MODERN VOTING SYSTEM USING CNN MODEL

Dr. R. Raja Kumar[1], P.Nagarjuna Reddy[2]

[1]Professor, Department Of Computer Science & Engineering, Rajeev Gandhi Memorial College Of Engineering & Technology ,Nandyal, Andhra Pradesh, India.

[2]M.Tech Student, Department of Computer Science & Engineering, Rajeev Gandhi Memorial College Of Engineering & Technology ,Nandyal, Andhra Pradesh, India.

ABSTRACT:

Voting has usually been done using a project ballot, an Electronic Voting Machine (EVM) based on Direct Response Electronic (DRE), or Identical Ballot Boxes. In order to remedy the shortcomings of the current voting procedure, this paper suggests a digital voting system built on a Deep Learning algorithm that makes use of iris recognition. People can be identified by the iris pattern in their eyes thanks to a computer called the Iris recognition-based Voting System. Iris recognition is an automated biometric identity system that recognizes complex patterns that are distinct, stable, and observable from a distance by analyzing video evidence of one or both of an individual's iris. Voters are only allowed to cast one ballot, and the proposed technology will not allow the same voter to cast more than one since it will recognize duplicate entries. Furthermore, since the Aadhar is integrated with the voter ID, this technique eliminates the need for the user to carry a voter ID that contains the necessary information. This improves digitalization by using digital verification of the biometric and iris pattern available in each user's Aadhar card. An easy iris scan at the polling place will enable the voter's iris to be gathered and utilized for identification. The four processes involved in iris recognition are acquisition of the image, iris segmentation, feature extraction, and pattern matching. Because iris recognition has a high identification rate, it is one of the most reliable biometric modalities. Thus, by embracing the modern change, this method improves digital voting while eradicating the main shortcomings of conventional voting systems.

Key words: Deep Learning, Iris recognition, Image Segmentation, Databases, Deep Learning algorithms

I. INTRODUCTION

The primary application of biometrics has been the identification of distinct physical characteristics and attributes. For this reason, a vast array of recognition technologies, including voice, iris, and fingerprint procedures, have been generally made available. The appropriate technical and technological domains for body controls and body measurements are the primary focus of biometrics. The proper biometric security system, which has grown in significance across all nations, is the foundation of the authentication system. Based on all of these processes and factors, the used system has demonstrated the appropriate, legitimate, and most outstanding performance. The fingerprint is the only method available for this reason that offers the appropriate security measures to ensure the system's complete uniqueness and robust privacy features. The primary application of biometrics has been the identification of distinct physical characteristics and attributes. For this reason, a vast array of recognition technologies, including voice, iris, and fingerprint procedures, have been generally made available. The appropriate technical and technological domains for body controls and body measurements are the primary focus of biometrics. The proper biometric security system, which has grown in significance across all nations, is the foundation of the authentication system. Based on all of these processes and factors, the used system has demonstrated the appropriate, legitimate, and most outstanding performance. The fingerprint is the only method available for this reason that offers the appropriate security measures to ensure the system's complete uniqueness and robust privacy feature. The biometric authentication procedure is the primary worry, with technologies mostly being brought up in relation to various privacy and security concerns (Hamd & Ahmed, 2018). There isn't another way to reverse or recover the relevant data from the damage while the biometric data is being processed. If a password has been hacked, anyone can change it using an iris scanner, fingerprint, or ear image effect. Therefore, the basic functionality of biometrics for all these reasons still falls under the category of security and privacy threats. The sensor module, preprocessing module, and feature extraction procedure are only a few of the issues that have been displayed on the numerous slides of the iris recognition system. All of these privacy and security concerns can be effectively resolved with the right kinds of technologies and cutting-edge, contemporary methods. Strong passwords and reliable system procedures should also be used to secure the security process. For this reason, several papers have been primarily recorded concerning the high accuracy states and superior dependability of neural networks, such as multilayer perceptions (MLP). This is mostly offered in the interim between accurate classifier applications and patterned recognition in the modern era. The primary machine learning method employed in this study was "convolution neural network (CNN)" to enhance the validation system's privacy security procedure. According to Herbadji et al. (2020), the input image is mostly required to provide adequate working performance and to reduce the size of the processed data. The corresponding work has been completed in a number of image processing stages, including factor extraction, image partitioning, and image enlargement.

