Identification of People by Iris Recognition

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Abstract
biometrics is a best medium of identification .iris recognition used to recognize people by iris. I present the new method of iris recognition "iris recognition by neural network". In this method first we collect the iris images and using image processing after this calculate the length of iris from left to right and top to bottom. Finally we use neural network for training and testing purpose .We have selected training algorithm and setting different parameter for training. CASIA iris database used in this work. Many types training and testing we get different results. We get best accuracy is 97.5%.

Keywords
Biometrics, iris recognition, neural network, Feature extraction.

I. INTRODUCTION

Today we are looking that many problems in the world and fake identity is the main issue .this is serious problem of whole world. This is big challenge to identify fake person but biometric recognition system give challenge to this. There are many types of biometrics such as face, finger, palm, voice etc but iris is more reliable and stable for identification [5], iris is a unique thing which does not change with age [3], iris remain stable and fixed from about one year of age throughout life [8] speed, simpltcity, accuracy and applicability these are the some key advantage of iris recognition system [1].iris recognition is very efficient method of biometrics and error rate is very less according to statistics[9]. So we can say that this is best approach for identification. Now we focusing on old related work in iris recognition .khin sint sint kyaw used a method in which Preprocessing system, segmentation, feature extraction and recognition. Especially it focuses on image segmentation and statistical feature extraction for iris recognition process. Author presented a straightforward approach for segmenting the iris patterns method determines an automated global threshold and the pupil center [2].Three step use by zhonghua Lin [4] firstly preprocess to iris image, ensures the effective iris area adaptively, secondly find all iris feature points by directional information, length information, width information about texture ,the neighboring gray information and relatively in the effective iris area. Thirdly makes codes to feature points and figures the iris pattern by iris codes.Common vector method and non – uniform quantization method are used to eliminate the contradiction between the fuzzy character of iris information and the sensitive of the hash function in a novel template protection algorithm for iris recognition, which stores the hash value instead of the iris template [1]. In [10] iris recognition system and smart card programming circuit with its software have been designed. Template on card (TOC) category has been employed. Template on card (TOC).The biometric template is stored on a hardware security module. It must be retrieved and transmitted to a different system that matches it to live template acquired by special scanners from the user. Two different approaches for iris identification presented by [11] Rajat Garg, Vikrant Gupta, Vineet Agrawal template matching and average value method, in template matching method it compares the user template with templates from the database using a matching metric. In average value method we can be characterized approximately by the average value of the area.

II. THE PROPOSED METHOD

Initialize this work with collection of database in iris recognition system. Collect the iris images in an image folder and apply feature extraction .so these process are-

A. Database

Database is necessary to any work so we collect the iris images for iris recognition. We have 20 users and each have 5 iris images.100 iris images were selected in this work.

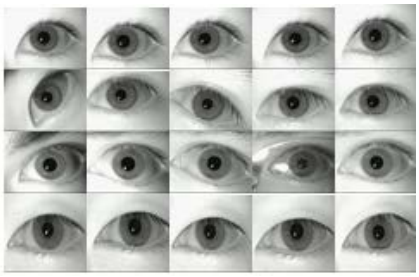

Fig.1. sample images of database

B. Feature Extraction

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If we use CCD camera ,HD camera and other device for capturing image then first apply image processing , by the use of image processing we will find clear image . Feature means everything has some quality and we detect that is called feature. So iris images have some feature and we detect by a tool this process is known as feature extraction. Imagej tool used in feature extraction. Calculate the length and breadth of iris database, which is set of feature in iris image .this measurement, is necessary for work because each thing has some feature and we can classify that thing by feature.

For Measurement of iris image we use imagej tool. Calculate the image from left to right length and top to bottom breadth in centre. As shown in fig .2, fig.3.

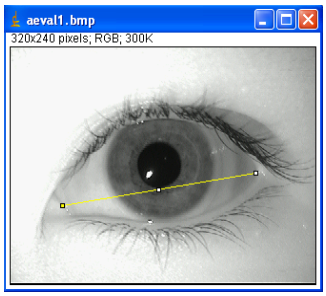

Fig.2. length=206.66

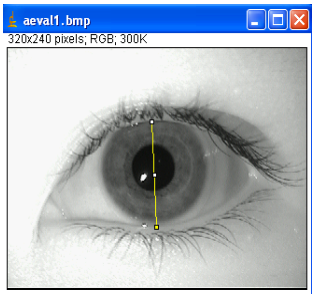

Fig.3.breadth =106.12

III. IRIS RECOGNITION SYSTEM

The flow graph of iris recognition is shown in fig.4.initialyze with captured image by a camera. Use image processing feature on captured image by this get clear image without noise. imagej tool use in feature extraction. Dataset is created for extracted feature. This paper used to neural network for classification .Feed forward back propagation neural network created here.sevral neural networks are created for different group of dataset, and check the performance of each created networks. The highest recognition rate is 97.1%.

