AUTHENTICATION FOR DOOR LOCK SYSTEM THROUGH BIO SCANNING EAR IMAGE PROCESSING SYSTEM

Mr.S. Pandiarajan

Assistant Professor, Department of Computer Science andEngineering KIT-Kalaignar
Karunanidhi Institute of Technology (Affiliated to Anna University)
Coimbatore, India, kitpandiarajan@gmail.com

Mr.J.Senthil Kumar

Assistant Professor, Department of Computer Science and Engineering KIT-Kalaignar
Karunanidhi Institute of Technology (Affiliated in Anna University)
Coimbatore, India, jsenthilkumarphd20@gmail.com

A. RamKumar

PG Scholar, Department of Computer Science andEngineering KIT-Kalaignar Karunanidhi
Institute of Technology (Affiliated to Anna University)
Coimbatore, India, kram00551@gmail.com

B. Parkavi

PG Scholar, Department of Computer Science and Engineering KIT-Kalaignar Karunanidhi
Institute of Technology (Affiliated in Anna University)
Coimbatore, India, parkavib1999@gmail.com

Abstract

In today's digital world, security and protection play an important role in the daily use of computer systems. Current security levels can be cracked by someone at any time. A biometrically oriented security system is expected to meet users' requirements, such as lower error costs, high security levels, the ability to detect forgery, and so on. Especially recently, an automated biometric recognition system has a wide range of applications, consisting of automated recognition and information capture (OCR), automatic security verification, confirmation of private recognition to prevent information disclosure or recognition fraud, and so on (RFID). These systems require high accuracy and ease of use. In this paper, an efficient ear-focused recognition technique using Convolutional Neural Network (CNN) and Shape Mapping technique (CCM) is proposed. It is a non-intrusive method, and connections are probably among the most common biometric techniques used by people to recognize others. There are numerous advantages to using the ear as a source of information for human recognition. A biometric ear system consists of exploration of the ear

and recognition of the ear. In the present work, the researchers used the K-nearest neighbor (KNN) method, which cannot cope with a large number of data sets and tries to detect the differences in each dimension. The goal of the recommended system is to improve the security and safety level using the Convolutional Neural Network (CNN). The experiments have shown that the CNN we developed achieves higher accuracy compared to existing systems.
Keywords: OCR, RFID, CNN, KNN, CCM.

I. INTRODUCTION

A convolutional neural network (CNN) is a kind of artificial neural network used in photo recognition and fine-tuning, which is specially designed to process pixel information. The Convolutional Neural Network, or ConvNet, was first introduced in the 1980s by Yann LeCun, a PhD researcher in clinical research studies in computer systems. The name "Convolutional Neural Network" indicates that the network uses a mathematical process called convolution. In today's world of hackers, we actually have a difficult time protecting our important information. For safety and security treatment, we use the various range of methods

to keep and preserve the information in secured technique. Nonetheless, biometric products are the absolute best technique to protect and secure the information at the highest level of security. CNNs are particularly useful for finding patterns in photos and recognizing products, handles and scenes. Synthetic knowledge provides us with the devices and solutions to evaluate and process information to make accurate predictions. The world has a lot of data - images, videos, spreadsheets, audio files, and text created by humans and computer systems flood the Internet, drowning us in information overload.

Ear recognition explains the treatment of automated human recognition according to the peak physical qualities of ears. It is ideally suited for a variety of application areas such as forensics, tracking, recognition investigations, and user device indexing. Due to the unique structure of the ear, ear photos can provide a rich source of biometric information for building efficient recognition systems. In addition, there are a variety of suitable high qualities of human ears, which consist of: Facilitating the capture of a vary, safety and security in time, ability to identify comparable elevations [1], and its aloof to sensations and ear expressions. With these appealing works, we can set up and develop reliable recognition systems on various devices in a non-intrusive and non-deflective method [4]- [6]. Nevertheless, accurate recognition can be a difficult task when ear photos are taken in an uncontrolled environment where different appearance variations and illumination settings must be considered [7].