II. LITERATURE REVIEW

The literature review chapter primarily offers a thorough explanation of the many issues and components of recognition that have been primarily connected to the complete field of the research study. The many kinds of study notes from various writers and academics have been used to aid in the fundamental research. The synopsis of the study from the many websites, journals, and online papers is another factor that evaluates the complete process. A thorough investigation of the validation-based recognition system as a whole has been the subject of fundamental research. Along with all of them, this chapter has also illustrated the specific theories and models related to the suggested subject for assessing the description process as a whole. This section also describes the gaps in the literature that are typically absent from the current study notes written by different authors. A biometric system is one of the safest methods to interact with the digital world, claims author Alrahawe (2018). Biometric methods, such fingerprint, face, and iris identification, are considered safer than other methods for protecting sensitive information since each person's biometrics are unique (Alrahawe, 2018). On the other hand, due to a lack of technology in the past, there was inadequate security for any sensitive data. Since technology has advanced recently, biometric security has become a crucial component of all systems. Furthermore, the author claims that these security procedures in digitalization are now error-free, which is why the newest systems are implementing this method (Singh & Kant, 2021). For security reasons, this is fairly dependable despite small system faults. The biometric system employs a number of recognition techniques, including the finger-knuckle recognition technology.Furthermore, the author claims that these security procedures in digitalization are now error-free, which is why the newest systems are implementing this method (Singh & Kant, 2021). For security reasons, this is fairly dependable despite small system faults. The biometric system employs a number of recognition techniques, including the finger-knuckle recognition technology.

Elhoseny (2018), the author, claims that the identification and verification procedures used a unimodal approach. However, because the unimodal system did not match the appropriate decision-making criteria, the accuracy was not entirely maintained. Elhoseny (2018) discovered that employing the unimodal technique for verification resulted in a notable decline in accuracy. The multimodal system was subsequently introduced. Since the multimodal system makes use of fusion technology, the verification's overall correctness was attained. The iris and fingerprint always have the highest permanence and distinctiveness when compared to other modalities. In addition, they are more affordable and have a faster speed in comparison to other modes of transportation. The multimodal system handles four distinct jobs, including acquisition, feature extraction from the modalities, matching with the real one, and decision provision, whereas the unimodal system was not fully involved in the notion of decision making (La, 2021). In numerous situations where a lower level of security can be advantageous, unimodal systems are also employed. Multimodal technologies are necessary for high-security applications and industries handling large volumes of sensitive data, nevertheless. The biometric system has been dealt with specifically in the scientific and technological field and department for managing the full body dimensioning procedure, claims author Adamu (2019). Additionally, it has been reported that the method uses a variety of indicators that are closely linked to the right qualities of a human being (Adamu, 2019). The primary idea behind biometric verification is that different kinds of processors can be used to accurately access the entire human body and human process control. According to Rouaid et al. (2019), the system has primarily addressed the accurate identification and measurement of each person's process for accurately grouping the numerous methodologies under appropriate inquiry. The biometric procedure is the most distinctive and has important characteristics and elements that can be used to characterize every entity. This specific technology is a great complement to the greatest innovation and is essential for higher quality business cases, which are mostly affected by various forms of big data violation processes. According to Naika (2018), biometric recognition is a legitimate and trustworthy technique for confirming an individual's true personality, which is entirely based on their physiological and social characteristics. According to academia.edu (2019), all of these assumptions are essentially unchanging, irreversible processes that don't experience any stress. Iris recognition has historically been regarded as one of the most widely used biometric technique types for human identification processes and verification stages, according to authors Garg & Gupta (2017). This specific approach is mostly used to highlight the distinctive qualities, traits, and attributes that have been utilized to highlight how different each person is in terms of security. In the case of the personal iris identification process, the full study has proposed the multi-algorithmic features for the appropriate forms of extraction strategies. In relation to the circular transformation process, the final localization and segmentation technologies are employed (Garg & Gupta, 2017). The procedure can be applied to separate the iris from the body as a whole in order to identify the specific noise. The study procedure should be completed as soon as possible in order to take into account the different kinds of components, including the customer's mental viewpoints, ergonomic features, and specific angles. Based on the appropriate convenience phases of the particular biometrics, the entire has been improved for the case of the best impression of the specific impression of the client. The optimal effectiveness of the concentration procedure and the appropriate level of adequacy have been affected by these particular elements (Nelufule & de Kock, 2020). The ergonomic elements have primarily taken into account the clients' availability and affordability as well as a variety of other psychological and physical characteristics (academia.edu, 2017).

