Optical Character Recognition using ANN

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Abstract - *Optical Character Recognition (OCR) is a type of PC vision that concentrates alphanumeric characters from a computerized picture. The innovation can be utilized for digitizing printed content, penmanship acknowledgment, and making computerized pictures accessible for content. Standard example acknowledgment strategies that have been effectively connected to OCR incorporate point by point worldwide correlations, worldwide changes, extraction of nearby properties, format coordinating, investigation by methods for ebbs and flows and auxiliary techniques. In any case, the use of these techniques for manually written character acknowledgment is discussable on account of the vast varieties of character shapes coming about because of composing propensities, style, training, district of starting point, social condition, state of mind, wellbeing and different states of the author. In addition, factors, for example, the composition instrument, composing surface, examining techniques, and so on likewise radically influence the effective of standard character acknowledgment calculations.*

In this paper we will discuss about to make an application interface for Optical Character Recognition that would utilize an Artificial Neural Network (ANN) as the backend to tackle the arrangement issue.

Key Words: OCR, ANN, Offline handwritten text, online handwritten text.

1. INTRODUCTION

Optical character Recognition (OCR) is a very well-considered issue in the immense territory of example acknowledgment. Its roots can be found as right on time as 1870 when a picture transmission framework was developed which utilized a variety of photocells to perceive designs. Until the center of the twentieth century OCR was essentially created as a guide to the outwardly impaired. With the appearance of computerized PCs during the 1940s, OCR was acknowledged as an information preparing approach out of the blue. The principal business OCR frameworks started to show up in the mid 1950s and soon they were being utilized by the US postal support of sort mail.

Different territories including acknowledgment of hand printing, cursive penmanship, and printed message in different contents (particularly those with an enormous number of characters) are as yet the subject of dynamic research." The real plans in OCR beginning from the moderately simpler to the most troublesome are as per the following.

- Fixed-textual style character acknowledgment is the acknowledgment of explicit textual styles (Ariel, Courier, and so forth.) of typewritten characters.

On-line character acknowledgment is the acknowledgment of single hand-drawn characters where the character picture is given as well as the planning data of each stroke.

- Handwritten character acknowledgment is the acknowledgment of single hand-drawn characters of a letter set which are detached and not written in calligraphy.
- Script acknowledgment is the acknowledgment of unlimited written by hand characters which might be associated and cursive.

The objective of this paper is to make an application interface for Optical Character Recognition that would utilize an Artificial Neural Network as the backend to take care of the arrangement issue. It was initially roused by Sural and Das (1999), which reports utilizing a multi-layer recognitions way to deal with do OCR for an Indian language, to be specific Bengali. Be that as it may, the methodology should work with English also.

2. TYPES OF OCR

OCR are of three types –

2.1 Offline Handwritten Text

A handwritten content of an individual and then is converted in to advanced configuration utilizing scanner after process of filtration is called an offline handwritten text.

2.2 Online Handwritten Text

Online transcribed content is the one composed straightforwardly on a digitized tablet consisting of stylus. The yield is an arrangement of x-y organizes that express pen position just as other data, for example, weight (applied by the essayist) and speed of composing.

2.3 Machine Printed Text

Machine is used to print the content and is quite common in our daily life. Created with help of counterbalance forms. E.g. laser printer, inkjet printer etc.

3. Uses of OCR

In order to change over the reports of various kinds we use OCR technology. It helps in converting the PDF documents and images which are captured by an technological sound camera into an editable and readable data. The OCR innovation could be used for following activities as well:

- Handling checks

- Recording library materials

Putting away records, seeking content and removing information from paper based reports.

4. Benefits and Pitfalls of OCR

OCR Technology not only offers advantages but a few shortfalls also. The advantages of the OCT are mentioned below:

- We can scan and preserve the historical documents.
- We can also convert the historical scanned documents into text which support searching feature
- OCR also facilitates obtaining the scanned data in shortest possible time and it is user friendly.

The short comings of OCR are to be known are mentioned below:

- The effectiveness of OCR diminishes if font size of the document is below 10.

- It we consider the threshold value than the necessary pixels of scanning also is compromised, hence decreasing quality.

5. Proposed Approach

The target of the paper is to build up an OCR for transcribed numeric characters and filtered picture, for example, number plate and some other checked picture. The contribution to the framework would be an examined picture content and yield would be a perceived in Computer meaningful rendition of information substance. Following were the fundamental goals of the venture.

