CNN Based Feature Extraction for Iris Recognition:

In this paper, an iris recognition system was proposed where the features are extracted from a pretrained CNN model, and for the classification task, the multi-class Support Vector Machine (SVM) is used. The performance of the proposed system is tested when extracting features directly from the segmented iris image, and extracting features from the normalised iris pattern.

What is CNN

A CNN is a Deep Learning algorithm and a very specific type of Neural network and is mainly used for object detection in images.Contrast to a normal neural network a CNN has hidden **convolutional layers** which helps in detecting various shapes and objects in images.These layers have filters which are nothing but matrices that are defined by the model creator and they are slid over through the whole input and the corresponding dot product is filled in to build a new matrix which is passed as input to the next layer .And in addition they have pooling layers which are used to reduce the size of convolved features helping in decrease of computational power required through dimensionality reduction. It also helps in extracting dominant features and noise suppression.This is the basic outlay of a CNN.

Proposed system

In preprocessing ,iris segmentation and normalisation are performed .An algorithm is provided for iris segmentation which uses circular Hough transform and canny edge detection to do the same .Finally iris region is transformed into a normalised rectangular image and features are extracted from this image.

For feature extraction a pre-trained AlexNet model is used .It was trained by a large set of iris images.And the numbers regarding no.of convolutional layers ,pooling layers , fully connected layers and the dimensions of the filters and maps used are provided in the paper.

And from the results it can be seen that the proposed model provides the best accuracy over the fc6 layer of the Alexnet model and gives us very high accuracy and it's also seen that it is very time efficient.

This paper evaluated the extracted learned features from a pre-trained CNN(Alex-Net) followed by a multi-class SVM algorithm to perform iris recognition. The iris is segmented using circular Hough transform and normalised using rubber sheet model. The segmented and normalised image is fed as an input to the CNN (Alex-Net). The proposed system is tested on public datasets (IITD iris databases, CASIA-Iris-V1, CASIA-Iris-thousand, and CASIA-Iris- Interval), and a high accuracy rate is achieved. The results showed that the recognition accuracy when extracting features from the segmented image is higher than when extracting features from the normalised image.