According to Gogate & Azad's research note from 2021, the biometric-oriented individual identification process has been primarily observed as a set of specific and useful techniques. The primary purposes of all the strategies are the automatic working process and high-quality, confident working performance for accurate person identification (Gogate & Azad, 2021). The real evidence has mostly cemented the multimodally oriented biometric system with appropriate access to the corresponding biometric modality sources.

Based on the combining of numerous relevant data kinds under a single identity procedure, this specific system has employed a variety of technologies to effectively overcome a variety of concerns and obstacles (Oyeniran & Oyeniyi, 2019). In this instance, the majority of the ethical considerations have to do with ensuring that the fingerprint approach is appropriately accepted for system validation in order to improve the overall security and privacy-based networking system and raise validity rates.

The administration-oriented problems and the facial recognition process can be readily resolved due to the distinct features of the fingerprint-based iris recognition process and the method's uniqueness. With the aid of "convolution neural networks (CNN)", the entire type of recognition system can be completed fast (Wang et al. 2018).

III. EXISTING SYSTEM

Encoding and analyzing each person's iris necessitates a great deal of additional computation. In terms of computations and established frameworks, superiority is nearly always ensured. However, because there aren't many large-scale or even medium-sized datasets that are publicly available, none of the computations has been well tested. The greatest online collection of frontal iris infrared photos is now accessible. There are two noteworthy solutions to the problem of calculation testing in the absence of data.

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

IV. PROPOSED SYSTEM

In order to train a CNN model that may be used to predict or detect persons based on their IRIS, we are using the 108 pictures in the CASIA IRIS dataset for this study. We are leveraging the IRIS features that the HoughnCircles approach extracts from eye photos in order to train a CNN model. **Advantages:** The algorithm has good clustering, as shown by theoretical analysis and comprehensive experimental findings.

V. SYSTEM ARCHITECTURE

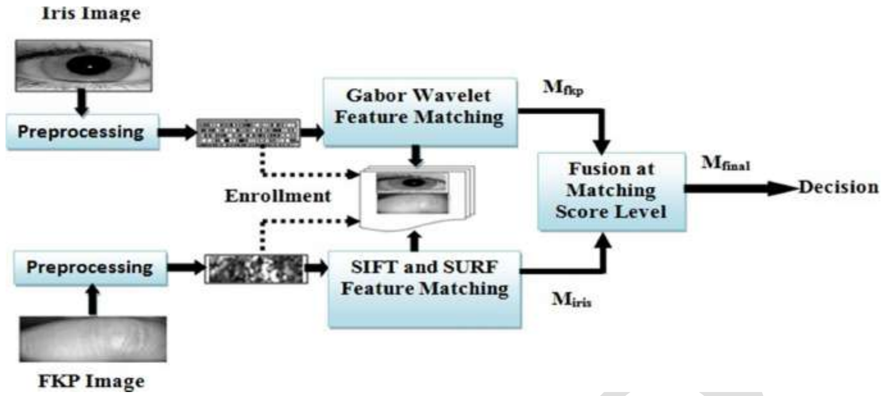


Figure 1: Architecture for fingerprint recognition method

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 splitinto a "training" set and a "test" set with a 70%:30% split.

Synthesis Of Models

Python would be the language utilized to put the plan into practice. Two powerful Python packages for any deep learning model are Theano and Tensorflow. However, building a model indirectly from these libraries is difficult. For this reason, we use tensorflow and keras as our backend libraries to create the most accurate model possible. The CNN layers are components of Keras's sequential model. These layers process the data in-depth by examining different patterns that show up in the dataset, which helps to increase the accuracy of the model. The data are then supplied into the chosen model to be trained in the following stage.

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 extractionalgorithms in a graphical format.

