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Offline Handwriting Character Recognition (for use of medical purpose) Using Neural Network

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Abstract: - Handwriting recognition means to scribe the written words from the paper. The written words are taken from the paper by the means of OCR. OCR means Optical Character Recognition. It is a technique of getting the printed or written text from the paper by using any scanning hardware like camera or scanner which can get printed or written words from the paper and convert it digitally. Offline handwriting recognition uses the techniques of OCR and able to detect and analyze the handwriting words. Here we can recognize the handwriting of the doctor and try to get some pattern which will be used to guess the most probable prescribed medicine. We can only guess prescribed medicine's name and does not assure the exact name because we all know that it is difficult to read the handwriting of doctors for non-medicine personal.

Keywords: - Handwriting Recognition; Neural Network Algorithm; Optical Character Recognition; Offline Character Recognition; Camera or Scanner;

1. Introduction: - This research project is figure out from the medical use of the OCR. We are trying to recognize the prescription written by the doctors. As we all know how difficult is this to read the actual prescription written by doctor own hand or doctor handwriting.

In India there is a big no of 7000 death in a year. Since the hand writing of doctors is difficult to read out, we are trying to do this by the means of handwriting recognition using the OCR techniques. Since most of the words are again unrecognizable to most humans therefore it will also be very hard for machine to do so. Thus we here want the most probable matching word to the ease for the human to guess the exact medicine.

In daily life practices the name and address from ID card, by bank clerks and in same institutions where the records are kept and entered from document to digital form. Even after 30 years of research in handwriting recognition, we still have a problem to recognize unconstrained handwriting and it is still an open field of research. Our main motive is to use the offline handwriting recognition method for medical purpose and its possibilities and future scope. Offline text handwriting recognition is the process of recognizing human's handwriting from a scanned paper document which is made available in the form of binary or gray scale image. This available image is then made available to the recognition algorithm.

The main process in offline recognition are distance measure, making prototype, feature extraction, processing, classification and knowledge acquisition from training data. Some classification techniques which are generally used in handwriting recognition are Neural Network, Back

Propagation Algorithm, K-nearest Neighbour. Those classification techniques considered statistical based approach where the features extraction are labelled by using statistical means [1].

This paper proposed the use of neural network for the offline handwriting recognition. We intended to use the very simple nearest neighbour OCR algorithm. For this the training and test images are used to train and test the neural network respectively. For any system to recognize well, it is very important to train it very well. As we all know the difference between the real life input and the training data provided to the system is very large, thus it is very well understood that the system may not behave well. Thus we have to give a diverse training data to the system.

2. Literature survey: - We have to survey from the other author research paper and they have to measure some related work of our research project.
They are:

Rahul KALA, et.al: proposed work on Offline Handwriting Recognition method with used Genetic Algorithm. In this research describe to a piece of paper and then convert it into text. They are used genetic algorithm to implement Offline Handwriting Recognition [4].

Brandon Maharrey COMP 6600 Artificial Intelligence Spring 2009 they survey about A Neural Network Implementation of Optical Character Recognition that measure that neural network is also use in OCR for the handwritten notes or words [7].

Sang Sung Park, Won Gyo Jung, Young et.al: teams they are implemented Optical Character Recognition System Using BP Algorithm they told her They use OCR (OCR : Optical Character Recognition) technique which is that saving relevant documents to DB after extracting text by using OCR. That is, text should be entered to DB after classifying segments one by one in realized whole document after doing character recognition through OCR. In this paper, in order to solve this problem, we constructed OCR system that saves abstracted characters to DB automatically after extracting only equivalent and necessary characters from a large amount of documents by using BP algorithm [8].

Made Edwin Wira Putra, Iping Supriana Suwardi both has implement the Structural off-line handwriting character recognition using the purpose of those model is to give the ability in improving recognition accuracy without relying in normalization technique. They are use in graph technique. The graph consists of several edges that indicate the connected vertices. The vertices are joining and to form a curve that make the character. The curve is extracted by analyzing the character's chain code, and its string feature is created using some principle [1].

Krupa dholakia has to define about the handwritten character recognition technique are divided into some subparts such as preprocessing, segmentation, feature extraction, classification and post processing[11].

3. Working Technology :-

1). **OCR-** Optical Character Recognition (OCR) is the mechanism of translation of images of handwritten, typed or printed texts by the means of scanner into a machine editable text. It is generally used for converting the paper books and documents into electronic files. When we scan any paper, the scanner only produces the image file or a photo of the page. This image is not readable for texts by computer that is the computer cannot understand the letters written or typed on the page. So, we cannot edit the texts of that image as we can do in any word processor. For that specific function we use OCR software to convert it into a word processor file or text to enable us to do editing on those printed or written texts. For our Offline Handwriting Recognition system we propose the use of Neural Network. We intended to use the nearest neighbour OCR algorithm.