Really very early work in ear recognition research has shown significantly improved effectiveness, especially for ear photos taken under controlled conditions [8]. Most of these techniques utilized practical, home- grown methods to discuss the important works of ear photos. The extracted works were then used to inform a traditional classifier that finds the patterns in the extracted works to distinguish individuals. The effectiveness of these ear recognition methods depends significantly on the robustness of the method used to eliminate the works and the effectiveness of the classifier used. Basically, these techniques struggle with 2 important limitations. On the one hand, manually picking out appropriate works from photos requires people with a strong understanding of the domain, under unrestrained imaging issues. Recently, deep-finding solutions, and in particular Deep Convolutional Neural Networks (CNNs), have led to developments in numerous application domains, including photo classification [9]- [13], product

exploration [14]- [17], and biometric recognition [18]. These improvements are the result of a variety of aspects, including easy access to amazing amounts of certain information, efficient devices to speed up computation, correctly developed deep network styles, effective optimization techniques, and technical improvement in deep network information. Aside from being scalable search techniques, deep CNNs perform work elimination and classification by

informing the entire system in an end-to-end method, eliminating the need for hands-on work elimination. Nevertheless, informing deep CNNs requires the improvement of a large number of trainable data (millions) and huge

particular data sets. Furthermore, gathering amounts of information can be expensive for real-world applications, which limits the capabilities of deep styles.

An effective technique to deal with these limitations is to use distance finding [19], [20]. This is a method in which the understanding found by a deep CNN for an offered task and dataset is removed or used to initialize deep CNNs that handle different, yet related, tasks and new datasets. Nowadays, distance finding has emerged as one of the most useful solutions for processing visual recognition tasks.

LITERATURE REVIEW

This evaluated on various techniques for product confirmation done earlier which have been made in the of handle confirmation.

Anila S., Devarajan N. [1]recommended a method of preprocessing by incorporating some preprocessing solutions like histogram equalization, gabber filter. Raktim Ranjan Nath et alia. [2]recommended a handle exploration method using SVM (Support Vector Gadget). Researchers utilizing HOG (Histogram of Driven Gradient) focused on handle detector, which offers more accurate results than various other synthetic knowledge solutions like Haar Cascade.

Jayanthi Raghavan and Majid Ahmadi [3]] recommended a method for a personalized CNN-based handle detection system. An accuracy of up to 96.2% is achieved with the recommended development in Extended Yale B information resources. The recommended method performs better than the various

other techniques in Extended Yale B. In FERET information resource, CNNLENET method performs better than the recommended method.

Syazana-Itqan K et alia. [4]recommended a method to develop a MATLAB-based Convolution Neural Network (CNN) handling system with an esthetic private individual interface (GUI) as private input. The accuracy of the system is 100% for all 50 subjects.

Salman Mohammed Jiddah et alia. [5] recommended an ear detection method using CNN. This research study examined in terms of its goals and objectives experiments on AMI ear information resources by using the Local Binary Patterns works and Laplacian filters on the raw photos separately to use the meaning

of geometric works. The accuracy of 85.86%.

EXISITING METHOD:

In an current work, scientists utilized K-Nearest

Neighbors (KNN) technique. It does not deal with big

variety of dataset and it's challenging to determine the range in each measurement.

PROPOSED SYSTEM:

In this prepared program, the ESP 32cam is incorporated with the Blynk program. In this system we have 8 AC linked to a little controller with 8 transmissions and solenoid door secure. The articulate regulate manages home home devices. It likewise concentrates on producing a wise cordless house safety and safety system that provides notifies to the proprietor through an on the internet video cam. If someone is standing in the entrance, the device will take a

photo and send out it to the proprietor through the ESP32 CAM Node MCU. through e-mail The mobile phone supervises of the whole application. This job expenses greater than similar items on the marketplace.This program can likewise be deemed CCTV to accessibility online streaming. It likewise utilizes the 74HC595 move sign up IC to enhance the input pins of the ESP32 webcamera

The goal of the recommended system is to improve the
security and Convolutional recommended security   level   with
 the   help of (CNN). The
accuracy   from
different various other styles

IOT - The Web of Points (IoT) explains the neighborhood of physical gadgets—"points"—which
may be installed with sensing units, software application, and various innovation for the intention of linking and altering stats with various devices and frameworks online. These devices range from typical household devices to cutting edge company devices. With higher than 7 billion connected IoT devices today, experts are viewing for this range to create to 10 billion through method of implies of 2020 and 22 billion through method of implies of 2030.