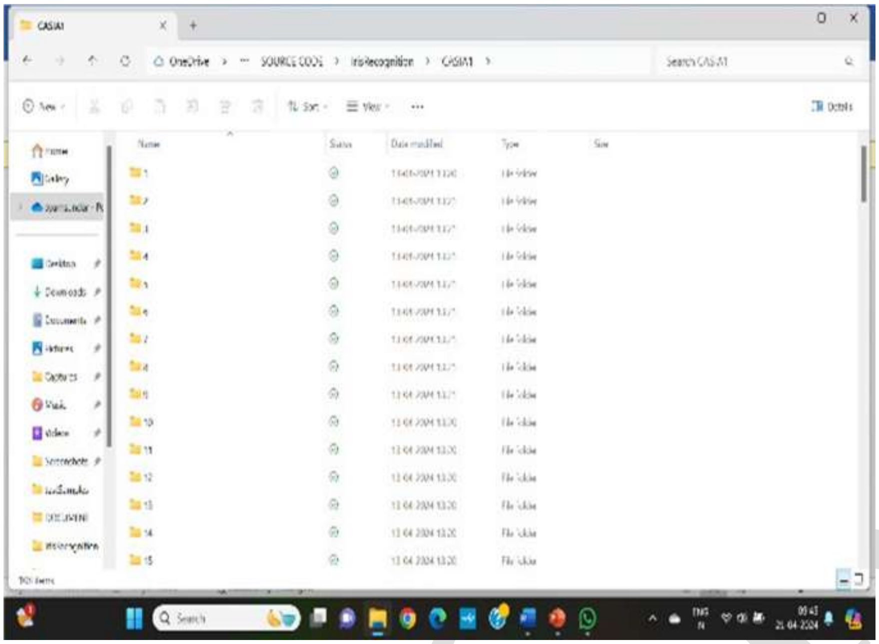
Iris Recognition Test Image Upload

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

VI. EXPERIMENTAL RESULT

Using Machine Learning Techniques for Iris Recognition

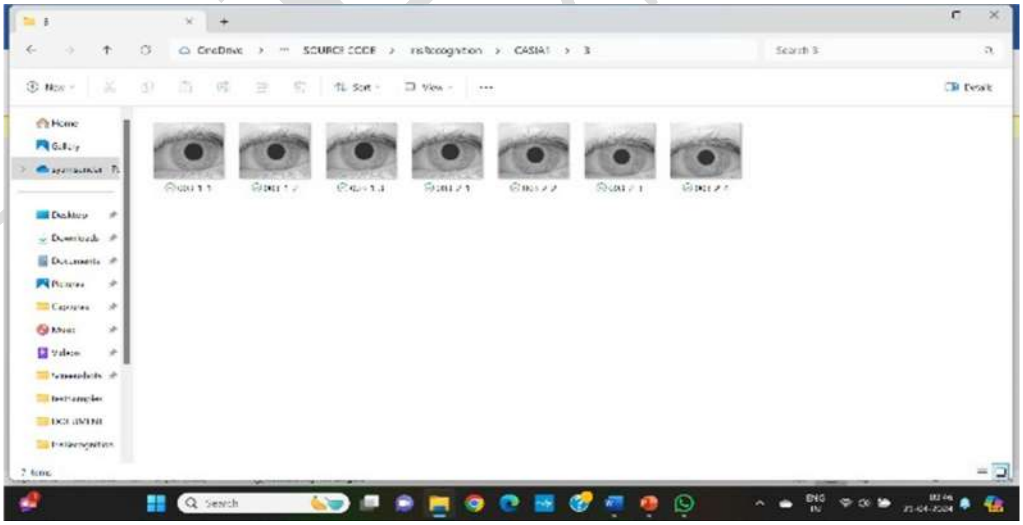
The CASIA IRIS dataset, which includes photos of 108 people, is used in this study to identify people from IRIS. By utilizing this dataset to train a CNN model, we can then utilize the CNN model to predict and



