

Hand written text evaluation using Gabor Filter and K Nearest Neighbour

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Abstract- Image processing has helped us simplify intensive task such as object recognition, face detection and tracking, number plate challan system, detecting whether motorist have worn helmets and the list can go. Evaluating candidates on how they performed during a test, exam or interview rounds is a tedious process which takes a lot of time to evaluate each candidates answer sheets separately. One way would be to use optical mark recognition (OMR). But using this system the candidates would be constrained on giving out his/her thoughts as the system only provides MCQ type answers. Giving the openness to candidates to answer broadly about the topic would help us understand how much the student has understood the topic covered during his/her learning process. But evaluation time is the biggest factor that we need to tackle. The objective of researcher is to develop a system which takes a scanned photo of an answer sheet and evaluate it on the basis of detecting and removing scribbled words, Converting the entire handwritten image into character format, Detecting a single paragraph, Forming separate sentences, Evaluating the formed sentence if they are grammatically correct using Natural Language Processing, and finding out how close the sentence matches the content of the topics on which the question is asked. This type of system will save the evaluation time and manpower in traditional examination system. It could also be used to make a digital archive of the answer sheets. This research paper mainly focuses on creating a dataset of character image and using Gabor Filter to extract features to create a training dataset for the K nearest neighbour algorithm. The author aimed to identify good amount of accuracy of to detect characters and on successful result of character accuracy author aims to detect all the words from the image.

Keywords- Image Processing, OMR, Scribbled Characters, Natural Language Processing, Evaluation System

I. INTRODUCTION

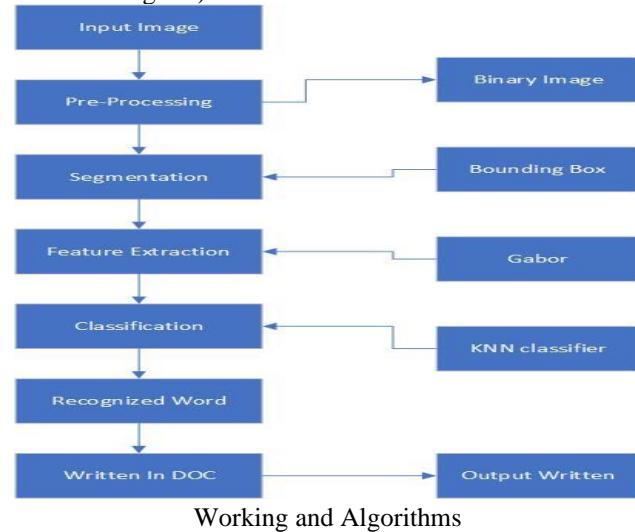
Character recognition has improved drastically over the past years. Off line hand written text recognition use different techniques to get a good amount of accuracy .When we compare offline hand written of people, each one has different style of writing which widens the probability of recognising certain characters. Factors like character size, tilt spacing between words have a huge impact on the recognition process. Many algorithms have been developed that use different filters to extract features of a particular character. Features could be angle, intensity and thickness of strokes.

In this research we are using the Gabor filter to extract features of each character and use this features to train the Kth Nearest Neighbour clustering algorithm.

II. PROPOSED SYSTEM

The system will take in scanned images which consist of hand written text. It will then convert the entire hand written image into computer readable format. If in case there exist any scribbled words, they will be remove by the system. The next step is to use Natural Language Processing to evaluate the content and rate the it on the similarity index by comparing it to contents gathered from other sources.

A. Architecture of the proposed system-(Flow Diagram)



The prerequisite is to scan all the images before it can be given to the system. The system will take a scanned copies of the hand written page and convert it into binary images that is black and white where 0's indicate black and 1's will represent white. The purpose of this step is to collect intensity features of each character in the image. These features will be compared to the trained dataset. If not then the found character is either scribbled or not a valid character.

Once the system iterates through the entire image, the final result will be a text document which will be in computer readable format.

Distance functions**Euclidean**

$$\sqrt{\sum_{i=1}^k (x_i - y_i)^2}$$

Manhattan

$$\sum_{i=1}^k |x_i - y_i|$$

Minkowski

$$\left(\sum_{i=1}^k (|x_i - y_i|)^q \right)^{1/q}$$

CONCLUSION

The proposed idea works theoretically, and we are working on its implementation. As mentioned earlier we are creating a data set of hand written characters and exploring the Gabor filter to create our own feature extraction filter that will specifically be used to extract important features from the input image and train the K Nearest Neighbour algorithm. Next we will be researching on Natural Language Processing to check whether the converted hand written image to computer image is grammatically makes meaningful sentences. Later on we will integrate all the modules to reach the final result that is, evaluating the scanned hand written image with the contents from the specified resources and give an output of its similarity index.

REFERENCES

- [1] Xuewen Wang, Xiaoqing Ding and Changsong Liu ,Gabor filters based feature extraction for character recognition, Pattern Recognition 38(2005) page 369-379
- [2] J. Zhang, X Ding, Multi-Scale feature extraction and nested subset classifier design for high accuracy handwritten character recognition, Proceedings of the ICPR 2000,2000
- [3] Yun-lei Cai, Duo Ji ,Dong-feng Cai ,A KNN Research Paper Classification Method Based on Shared Nearest Neighbor, Proceedings of NTCIR-8 Workshop Meeting, 2010, Tokyo, Japan