Artificial intelligence - IoT and Device grasping provide understandings in other situation concealed in stats for fast, automated reactions and advanced option production. Device grasping for IoT might be utilized to project fate patterns, find anomalies, and enhance knowledge through method of implies of taking in picture, video clip and sound.

Raspberry Pi - Is a little single board laptop computer. By linking peripherals like Key-board, computer mouse, reveal to the Raspberry Pi, it'll serve as a small personal laptop computer. It's commonly utilized for real time Picture/Video clip Refining, IoT mainly centered completely bundles and Robotics bundles. However it's slower compared to computer or laptop computer nevertheless remains to be a laptop computer that can provide all the anticipated abilities or capabilities, at a reduced power usage.

OpenCV - OpenCV is a collection of open-source computer system vision and computer system software application. OpenCV was produced to offer a typical facilities for computer system vision applications and to speed up using automated acknowledgment in industrial items. As a BSD permit, OpenCV enables business to quickly utilize and customize its code.

Ear acknowledgment - Ear appeal is a method of using ears to select or verify an individual's identification. Ear appeal frameworks might be utilized to select people in pictures, video clips, or in real time. Ear appeal is a kind of biometric security. Various other type of biometric software application include articulate appeal, finger print appeal, iris or retina appeal. This generation is typically utilized for security and policy enforcement, nevertheless there is establishing pastime in various utilizes also.
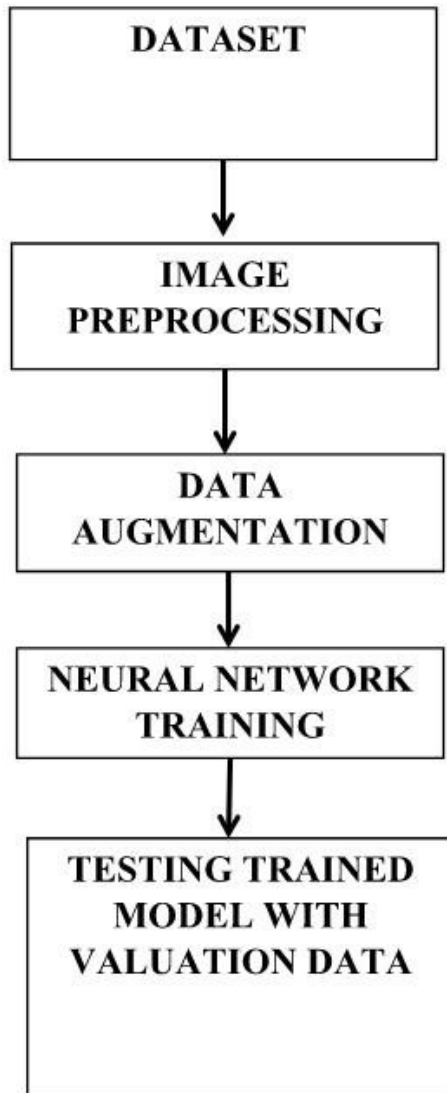
V. PROCESSES IN CNN:

Collection of records:

Appropriate data sets are required at each stage of the recognition investigation, from the information phase to the evaluation of the effectiveness of recognition solutions. All photos collected for the dataset were
downloaded from the internet and installed contacting different sources in different

languages.

```
┌─────────────────────────┐
│                         │
│        DATASET          │
│                         │
│                         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│         IMAGE           │
│     PREPROCESSING       │
│                         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│         DATA            │
│     AUGMENTATION        │
│                         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│    NEURAL NETWORK       │
│       TRAINING          │
│                         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│   TESTING TRAINED       │
│    MODEL WITH           │
│   VALUATION DATA        │
│                         │
│                         │
└─────────────────────────┘
```

Pre-processing and labeling of photos:

The photos downloaded and installed from the internet were available in different designs as well as in different resolutions and best quality. To get better work elimination, last photos implied to be used as dataset for deep neural network classifier were preprocessed in buy to get uniformity. In addition, photo pre-processing treatment consisted of manually cropping all photos to highlight the price of enthusiasm.

