journal of Modern Engineering Research (IJMER),Vol. 2, Issue. 5,, 2012.

[11] K. R. Kumar and V. Srimadhavan., Security system with face recognition, sms alert and embedded network video monitoring terminal, International Journal of Security, Privacy and Trust Management (IJSPTM) Vol 2, No 5, October, 2013.

[12] S. K. G. Vijayendra R, Identifying objects using rf transmitters and receivers, and retrieving data using gsm, IEEE, 2010.

[13] S. J. . D. A. Janeera., Real-time fire detection, alerting and suppression system using live video surveillance, Imperial Journal of Interdisciplinary Research (IJIR) Vol-2, Issue-7,2016.

[14] A. P. M. M. S. Asst. Prof. S B Dhekale, Smart home safety and security system automated with alerts through gsm mobile phone, 3rd international confernce on electrical, electronics engineering trents, communication, optimazation and science, 2016.

[15] B. K. H.Venkateswara Reddy, Automated video surveillance system with sms alert, International Journal Of Engineering And Computer Science ISSN:2319-7242 Volume1 Issue 3 Dec, 2012.