

Abstract: the content of medicine. the curvelet

[Literature](#), [Russian Literature](#)



Abstract: Writing is the painting of the voice and handwriting enables civilization. All of us have different handwritings. It is difficult to recognize the different kind of handwritings, especially the doctor's prescription. Often the same medicine is prescribed for different kinds of diseases.

The aim of this paper is to propose a system which use curvelet transform and artificial neural network for the recognition of doctor's prescription and convert it into a record. then retrieve the content of the medicine. The input is a scanned image of prescription and output is a bill with the prescription and the content of medicine. The Curvelet transform is to be used in the feature extraction stage and artificial neural network is used for recognizing prescription. Curvelet transform makes it easier to extract curves in handwriting.

Back propagation algorithm is employed to train the system. So this system helps us to know whether the prescribed medicine is right. It also gives a solution to the difficulties in understanding a prescription. Keywords: OCR, ANN, Feature extraction Classification

1. Introduction Every individual have different kind of handwriting. Some handwritings are beautiful and some are not. It is easy for human being to read and understand a handwritten document.

But a system cannot recognize the different kind of handwriting. By using the OCR is able to provide that ability to the system. It is easy for human beings to read and understand a handwritten document. By using the OCR is able to provide that ability to the system.

The conversion of hand written image or text in to document or records called optical character recognition (OCR). Handwriting recognition refers to understanding or determining the written word and converting it into a printed format. This technology is using different fields including banking, postal, teaching etc. OCR is classified into two types. They are handwritten character recognition and printed character recognition. Handwritten character is again divided into two on-line and off-line character recognition.

There are several advantages for OCR. It can reduce the data entry time. It can reduce the storage space required by the time. The other advantage is fast retrieval of the data. There are many recognition systems to recognize the English handwritten document. This paper focuses on the recognition of a prescription it is very tough to understand the matter in it. The prescription will be written in cursive writing. It also will have many curves in it.

So by using curvelet transform we can easily extract the features of character. Artificial neural network (ANN) is used for the classification. ANN is a computational model. The aim of ANN is to provide the human intelligence to the machines.

After classifying the character the system aims to retrieve the content of the medicine. 2. Related works There exist many systems for the classifying handwritten characters. Most of the systems does not support the cursive letters. A handwritten recognition system must have 2 steps. They are feature extraction and classification.

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The systems mainly make use of wavelet transform for the feature extraction. Different algorithms from neural network is used for the classification. In some system support vector machine is used for the classification. Many researchers have developed the character recognition systems by using template matching, spatial features, Fourier and shape descriptors, Normalized chain code, Invariant moments, central moments, Zernike moments, modified invariant moments, structural, statistical, Topological, Gabor, Zoning features combinations of these feature etc. Different pattern classifiers like neural networks, Hidden Markov models, and Fuzzy and SVM classifiers are used.

3. Proposed system In this paper we propose a system to recognize the medical prescription and retrieve the content of the medicine. The system includes 5 modules. The first module is for the recognition of the prescription. The last module is to retrieve the content of the medicine. Modules for handwriting recognition include preprocessing, segmentation, feature extraction, and classification.

Classification is done using artificial neural network. A neural network is trained with the 26 characters of English language. The features of the character which is to be recognized is given as input to the system. The neural network compares the input features with the trained data set in it. After classifying or recognizing the letter it returns the letter.

After classifying the entire medicine it is given as an input to medical database. Medical database returns the information on content of the medicine. The modules implemented in this paper is shown in the fig 1. The

proposed system architecture is shown in fig 2. Fig 1: Fig 2: 3. 1. Image Acquisition Collection of sample data for training the neural network is involved in this module.

Data from different sources are collected and stored in a file. The recognition system acquires a scanned image as an input image. The image should have a specific format such as JPEG, BMP etc. 3. 2.

Preprocessing There will be many irregularities in the scanned prescription due to the sporadic handwriting. So the scanned image cannot be given directly to the system as input. The irregularities affect the performance of the recognition system badly.

So some operations should be performed on the image to remove their irregularities and to make them in a normalized form. Preprocessing is done to remove this kind of irregularities in order to get a better performance.

Preprocessing includes three functionalities. They are: Noise removal, Binarization, Thinning. Firstly the cropping of images was done manually. Then the size of all images is made as uniform. Then the noise from the image is removed by using the median filtering algorithm. Secondly the process of binarization is done which makes our image as a binary image. It is done by using Otsu's global thresholding method.

Now the image is reduced to level intensities white and black. After inverting the image the boundary box is created for every word which touches the four sides of the word. At last thinning is done to resize the image. 3.

3. Segmentation Image segmentation is a process of separating the image in the super pixels. Segmentation makes the image more meaningful. It is easy to analyse a segmented image. The scanned prescription contains the names of medicine. The name is separated into a single character for further proceedings.

The individual character is obtained by the character segmentation. 3. 4.

Feature extraction Feature extraction is used to reduce the dimensionality of the image. It is done to extract the unique features or property of every single character in the prescription. By extracting the unique features we can define a letter with minimum amount of resources. The letter can be represented with lesser number of bits. Curvelet transform is used for the feature extraction because prescription contains many curves in it. More focus is made on Discrete Curvelet Transform with the Wrapping Technique.

Algorithm for Feature Extraction
Input: image after segmentation
Output: features library
1: segmented image of 64X64 pixels
2: image is reduced by using a discrete curvelet transform with a wrapping based technique
3: find out the curvelet coefficient for every character
4: compute the standard deviation of these coefficients in order to get a feature set of input
5: obtain the features of every single character in the image and store it in a train library. 3.

5. Classification Classification refers to the recognition of the character. It is done by using a multi-layer perceptron. Neural network is used for recognition. Before applying neural network it has to be trained with character database. The input to the trained neural network is the

features of the character that is to be recognized. Neural network is already trained with 26 characters and its features.

it compares the input with this data and returns the most matched pattern as the result. The neural network classifies the input into one of the 26 characters.

Algorithm for classification
Input: Isolated test character images. Output:

recognition of prescription

1. Obtain the features as per the algorithm.

2. Store these feature vectors in test library database.
3. Compute the % of similarity between the features in the test library and train library.
4. Obtain the character with maximum % of similarity and print that character.

3. 6 Obtaining the details of the medicine
After recognizing the letter next step is to retrieve the content of medicine. For this a medical database is created. The recognized medicine is given as input to the medical database. It compares with medicine and the content of medicine to the user.

- 4 Conclusion
An algorithm proposed here is used for the recognition of medical prescription. The system is expected to give a high performance with the maximum accuracy.

Curvelet transform is used for the feature extraction. It will be easier because the prescription contains many curves in handwriting. ANN is used to provide the artificial intelligence to the system. Back propagation algorithm is used to classify the prescription. At last the text document of the prescription is obtained as an output with the content of medicine in it. This system helps to solve dilemma in understanding the prescription.

- 5.

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