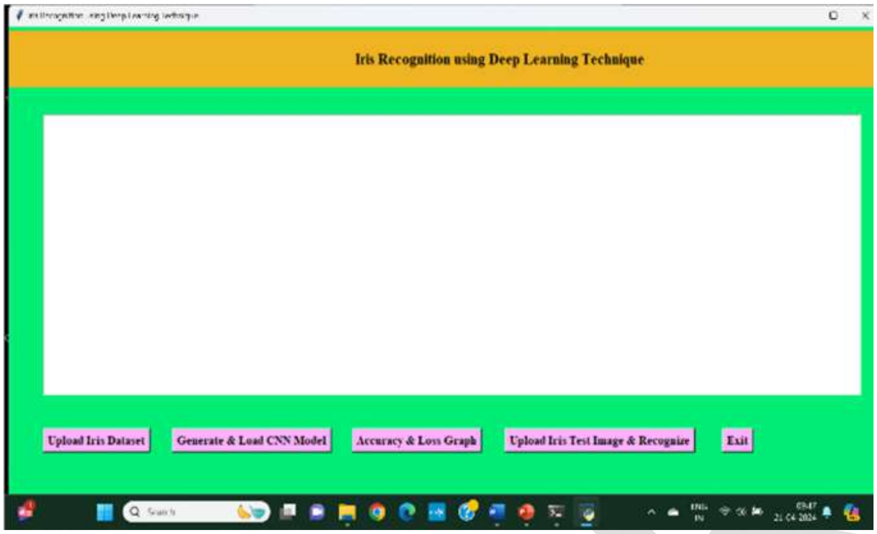
recognize people. We are utilizing the HoughCircles technique to extract IRIS circles from eye pictures in order to train the CNN model. Screenshots of the dataset with person IDs are shown below; it is stored in the "CASIA1" folder.

We have 108 people's IRIS photographs displayed above; simply select any folder to view that person's IRIS images, such as

below screen

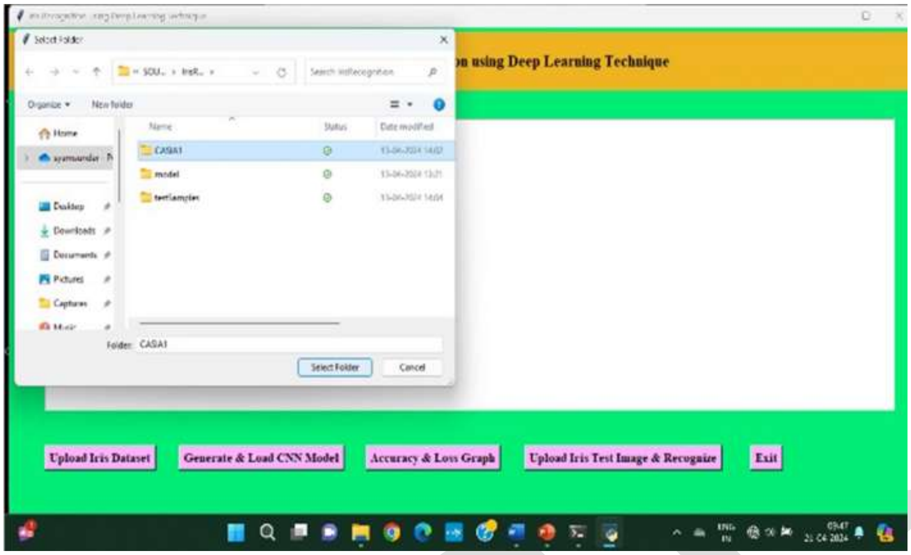


SCREEN SHOTS


Iris Recognition using Deep Learning Technique
Iris Recognition using Deep Learning Technique
Upload Iris Dataset
Generate & Load CNN Model
Accuracy & Loss Graph
Upload Iris Test Image & Recognize
Exit

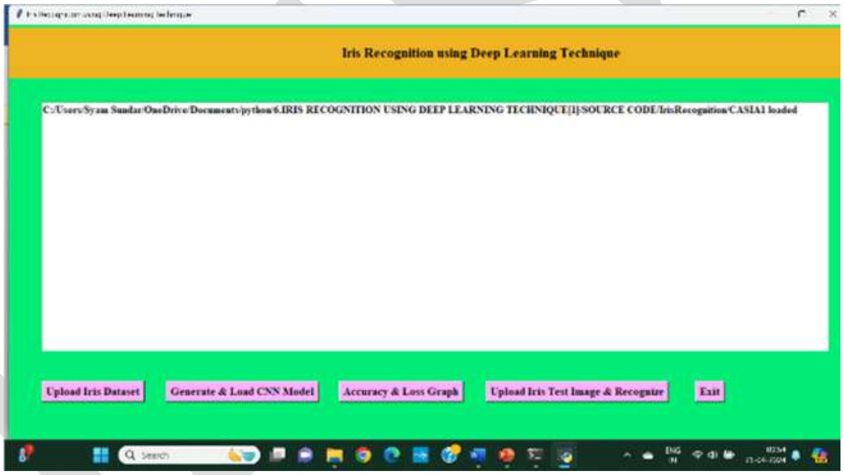
To run project double click on 'run.bat' file to get below screen