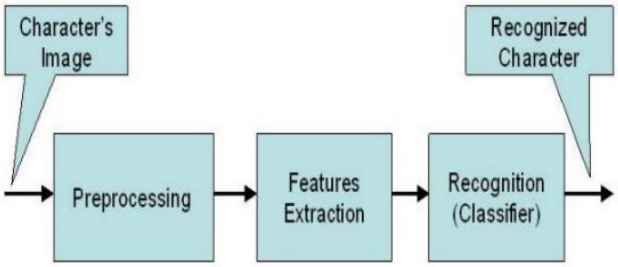

Fig1 Structure of OCR System

2)**Neural Network**- A neural network is a powerful data modeling tool that is able to capture and represent complex input/output relationships. The motivation for the development of neural network technology stemmed from the desire to develop an artificial system that could perform "intelligent" tasks similar to those performed by the human brain. Neural networks resemble the human brain in the following two ways: they acquire knowledge through learning, and the knowledge is stored within inter-neuron connection strengths known as synaptic weights [12], [5].

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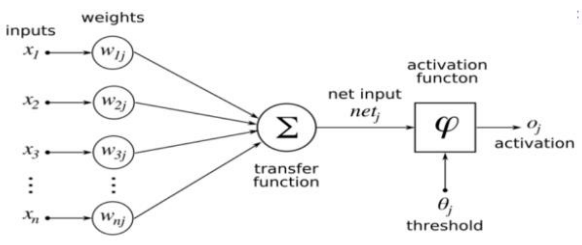

Fig 2 Structure of ANN

1. A neural network acquires knowledge through learning.
2. A neural network's knowledge is stored within inter-neuron connection strengths known as synaptic weights [5].

4. Proposed Methodology –

For the training and test of the neural network, the training and test images are used respectively. The test images are in the IDX file format. An IDX file is an index file extension commonly used in Windows to speed up the search process in a database, or to quickly retrieve and sort files in directories [6]. The IDX file format is a simple format for vectors and multidimensional matrices of numerical types [7]. We use images of 28 pixels width and 28 pixels height. Each pixel is represented by a byte. It comprise of the values from 0 to 255. A value of 0 represents white whereas value of 255 represents black. The values between 0 and 255 will represent greyscale shades. For analyzing the test Images against our proposed neural network will be as follows-

The neural network algorithm first acquires the characters by ungrouping them. Each individual recognized character will be treated as the test images. Each test image is now compared to each trained neural network character. In the whole process the OCR algorithm will try to guess the test image. When any of the test images is guessed by the OCR, it is stored in the different test image as actual character to which it resembles. By performing these steps in a single line we will get a set of recognized characters arranged in an order with their respective places.

Since we cannot recognize all of the handwritten words, we here try to guess the possible string with those recognized characters in given pattern by our saved offline dictionary. Those character patterns are matched to every possible string and the best match is given as the answer. It is quite difficult to have a dictionary of all possible strings, thus we have given an option for online search for the possible answers for that recognized character pattern.

5. Flow Chart: - A flow chart is a diagram that represents the process. The steps are represented by boxes.

We have defined simply a flow of content that are successfully executed or recognition character. We have not given any else condition because we have to only successive condition not false condition.

There is the steps start the process, scan images that are taken by any camera (i.e. handwriting images), distance measure, make prototype, feature extraction (means it is a special form of dimension reduction. Its uses when image size is large and a reduced feature representation is required to quickly complete tasks such as image matching and retrieval.)[11], classification (it depend on quality of features are extracted) [11], and acquisition from trained character then finally get the recognized character or words.

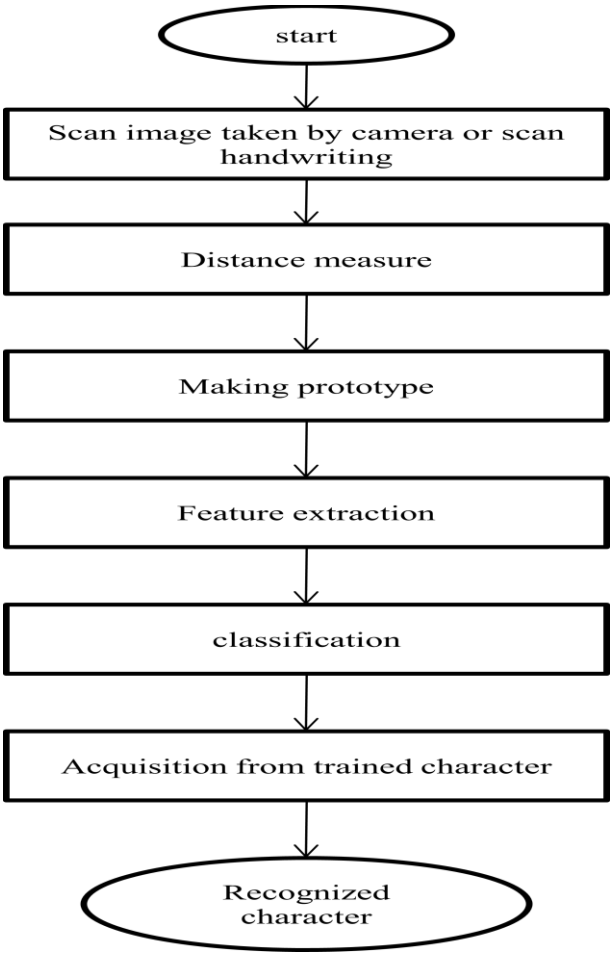

Fig: A flow chart of successfully recognized character

6. **Conclusion: -** In this paper we have introduce the offline handwriting recognition, to provide in improving the ability of recognition accuracy. In this we use the neural network method to implement the OCR. We have research the Indian doctor prescription and have to decide to implement the OCR in medical point of view. In this method unknown word (i.e. handwritten word) is input and recognition text is output.

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