Enhancement treatment:

The main task of enhancement is to improve the dataset and add low distortion to the photos, which helps to reduce over-fitting during the information phase.

Photo data enhancement is a technique that can be used to artificially expand the measure of an information dataset by creating personalized variants of photos in the dataset.

Informing deep neural network styles about more information can lead to more skilled styles, and enhancement techniques can create variations of photos that can improve the ability of matched styles to generalize what they have discovered to new photos.

Informing the neural network:

The main objective of the neural network is to find the works that distinguish one program from the others. For this reason, when using more extended photos, the possibility for the network to find the appropriate works has been improved.

Testing the certified development with evaluation information:

Finally, the certified network is used to test the private area by fine-tuning the input photos in the evaluation dataset and the results are fine-tuned.

RESULTS
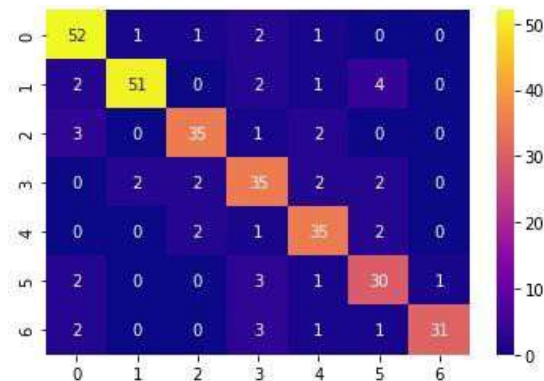

Figure 2. image identification

Figure 3. confusion matrix of the predicted cases

	precision	recall	f1-score	support
0	0.85	0.91	0.88	57
1	0.94	0.85	0.89	60
2	0.88	0.85	0.86	41
3	0.74	0.81	0.78	43
4	0.81	0.88	0.84	40
5	0.77	0.81	0.79	37
6	0.97	0.82	0.89	38
accuracy			0.85	316
macro avg	0.85	0.85	0.85	316
weighted avg	0.86	0.85	0.85	316

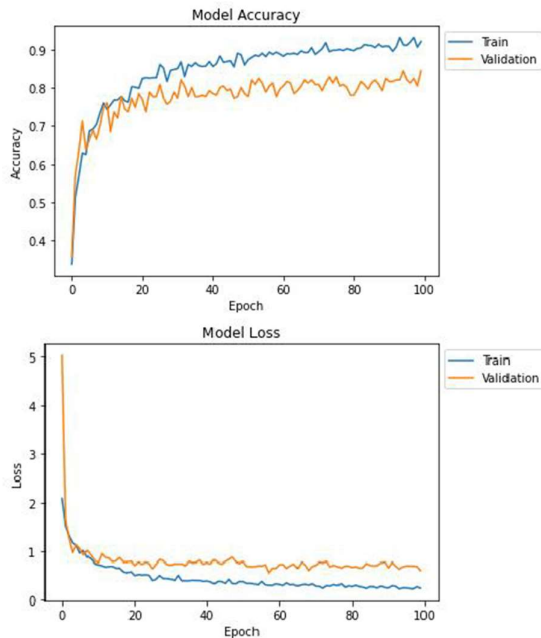Figure 4. classification report of the predicted class

Figure 5. accuracy and loss of the presented model

CONCLUSION

An automatic house application that enables people to manage house applications with a Mobile phone application. It likewise concentrates on having the ability to secure or open the door secure. This is accomplished with a main gadget that related to the door essential, in addition to Blynk software application that highlights inexpensive and open up resource setup. This job likewise objectives to enhance the input of microcontroller pins, as we have a restricted variety of input / outcome pins. This telephone can likewise be utilized as CCTV to safeguard our home. This innovation is affordable to utilize due to its extensive utilize in today's society. Also if it's challenging to run, the gadget can be just controlled in time and the demands can be changed. This device is really helpful for people with physical and aesthetic impairments. It likewise makes life simpler for the hectic individual. This job will reduced the set you back and time it requires to produce an application that manages electric home devices or devices.

