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MACHINE LEARNING BASED IRIS RECOGNITION MODERN VOTING SYSTEM

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ABSTRACT

One of the main results of the validation system is based on the fingerprint based iris recognition system and respective technology. The entire biometric process is very much authentic and unique than the other types of recognition system and validation process. This has provided innovative ideas in the daily lives of human beings. The multimodal biometric process has generally applied various types of applications for properly dealing with the appropriate and most significant limitations of the "unimodal biometric system". The entire process has been generally included with the proper sensitivity of noise, the population coverage areas, variability cases of the inter class and intra class issues, vulnerability cases of possible hacking and the non universality criteria. The entire research paper has been mainly focused on the deep learning oriented machine learning system. The fingerprint based iris recognition system to do the proper validation of human beings has been mainly done by convolutional neural network (CNN) technique. In the existing data validation process, the iris recognition system has been mainly done with respect to the "high security protection system with actual fingerprints". The entire paper has been briefly elaborated on the best uniqueness, reliability process and the proper "validity of the iris biometric validation system" for the actual purpose of the person identification.

1. INTRODUCTION

The biometric process has been mainly used to recognize individual types of physical aspects and features. For this purpose, a tremendous amount of acknowledgement technologies have been generally provided with the actual fingerprint, iris procedures and voice acknowledgement. The biometric mainly deals with the proper technical and technological fields for the body controls and body dimensions. The authentication system is based on the appropriate biometric security system that has increased the actual importance within all countries. The used system has been shown the proper valid and best impressive performance based on all these procedures and aspects. For this purpose, the fingerprint is the only procedure for providing the proper security techniques to provide the true uniqueness and the strong privacy properties of the entire system. The exceptional fingerprint assurance or the proper kind of imprint approval has been mainly insinuating the automated methods and procedures to ensure similarity between the two people fingerprints. The entire chapter has been generally provided with the actual purpose of the fundamental research that is overall dependent on the research objectives and

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respective research questions. In this chapter, the research framework of the entire study has also been provided. The fundamental research has described all the factors that are responsible for this recognition process.

2. LITERATURE REVIEW

The literature review chapter has been mainly provided with a detailed description of the various problems and different types of recognition aspects that has been mainly associated with the entire area of the research study. The fundamental research has been conducted with the help of the different types of research notes of different authors and researchers. The entire process is also evaluated by the brief description of the research from the different online articles, journals and various websites. The fundamental research has been conducted with respect to the in-depth analysis process of the entire validation based recognition system. Including all of these, this particular chapter has also demonstrated the particular models and theories of the proposed topic for evaluating the entire description process. In this part, there are also described the literature gaps that are generally missing in the existing research notes of various authors.

According to the author Alrahawe (2018), a biometric system is one of the safest ways to work with the digital world. Since biometrics such as fingerprints, face, and iris recognition are different for different persons, these are safer compared to any other processes to secure confidential data (Alrahawe, 2018). However, in the olden days, there was a lack of technology for which there was less security provided for any confidential information. With the advancement in technology in recent times, biometric security has been an integral part of any system. Moreover, the author states that these kinds of processes for security in digitalization have become error-free, for which this system is getting implemented in the latest systems (Singh & Kant, 2021). Due to minor errors in the system, this is pretty reliable for security purposes. The biometric system has used various types of recognition processes, among which it also uses the finger-knuckle recognition system.

According to the author Elhoseny (2018), there was a unimodal system for identification and verification processes. However, through the unimodal system, the accuracy was not fully maintained since it failed to meet the proper decision-making criteria. It was found that there was a significant amount of reduction in accuracy while using the unimodal system for verification (Elhoseny, 2018). Thus the multimodal system was introduced. As the multimodal system uses fusion technology, the overall accuracy from the verification was achieved. While comparing the different sorts of modalities, fingerprint and iris always have the highest distinctiveness and permanence. Moreover, they are cost-efficient too, and the speed is relatively higher when compared to any other modalities. While the unimodal system was not totally involved in the decision making concept, the multimodal system covers four different tasks such as acquisition, extracting the feature from the modalities, matching with the actual one and then providing the

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decisions (La, 2021). The unimodal systems are also used in many cases where less security can be helpful. But for high-security purposes and the sectors that deal with massive amounts of confidential data require multimodal systems.