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



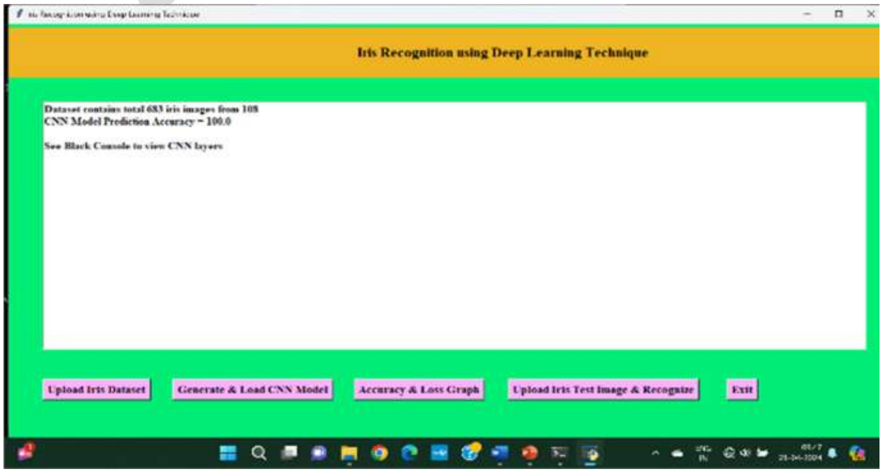
Folder: CASIA1

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


Iris Recognition using Deep Learning Technique
Upload Iris Dataset
Generate & Load CNN Model
Accuracy & Loss Graph
Upload Iris Test Image & Recognize
Exit

```
C:/Users/Syam Sundar/OneDrive/Documents/python/6.IRIS RECOGNITION USING DEEP LEARNING TECHNIQUE[1]/SOURCE CODE/IrisRecognition/CASIA1 loaded
```

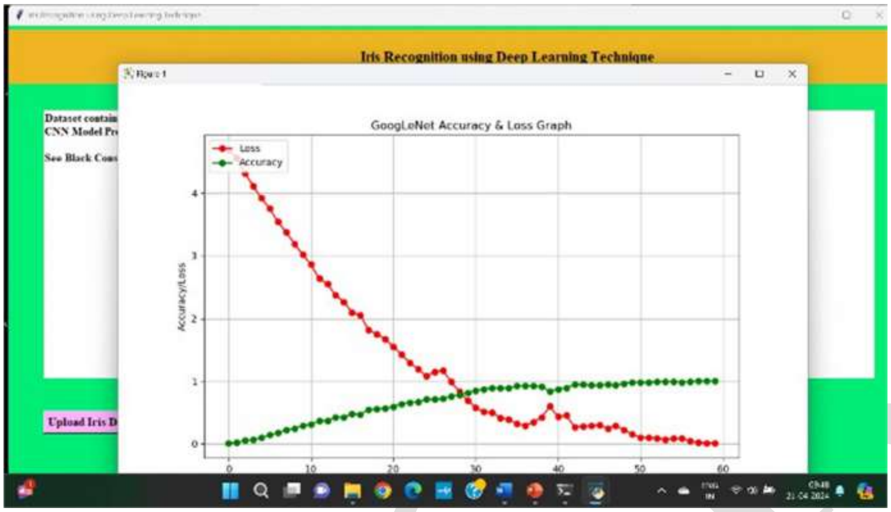
In above screen dataset loaded and now click on ‘Generate & Load CNN Model’ button to generateCNN


Iris Recognition using Deep Learning Technique
Upload Iris Dataset
Generate & Load CNN Model
Accuracy & Loss Graph
Upload Iris Test Image & Recognize
Exit