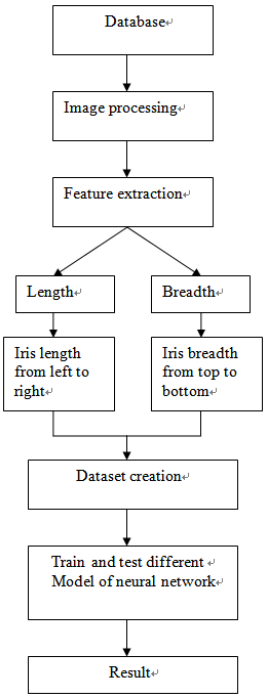

Fig.4.Flow graph of training and testing phase

IV. NETWORK STRUCTURE

A neural network is like a brain network. The element of neural network is inspired by biological nervous systems. It is a powerful approach for building complex and nonlinear relationship between a set of input and output data.

Neural network are used in this work as a classifier. Neural network has some feature as adaptive nature, self organization, function approximation technique, real time operation and fault tolerance.

The mostly used and simplest network architecture called Feed Forward Back Propagation neural network [12] is used in this paper. It has three layers an input layer, an output layer and a hidden layer. Input and an output layer also have one or more intermediary layers known as hidden layers. The hidden layer helps in performing useful intermediary computations before directing the input to the output layer. Network Architecture defined two things, first is the number of hidden layer and second is the number neuron in each layer. Based on these we can also define different training algorithm.

A. Input layer

A vector of predictor variable Values(x1, x2) are presented to the input layer. The input layer distributes the values to each of the neurons in the hidden layer. We have two no. of neurons in input layer.

B. Hidden layer

Arriving at a neuron in the hidden layer, the value from each input neuron is multiplied by a weight (wji), and the

resulting weighted values are added together producing a combined value uj. The weighted sum (uj) is fed into a transfer function, σ, which outputs a value hj. We have found 8 neuron hidden layers.

C. output layer

In the output layer, the value from each hidden layer neuron is multiplied by a weight (wkj), and the resulting weighted values are added together producing a combined value vj. The weighted sum (vj) is fed into a transfer function, σ, which outputs a value yk. The y values are the outputs of the network. We have 20 neurons in output layer.

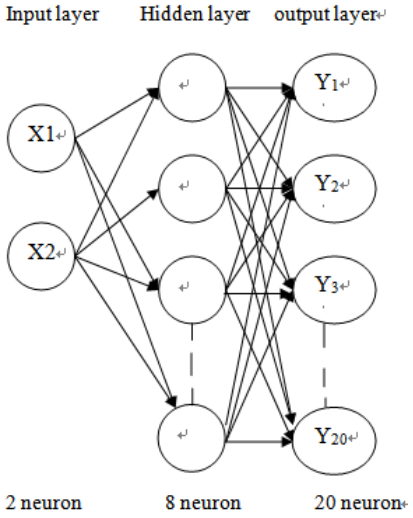

Fig.5. structure of neural network

Fig.5 shows the network structure with one input layer, one hidden layer, and one output layer. Network structure x = [x1, x2] is the network input. Y = [Y1, Y2, Y3….. Y20] is the output vector.

D. Feed Forward Back Propagation Neural Network

The mostly used and simplest network architecture called Feed Forward Back Propagation neural network. It is a multiple layer network and non linear differentiable transfer function. Input Vectors and corresponding target vectors are used to train a network until it can approximate a function, associate input vectors with specific output vectors, or classify input vectors in an appropriate way as defined in this work. Networks with biases, a sigmoid layer and a linear output layer are capable of approximating any function with a finite number of discontinuities. The back propagation algorithm consists of two paths; forward path and backward path. Forward propagation of a training pattern's input through the neural network in order to generate the propagation's output activations. Backward propagation of the propagation's output activations through the neural network using the training pattern's target in order to generate the deltas of all output and hidden neurons. Before training a feed forward back propagation network [13], the weight and bias, must be initialized. Once weight and bias have been initialed the network is ready to train. For training of neural network, proper inputs and targets is needed as outputs. During training process, the weights and biases of network is to be adjusted, so network performance function to be minimized. Many algorithm are available for training neural network, these algorithm uses gradient of performance function to determine how to adjust
weight to minimize performance function. An iteration of this algorithm can be written