REFERENCE

1. Anila S, Devarajan N,"Pre-Processing Technique for Face Recognition Applications Under Varying Illumination Conditions", Global Journal of Computer Science and Technology July 2020.

2. Raktim Ranjan Nath,Kaberi Kakoty and Dibya Jyoti Bora (2020), "Face Detection and Recognition Using Machine Learning Algorithm", Sambodhi (UGC Care Journal)   ISSN: 2249-6661 Vol-43, No.-03 (III)
November-December (2020).

3. Jayanthi Raghavan and Majid Ahmadi (2021),"A Modified CNN-Based Face Recognition System", International Journal of Artificial Intelligence and Applications (IJAIA), Vol.12, No.2, March 2021.

4. Syazana-Itqan K, Syafeeza A.R and Saad N.M (2020),"A MATLAB-Based Convolutional Neural Network Approach for Face Recognition System",

5 Salman Mohammed Jiddah and Kamil Yurtkan(2018),"Fusion of Geometric and Texture Features For EarRecognition" 2018

6. Nejati H , Zhang L , Sim T , Martinez-Marroquin E, & Dong G, (2012). Wonder ears: identification of identical twins from ear images, international conference on pattern recognition, (pp. 1201–1204)

Emeršic Ž, Štruc V, Peer P. Ear recognition: more than a survey. Neuro- computing. 2017;255:26–39.

Purkait R, Singh P. Anthropometry of the normal human auricle: a study of adult Indian men. Aesthet Plast Surg. 2007;31:372–379. doi: 10.1007/s00266- 006-0231-4.

Sforza C, Grandi M, Binelli G, Tommasi D, Rosati R, Ferrario V (2009) Age- and sex-related changes in the normal human ear, forensic anthropology Popul. Data 187(1–3) anthropometric changes with aging in an urban Italian

Ferrario V, Sforza C, Ciusa V, Serrao G, Tartaglia G. Morphometry of the normal human ear: a cross- sectional study from adolescence to mid adult- hood, J craniofacial genet. Dev Biol. 1999;19(4):226–233.

Burge M, Burger W. Ear biometrics. Biometrics: Personal Identification in Networked Society; 1996. pp. 273–285.

B Moreno , A Sánchez , JF Vélez , (1999). On the use of outer ear images for personal identification in security applications, IEEE international Carnahan conference on security technology, pp. 469–476

Rahman M, Islam MR, Bhuiyan NI, Ahmed B, Islam A. Person identification using ear biometrics. Int J Comput Internet Manag. 2007;15(2):1–8.

M Choras , RS Choras , (2006). Geometrical algorithms of ear contour shape representation and feature extraction, IEEE International Conference on Intelligent Systems Design and Applications, pp. 451– 456

Choraś M. Perspective methods of human identification: ear biometrics. Op to Electron Rev. 2008;16(1):85–96.

Pflug A, Busch C. Ear biometrics: a survey of methods. Biometrics. 2012;1(2):114–129. 18. DJ Hurley , MS Nixon , JN Carter , (2000). Automatic ear recognition by force field transformations, Proceedings of the Colloquium on Visual Biometrics, 7–1

19. Dong J, Mu Z. Multi-pose ear recognition based on Symposium on Intelligent Information Technology Application. 2008;3:771–775.

20. Hurley DJ, Nixon MS, Carter JN. Force field energy functionals for image feature extraction, image Vis. Comput. 2002;20(5):311–317.