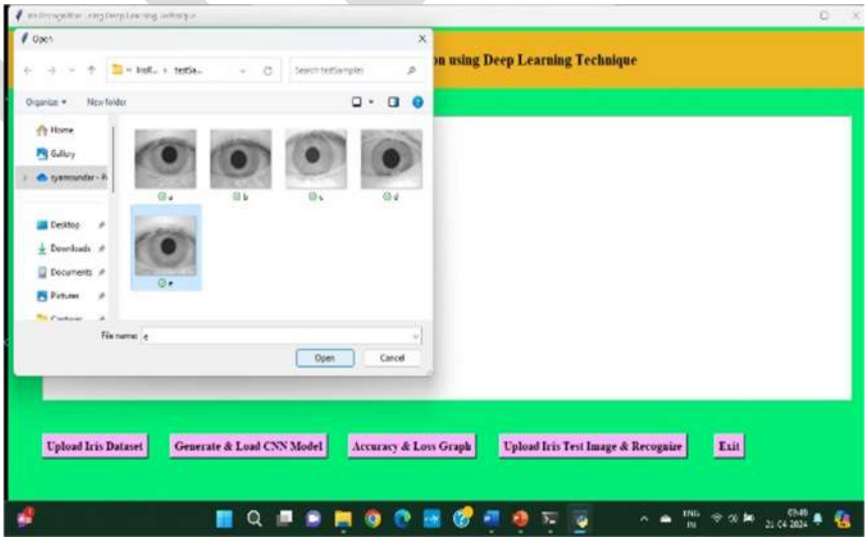
```
Dataset contains total 683 iris images from 108
CNN Model Prediction Accuracy = 100.0

See Black Console to view CNN layers
```

model from loaded dataset

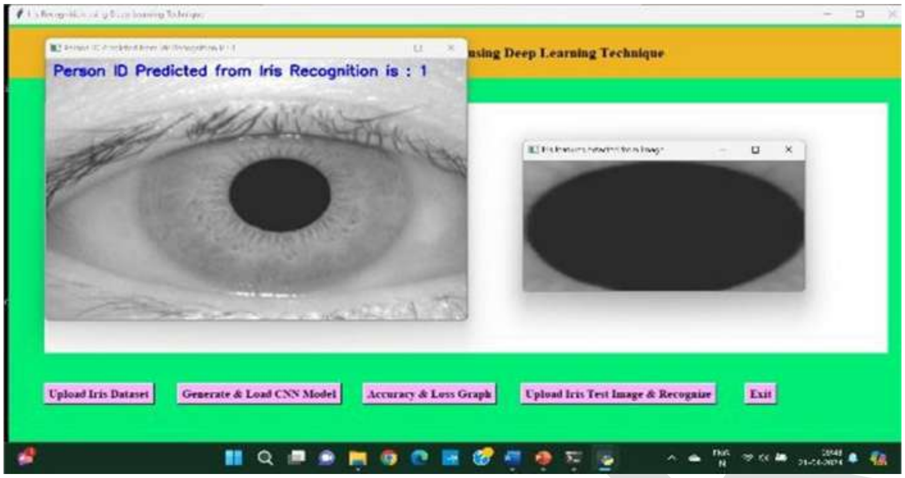
In above screen 683 images loaded from different 108 peoples and we got it prediction accuracy as 100%. Now modelis ready and now click on ‘Accuracy & Loss Graph’ button to get below graph



In the graph above, the red line denotes the CNN model's loss value; we can see that this value was greater than 4% at first, but as the epoch increased, the LOSS value decreased to 0. The green line, on the other hand, represents accuracy; it was 0% at first, but as the epoch and number of model iterations increased, accuracy increased to 100%. The x-axis in the graph above represents EPOCH, and the y-axis represents accuracy and loss values. Next, select the "Upload Iris Test Image & Recognize" button. From there, you may upload any test image, and CNN will use it to identify the person's ID. You can also upload a test image from the CASIA folder if you'd like to see if your prediction is 100% accurate.