$$x_{k+1} = x_k - \alpha$$

There are two modes of learning to choose from: One is incremental learning and the other is batch learning. In the batch mode all inputs are applied to the network before the weights are updated. In incremental mode, the gradient is computed and weights are updated after each input is applied to the network. In this work
Bayesian Regulation Training (trainBR) algorithm is using to learn neural network.

V EXPERIMENT AND RESULT

This work performed on CASIA iris database. The datasets contains 100 instance of 20 subjects where each subject has 5 instances. The experiments were performed by using Matlab software with its neural network toolbox is used in this work. Feed forward back propagation neural network are used for training and testing. Training algorithm is Bayesian Regulation; performance is measured by Sum squared error. In table1 we train many sets, but the best classification accuracy is 97.1% with 2 hidden layers. Respectively fig.6, fig.7, fig.8 show performance plot, regression plot and training state graph for highest performance.

Network Type	Feed-Forward backprop	Feed-Forward backprop	Feed-Forward backprop
Training function	TrainRP	TrainRP	Train BR
Adaption learning function	LearnGD	LearnGD	LearnGDM
Performance function	SSE	MSE	MSEREG
No. of layers	2	2	2
No.of neurons	15	15	12
Transfer function	Tansig	Tansig	Tansig
Performance	95%	97%	97.5%

TABLE 1. Data sets group

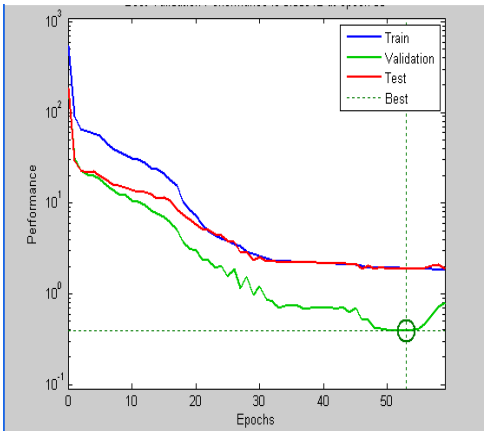

Fig.6. performance plot

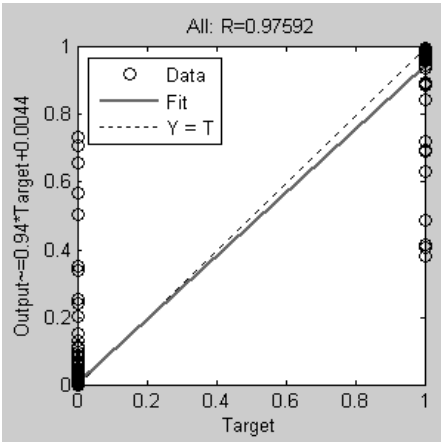

Fig.7. Regression graph for highest performance

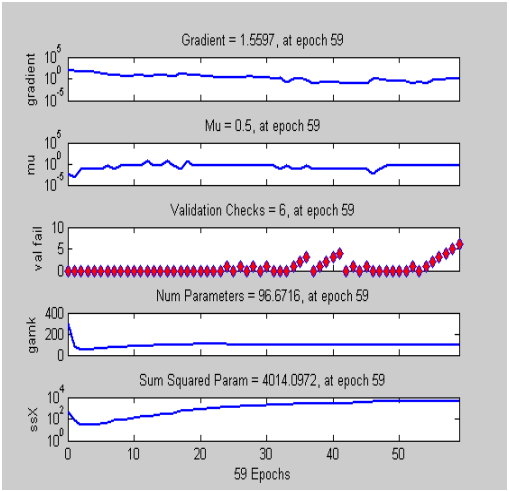

Fig.8. Training state graph

VI. CONCLUSION AND FUTURE WORK

In this work introduces new method of iris recognition in which specific features, as length from left to right and breadth from top to bottom. By the use of neural network in this work we able to recognizing people. Our performance show that these features are more effective to identify people .The recognition rate of this method is 97.1%.

In the near future neural network become more secure and reliable by the regularly use this we can get more accurate result.

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