3. EXISTING SYSTEM

The process of encoding and processing an individual's irises requires a large number of new calculations. When it comes to built frameworks and calculations, almost always only superior is guaranteed. However, neither of the computations has been subjected to extensive testing due to the lack of publicly available large-scale and even medium-size databases. The largest collection of infrared frontal iris images is now available online. Two notable solutions to the calculation testing problem in the lack of data.

- **Disadvantages:**

Errors are probable due to hazy iris images and the fact that segmentation and noise detection are handled in separate processes.

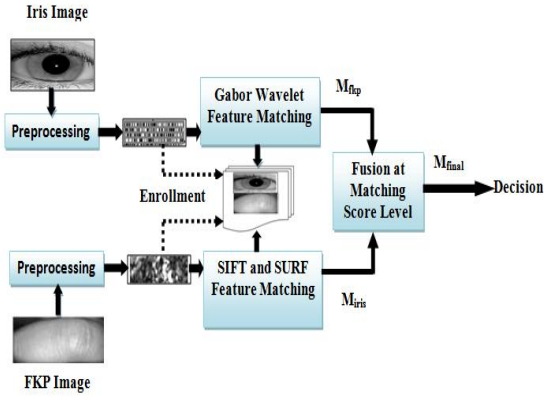
4. PROPOSED SYSTEM

For this project, we are using the CASIA IRIS dataset, which contains photos of 108 people, to train a CNN model that may be used to predict or detect people based on their IRIS. To train a CNN model, we are using the IRIS features extracted from eye pictures by the HoughnCircles technique.

Advantages:

The algorithm has good clustering, as shown by theoretical analysis and comprehensive experimental findings.

SYSTEM ARCHITECTURE



5. ALGORITHIMS

Convolution Neural Network technique (CNN)

The **"convolution neural network (CNN)"** is a specific type of deep learning-based algorithm. This algorithm has been taken as an appropriate input image, an important attribute that is learnable weights with respect to the proper biasing system to the different types of objects. For this purpose, this particular system is very much effective to show the actual difference in the working process in each case. The actual requirement and necessity of preprocessing within the ConvNet are very much lower than the other classifier algorithms (Haytom *et al.*, 2019). The proper learning strategies and designing components and respective hierarchies of various factors should be done through "convolution neural network (CNN)" with various building structures like pooling layers, convolution layers and entire connected layers. The **"convolution neural**

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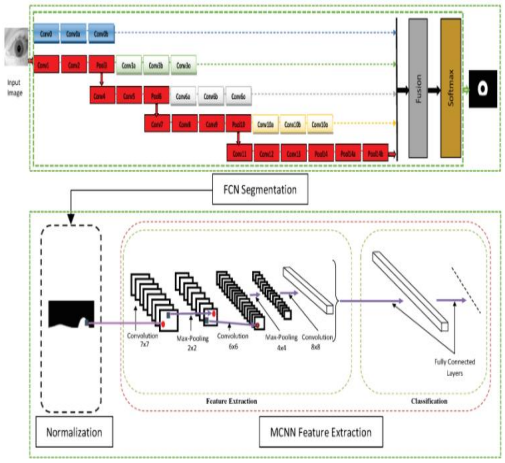
network (CNN)" has been recently provided various types of tasks like the object recognition, object detection, image captioning anf image segmentation. The **"convolution neural network (CNN)"** is the particular types of category that is mainly designed various types of models and methods for completing the entire process such as the respective videos and images that will be very much necessary for completing the entire finger based iris recognition process. This particular network technique is image classification, signal processing and image segmentation. The iris recognition system has been regarded with respect to the "reliable biometric recognition" process during the extraordinary and stable variation within the appropriate texture (Hernández-García *et al.*, 2019). This entire research note has explored the efficient technology and modern techniques which has been mainly used for feature extraction and feature classification. This recognition system is mainly used for enhancing the respective recognition efficiency.



