ISSN: 1832-5505

Applied GIS

Vol-10 Issue-03 July 2022

FACE RECOGNITION FOR SMART DOOR UNLOCK

Mr. P. Shanmugam[1], R. Pavithra[2], K. Yuvashree[3]

1ASSISTANT PROFESSOR,

ADHIPARASAKTHI ENGINEERING COLLEGE

ABSTRACT

The keys, security cards, passwords, or patterns that people use to open most doors are controlled by people. The goal of this paper is to show people how to use face detection and recognition to make doors in private areas safer. Face identification, face recognition, and automatic door entry control are the three major parts of this project.

Face recognition finds the part of a picture that looks like a face. A method called Principal Component Analysis (PCA) is used to find the face using face recognition. The use of Eigen-faces is what most people call face recognition based on PCA. If you can recognize a face, it means that you know what it is. The known person will be able to open the door immediately because the microcontroller told it to. Face pictures can be kept in a database for many people because PCA shrinks the photos without losing any important details. It doesn't matter how many training pictures are used; the computer's performance can't go down by much. That's why PCA-based face recognition might work better for door security than other face recognition methods.

Introduction

These days, biometric data is often used for automatic personal identification in access control instead of cards, passwords, or patterns. To get most of the genetic data, you need to use special tools like a fingerprint reader, palm print scanner, or DNA analysis. During the data collection step, the target items have to come into contact with the right gear. The good thing about this method is that you don't have to touch any devices to use face recognition. Face is automatically found using a face identification method, and the whole process of face recognition can be done without touching any devices. The first thing that the face recognition technology does is find faces. The dependability of the face detection affects how well the whole face recognition system works. By using face recognition, it can only find the face in a picture, no matter what else is in the picture. Viola-Jones face recognition method is used in this project.

OBJECTIVE

At this point in time, doors are opened and managed by keys, passcodes, patterns, keycards, and fingerprints. Face recognition systems that use the whole face as an entry token can be used to break these systems to a certain point. Face is a complicated, three-dimensional structure that needs very good recording methods for location and recognition. It is hard to separate. Face recognition systems have made it easier to prove who someone is and identify them, and they are expected to play a big role in protecting people, the country, and the world. The Viola Jones method is used to find the face, and the Local Binary Patterns Histograms are used for face recognition.

Existing system

ISSN: 1832-5505
Vol-10 Issue-03 July 2022

It has been demonstrated that the Linear Discriminant Analysis (LDA) approach outperforms the Principal Component Analysis (PCA) approach in face recognition tasks. Due to the high dimensionality of a image space, many LDA based approaches, however, first use the PCA to project an image into a lower dimensional space or so called face space, and then perform the LDA to maximize the discriminatory power.

Disadvantages of existing systemImage quality

Image quality affects how well facial-recognition algorithms work. The image quality of scanning video is quite low compared with that of a digital camera. Even high-definition video is, at best, 1080p (progressive scan); usually, it is 720p. These values are equivalent to about 2MP and 0.9MP, respectively, while an inexpensive digital camera attains 15MP. The difference is quite noticeable.

Image size

When a face-detection algorithm finds a face in an image or in a still from a video capture, the relative size of that face compared with the enrolled image size affects how well the face will be recognized. An already small image size, coupled with a target distant from the camera, means that the detected face is only 100 to 200 pixels on a side. Further, having to scan an image for varying face sizes is a processor-intensive activity. Most algorithms allow specification of a face- size range to help eliminate false positives on detection and speed up image processing.

Proposed System

Smart security system has become indispensable in modern daily life. The proposed security system has been developed to prevent robbery in highly secure areas like home environment with lesser power consumption and more reliable standalone security device for both Intruder detection and for door security. The door access control is implemented by using face recognition technology, which grants access to only authorized people to enter that area. The face recognition and detection process is implemented by principal component analysis (PCA) approach and instead of using sensor devices intruder detection is achieved by performing image processing on captured video frames of data, and calculating the difference between the previously captured frame with the running frames in terms of pixels in the

ISSN: 1832-5505
Vol-10 Issue-03 July 2022

captured frames.

