Iris Recognition Using CNN to Prevent Bank ATM Frauds

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A B S T R A C T

The paper is about the done project that is used to develop an application which could take the captured images that already exists and thus helps to authenticate the user before any transaction is done and this helps that only a legal user is allowed to withdraw or deposit any money into the bank accounts. The design of a reliable user authentication system is important to be able to to provide accurate detection of personal identity. Iris recognition is being used as a form of biometric identification for individuals has been actively researched for decades and has been gaining wider popularity considering the aspects of increasing awareness of the personal privacy in various sectors/domains. The rise of AI surelyy provides a great opportunity to further elevate the usage of Iris Recognition in safeguarding one's private data. Convolutional Neural Network(CNN) is a practical algorithm that is highly suitable for image processing and pattern recognition, it is considered effective and flexible to be used and applied in many fields. The paper focuses on building such an application that uses the human iris as an biometric to be able to validate users based on the dataset that is provided.

Keywords: CNN, Iris Recognition, Bank Transaction, Authentication, Convolutional

1. INTRODUCTION

Iris recognition refers to the automated process of recognizing individuals based on their iris patterns. Iris recognition algorithms have demonstrated very low false match rates and very high matching efficiency in large databases. This is given the facts that :

i. complex textural pattern of the iris stroma that varies significantly across individuals,

ii. the perceived permanence of its distinguishing attributes,

iii. its limited genetic penetrance.

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Iris is most commonly used in all Biometric authentication systems since authentication using iris is more reliable because the minute architecture of the iris exhibit variations in every humans. The main process in the recognition of the Iris image is basically the extraction of the features and labeling of the Iris images. The Iris images are acquired through camera with subtle infrared illumination to acquire images of the detail-rich, intricate structures of the iris externally visible at the front of the eye. Digital templates IRIS encoded from the identified Iris patterns by mathematical and statistical algorithms allow the identification of the individuals. Iris images obtained has similar patterns for persons. The race of the person can also be identified through iris. Asian peoples have iris mostly brown or black in color. Non-Asian people have iris in different shades of red and sometimes blue.

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2. LITERATURE REVIEW

A biometric framework that gives automatic identity proof of an individual based on unique characteristics or features of the individual should be considered when it comes to handling secure data so that illegal users cannot be able to access those highly secure and private data and this is why such an implemetation is done to be able to build a system that does the above mentioned work. As biometric recognition demands a very highly secure identification are hiking and as the human iris gives a pattern that is phenomenal for identification, the utilization of inexpensive equipment could help iris recognition turn into another standard in security framework. Iris recognition is viewed as the most reliable and precise biometric identification framework available. A test situation depending upon the open source code can be built to measure the performance of iris recognition techniques, image quality, and acceptance rate. In this paper, the image quality of images as data from a database acquired from a standard camera is surveyed, the most imperative issue areas recognized, and the overall general recognition performance measured. The principal point of this paper is to study the unique pattern of the iris in the eye. When imaging the iris under not as much as perfect condition antiquities in image occur such as different type of noise and reflections from light sources, artifacts that introduce error in the iris recognition process, influence the execution.

3. PROPOSED SYSTEM

This proposed system that is designed for the application evolves around and focuses on the concepts of CNN to develop Convolution Neural Network (CNN) based Iris Recognition models under different network structure. A deep neural network models is proposed for this paper by using a non-linear, rational, and exponential pixel scaling techniques.
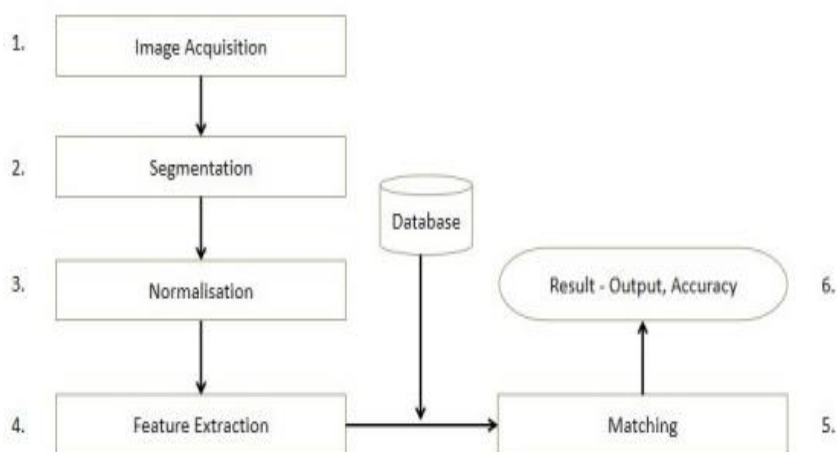

Fig 1 - Workflow of the Proposed System

- Image Acquisition : Image acquisition can be defined as the act of procuring an image from sources. This can be done via hardware systems such as cameras, encoders, sensors, etc. Irrefutably, it is the most crucial step in the MV workflow because an inaccurate image will render the entire workflow useless.

- Segmentation : Image segmentation is a commonly used technique in digital image processing and analysis to partition an image into multiple parts or regions, often based on the characteristics of the pixels in the image.

- Normalization : Normalization is a method frequently applied as a component of information groundwork for AI. The objective of normalization is to change the upsides of numeric sections in the dataset to a typical scale.

- Feature Extraction : Feature extraction refers to the process of transforming raw data into numerical features that can be processed while preserving the information in the original data set.

- Matching : Image Matching or wide multiple baseline stereo is a process of establishing a sufficient number of pixel or region correspondences from two or more images depicting the same scene.

IMPLEMENTATION

The implementation is done using the programming language of Python as it is considered to be an easy language which is best to learn and is a very powerful programming language. The following libraries are used in this project. Numpy is the first library that was used that consists of multidimensional array objects and a collection of routines for processing visualization library in Python for different types of 2D plots of arrays. The module Pandas is an open-source data analysis and manipulation tool while working with Excel sheets and tabular data pandas is very useful. Keras is a high-level neural networks API Open CV supports many algorithms related to computer vision and machine learning Flask is a web framework that helps to develop web

applications. Along with all the above mentioned modules, TensorFlow and OpenCV is also used in order for image processing and used for identifying the different segments of the images and further matching it with the iris images that are uploaded so that the user is validated so that the person can access the ATM interface to be able to deposit and withdraw money.

RESULT

The CASIA Iris V4 dataset with over 7000 test data was considered for extraction of iris images so that they could be matched with the users data to get an accuracy of matching. The model is developed using the machine learning algorithm named CNN that uses several layers to convert the training data and testing data so that there is accurate matching. The data that is considered is utilized for the trials is split into training and test data, with the model considering 70% of the data for the training set and the remaining 30% for test data so that there is a split such that training of the system results in higher accuracy rates. FInally with the use of CNN algorithm, the user is validated by uploading the image of the user's iris and then allowing them to be able to withdraw money from the account and deposit money into the account and the validation process giving upto 96% accuracy.

CONCLUSION

There are many ways to be ensuring the safety and security of users information and allowing only authenticated users to access the information and one of the method of user identification and validation is using biometric ways to be able to do the same. Most of the already present algorithms that are used provide an accuracy of up to 96% and also high error rates. As analyzed from the study done it should be noted that there are limitations which in turn increases the error rates. This paper mainly focuses on the Iris Recognition using the concepts of Convolutional Neural Network (CNN) that recognizes and fetches all the information related to that individual. The paper basically focuses on using the concepts of CNN in recognizing an individuals iris and fetch their data and this would mainly be used to prevent the frauds happening in banking sector mostly in the ATM machines where only a pin is used to complete the transaction.

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