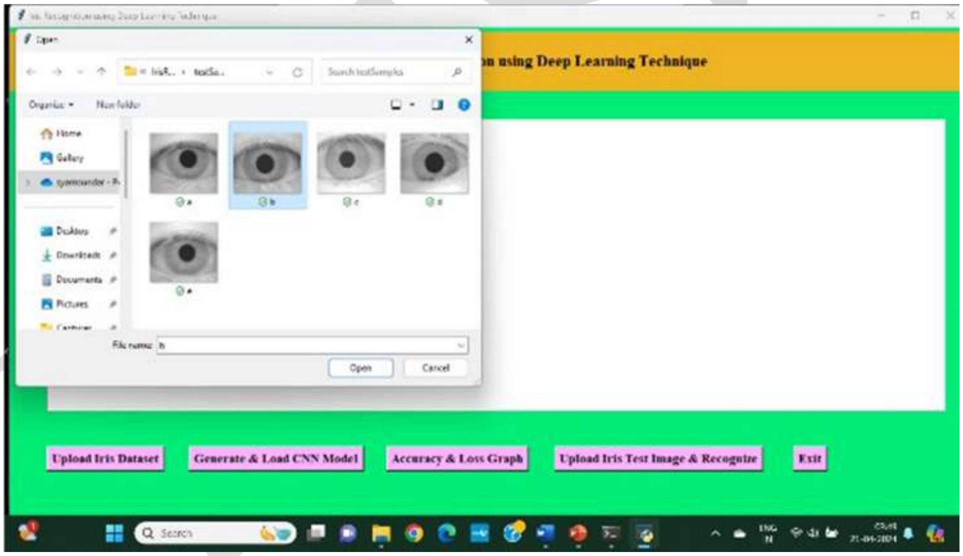


In above screen selecting and uploading ‘b.jpg’ file and then click on ‘Open’ button to get below screen

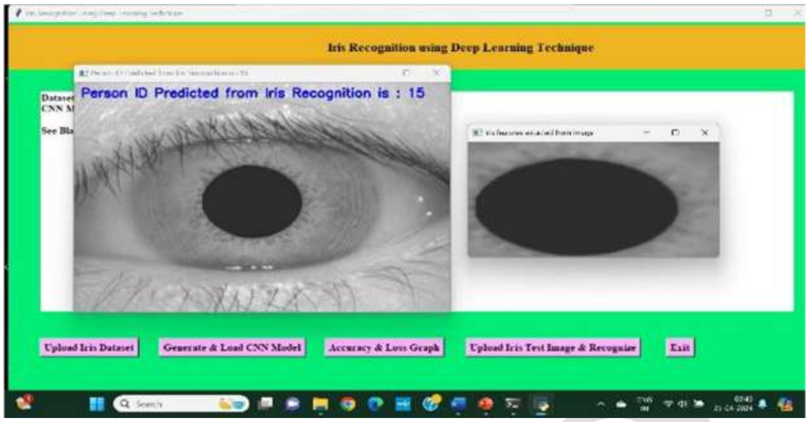

Person ID Predicted from Iris Recognition is : 1

using Deep Learning Technique
Upload Iris Dataset
Generate & Load CNN Model
Accuracy & Loss Graph
Upload Iris Test Image & Recognize
Exit

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


Iris Recognition using Deep Learning Technique
Dataset
CNN M
See Bla
Upload Iris Dataset
Generate & Load CNN Model
Accuracy & Loss Graph
Upload Iris Test Image & Recognize
Exit

Person ID Predicted from Iris Recognition is : 15

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

VII. CONCLUSION

The iris recognition system is appropriately covered throughout the study note in order to ensure correct validation. The primary science for the most accurate measurement of the many physical features and the automatic characteristics throughout the system is the biometric system. The most effective measurements among all these attributes have mostly been conducted on the face recognition and fingerprint-based recognition methods. In this instance, artificial intelligence and machine learning technologies are far more intelligent and successful at bringing about the real technological revolution in the relevant field. For optimal security, the whole research effort has been concentrated on creating an iris recognition system using the "convolution neural networking (CNN)" approach. The technology as a whole should be more sophisticated for this purpose in order to capture all the needs. The multimodal biometric process's right design and implementation are extremely difficult, and their impact has been seen across the complete working performance. The models and theories that have been presented in relation to the literature review are able to accurately and succinctly express all the requirements and significance of the complete system. It is possible to properly integrate several types of technology in order to create precise software that will be highly effective for any audience. The majority of this research has been made possible by the appropriate software for a deeper comprehension.

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