Convolution Neural Network technique (CNN) for Iris recognition system

Normalization process of Convolutional Neural Networking (CNN) model – This particular area has been mainly enclosed by both the outer boundaries and inner boundaries of the iris that will be mainly varied with respect to the contraction of the entire pupil. The extraction of the various features of the **"convolution neural network (CNN)"** is totally based on the classification module. The actual segmentation of the iris recognition system has been generally mapped by the proper region with respect to the fixed and proper dimension. The author proposed an appropriate model, Rubber sheet method for transformation of the different segmentation of iris images within a fixed rectangular area.

6. IMPLEMENTATION MODULES

Upload Iris dataset

This section is for integrating the Iris dataset into the program.

Preparing the Data

When a dataset is preprocessed with this module, it is ready for further analysis.

Purpose: Feature Extraction

In this step, information is divided into two categories: training data and test data. Data, for instance, might be split into a "training" set and a "test" set with a 70%:30% split.

Synthesis of Models

As for the language used to actualize the strategy, it would be Python. Theano and tensorflow, two Python packages, are very

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potent for any given deep learning model. Indirectly constructing a model from these libraries, however, is challenging. That's why we utilize Keras and tensorflow as our backend library to make the model as precise as possible. Keras's sequential model includes components referred to as CNN layers. To improve the model's accuracy, these layers perform in-depth processing of the data by analyzing various patterns that emerge in the dataset. In the next step, the data are fed into the selected model to be trained.

Construction of a Convolutional Neural Network Model

Using this component, a CNN Model can be constructed for testing and training purposes.

Graph of Accuracy and Error

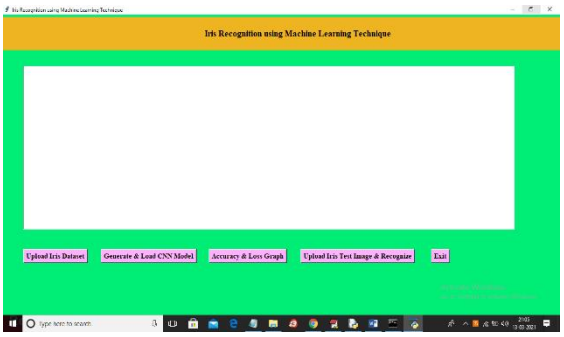
By doing so, we may compare the efficiency of different deep learning methods with that of feature extraction algorithms in a graphical format.

Iris Recognition Test Image Upload

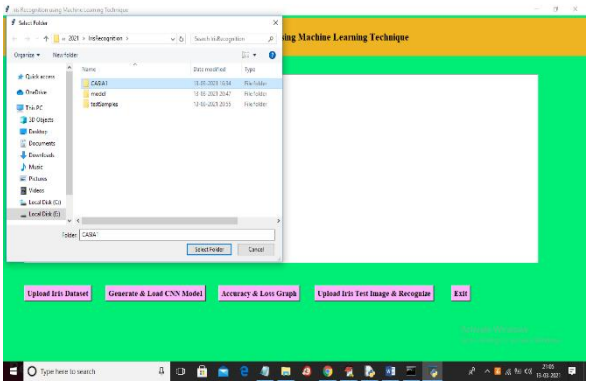
With this feature, users can put an image through its paces by uploading it for testing and subsequent recognition by the software.