Advantages of proposed system

Greater AccuracyBetter Security

Convenient and Frictionless Smarter

Integration Automation

LITERATURE SURVEY

Implementation of face recognition algorithm for biometrics based time attendance system

Adrian Rhesa Septian Siswanto ; Anto Satriyo Nugroho ; Maulahikmah Galinium IEEE 2015

Face Recognition begins with extracting the coordinates of features such as width of mouth, width of eyes, pupil, and compare the result with the measurements stored in the database and return the closest record (facial metrics). Nowadays, there are a lot of face recognition techniques and algorithms found and developed around the world. Facial recognition becomes an interesting research topic.

Individual Stable Space: An Approach to Face Recognition Under Uncontrolled Conditions Xin Geng; Zhi-Hua Zhou; Kate-Smith Miles IEEE 2015

There usually exist many kinds of variations in face images taken under uncontrolled conditions, such as changes of pose, illumination, expression, etc. Most previous works on face recognition (FR) focus on particular variations and usually assume the absence of others. Instead of such a ldquodivide and conquerrdquo strategy, this paper attempts to directly address *face recognition under uncontrolled conditions*.

Illumination Invariant Face Recognition Using Near-Infrared Images Stan Z.Li; Rufeng chu;Shengcai Liao;Lun Zhang, IEEE 2016

Most current face recognition systems are designed for indoor, cooperative-user applications.

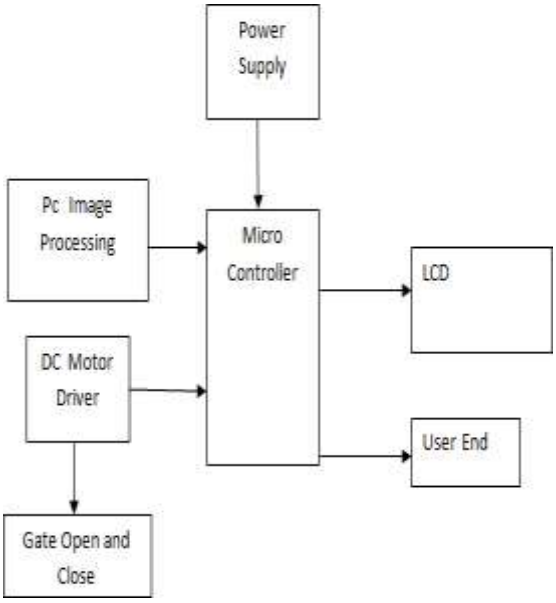
However, even in thus-constrained applications, most existing systems, academic and commercial, are compromised in accuracy by changes in environmental illumination. In this paper, we present a novel solution for illumination invariant face recognition for indoor, cooperative-user applications.

ISSN: 1832-5505

Applied GIS

Vol-10 Issue-03 July 2022

BLOCK DIAGRAM



PCA ALGORITHM

Principal Component Analysis (PCA) is a statistical procedure that uses an Orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal component. If there are n observations with p variables, then the number of distinct principal components is min(n-1,p). The first principal component has the largest possible variance and each succeeding component in turn has the highest variance possible under the constraint that it is orthogonal to the preceding components. The resulting vectors are an uncorrelated orthogonal basic set.

MODULES

DC Motor Driver

It is connected to the door and the micro controller in order to open the door when an authorized person is allowed to access the door. If someone tries to open the door more than three attempts then the camera captures their picture and send it to the user.

PC image processing

The PC image processing system is used to match the pixels of the face captured in the USB camera is then matched with the trained images in the database. It does

ISSN: 1832-5505
Vol-10 Issue-03 July 2022

not detect the new face. The captured image from pi camera will be sent to the authorized person through email for safetypurposes.

CONCLUSION

The smart home trend is used in this work by connecting smart devices to home items so they can be controlled automatically. Face recognition in this smart door lock makes it easier for people to use and better protects their identity. The data transmission system is set up to make sure that smart gadgets can talk to each other correctly.

REFERENCES

[1] Hteik Htar Lwin, Aung Soe Khaing, Hla Myo Tun, "Automatic Door Access System UsingFace Recognition", International Journal of Scientific & Technology Research Volume 4,
Issue 06, June 2015.

[2] Sadeque Reza Khan, Ahmed Al Mansur, Alvir Kabir, Shahid Jaman, Nahian Chowdhury, "Design and Implementation of Low Cost Home Security System using GSM Network",
International Journal of Scientific & Engineering Research, Volume 3, Issue 3, March 2012.

[3] B. Udaya Kumar, D. S. Murty, Ch. R. Phani Kumar, "Implementation of Low Cost Ethernet Based Home Security Using Wireless Sensor Network", Journal published at Algorithms