7. SCREEN SHOTS

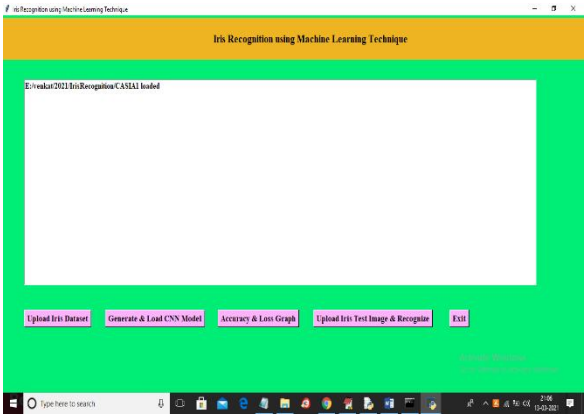
To run project double click on 'run.bat' file to get below screen



In above screen click on 'Upload Iris Dataset' button and upload dataset folder



In above screen selecting and uploading 'CASIA1' folder and then click on 'Select Folder' button to load dataset and to get below screen



In above screen dataset loaded and now click on 'Generate & Load CNN Model' button to generate CNN model from loaded dataset

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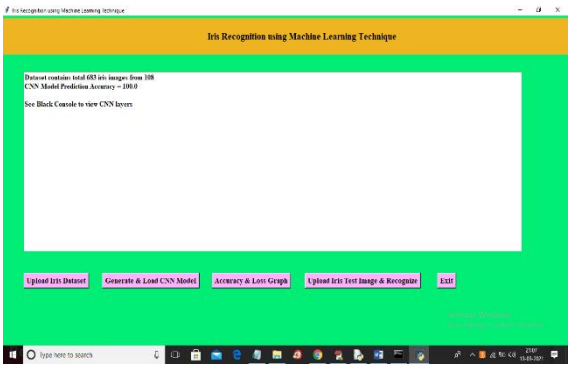
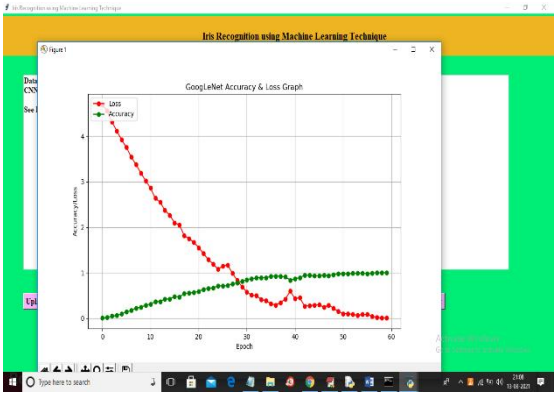
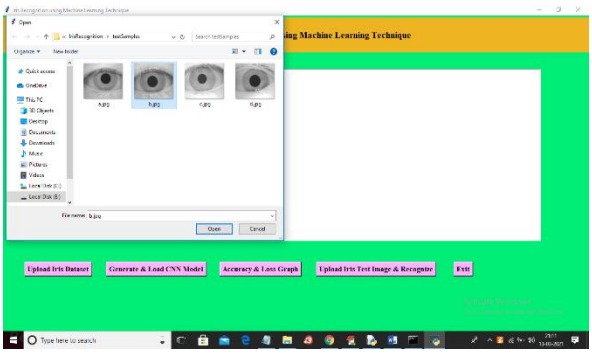


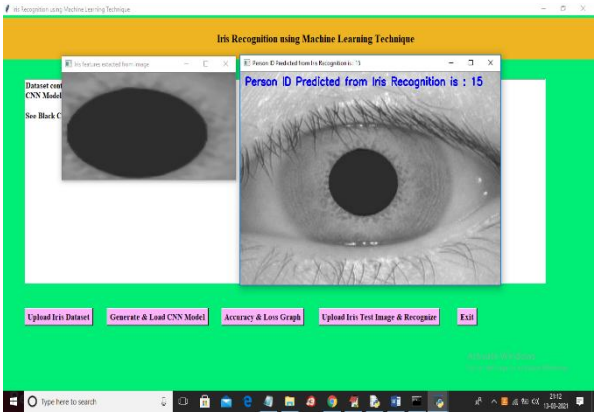
In above screen 683 images loaded from different 108 peoples and we got it prediction accuracy as 100%. Now model is ready and now click on 'Accuracy & Loss Graph' button to get below graph



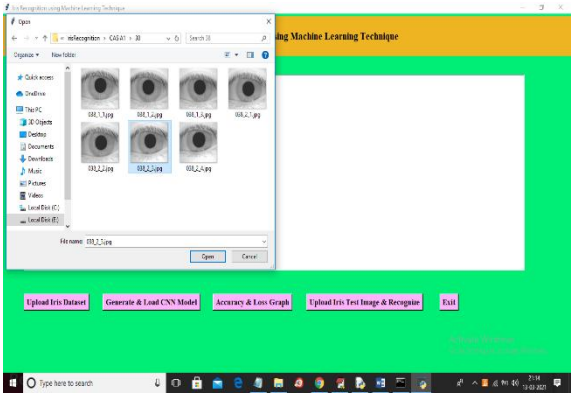
In above graph red line represents CNN model loss value and we can see at first iteration loss was more than 4% and when epoch increases then LOSS value reduce to 0 and green line represents accuracy and at first iteration accuracy was 0% and when epoch/iterations of model increases then accuracy reached to 100% and in above graph x-axis represents EPOCH and y-axis represents accuracy and loss values. Now click on 'Upload Iris Test Image & Recognize' button and upload any test image and then CNN will recognize person ID from that IRIS image. If you want you can upload test image from CASIA folder also and you will see prediction will be 100% correct



In above screen selecting and uploading 'b.jpg' file and then click on 'Open' button to get below screen



In above screen from uploaded image we extract IRIS features which is displaying in first image and then this image feeds to CNN and then CNN predicted that IRIS belong to person ID 15. Now I will upload one image from CASIA folder and then test whether CNN will predict correctly or not



In above screen from CASIA folder I am uploading IRIS of person ID 38 and then click 'Open' button to get below result

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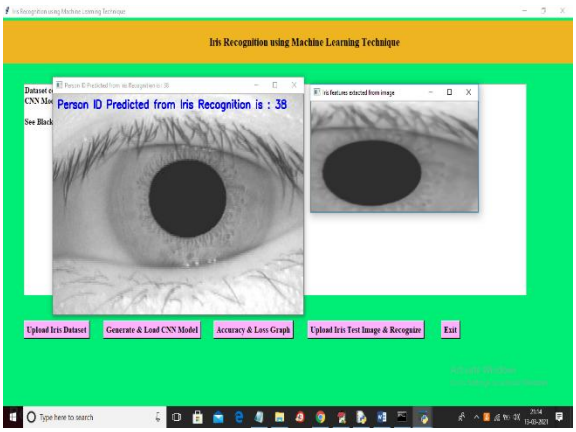

In above screen CNN predicted ID is 38 which is 100% correct

8. CONCLUSION

This work proposes a machine learning-based method for iris recognition using photos taken with a smartphone. The results shown above demonstrate that machine learning techniques are competitive with, and in some cases superior to, state-of-the-art methods when applied to iris photos collected in the visible spectrum using a smartphone. Still, precision can be enhanced. We also found that proper segmentation is a key factor in precision. Therefore, various powerful methods may be used to enhance the segmentation outcome. We aimed for simplicity by using only standard techniques for identifying and separating groups. This was done with their straightforward implementation in mind. The high quality of the cameras found in today's smartphones bodes well for the overall recognition system, which might be used for identification, security, and recognition. There is already a functional iris scanner embedded into Samsung devices. A cloud-based server that facilitates the transmission of iris data through mobile device is our next order of business. The transmitted information will be matched and confirmed by a classifier that runs on the server. That's why it's possible to create a comprehensive security system utilizing only the smartphones.

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