5.1 Text lines ought to be practically straight

The sentences inputted to the OCR ought not have huge inclines. They ought to be practically straight. In spite of the

fact that the framework is sufficiently powerful to deal with lines with slants of 10-20 degrees.

5.2 Image ought to be without clamor

Another suspicion about the information picture of Hindi content ought to be without commotion. This presumption does not diminish the intricacy of the issue as this is only a piece of preprocessing module. A loud picture can be made commotion free by applying standard capacities and procedures. These were avoided because of time imperatives included.

5.3 Normalizing

Presently as we have separated the character we have to standardize the extent of the characters. There are huge varieties in the sizes of each Character henceforth we need a strategy to standardize the size. We have discovered a straightforward technique to execute the normalizing.

To comprehend this technique considers a precedent that we have extricated a character of size 7 X 8. We need to change over it to size of 10 X 10. So we make a grid of 70 X 80 by copying lines and sections. Presently we separate this 70 X 80 into sub Matrix of 7 X 8. We separate each sub lattice and figure the no. of ones in that sub lattice. On the off chance that the no. of one's is more prominent than a large portion of the measure of sub lattice we allocate 1 to relating position in standardized framework. Consequently, the yield would be a 10 X 10 lattice.
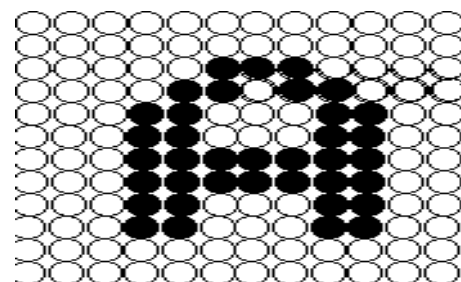

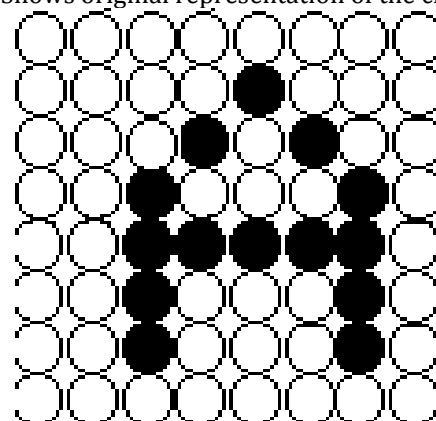**Fig-1:** Shows original representation of the character

Fig-2: Shows the Normalized Character representation after Normalizing.

5.4 Skew Detection

The Characters are regularly observed to be slanted. This would force issues on the effective character acknowledgment. So to address the impact of this skeweness we need counter pivot the picture by an edge θ. We utilize a basic however powerful procedure for Skew Correction. We use "Line Fitting" for example Direct Regression to discover the point θ Consider the Skewed character as a chart for example every one of the pixels that have esteem 1 are viewed as information focuses. At that point we perform direct relapse utilizing the condition Y = M*X +C. Utilizing the recipes for relapse we ascertain M= (n∑xiyi - ∑xi∑yi)/(n∑xi2-(∑xi)2).This edge is proportional to the slanted point so by pivoting the picture by inverse of this edge will evacuate the skewness. This is an unrefined method for evacuating skewness there are other very effective methods for expelling skewness. In any case, for Characters that have low Skew points this completes the thing. The Characters are regularly observed to be slanted. This would force issues on the productive character acknowledgment .So to address the impact of this skeweness we need counter pivot the picture by an edge θ..We utilize a straightforward yet powerful strategy for Skew Correction. We use "Line Fitting" for example Straight Regression to discover the point θ. Consider the Skewed character as a chart for example every one of the pixels that have esteem 1 are viewed as information focuses. At that point we perform straight relapse utilizing the condition Y = M*X +C. Utilizing the recipes for relapse we compute M= (n∑xiyi - ∑xi∑yi)/(n∑xi2-(∑xi)2).This point is equal to the slanted edge so by turning the picture by inverse of this edge will expel the skewness. This is an unrefined method for expelling skewness there are other profoundly productive methods for evacuating skewness. Yet, for Characters that have low Skew edges this completes the thing.

Fig-3(a): Skewed Image

Fig-3(b): Corrected Image.

6. APPLICATIONS

Given this portrayal of neural systems and how they work, what genuine applications would they say they are appropriate for? Neural systems have wide appropriateness to genuine issues. Indeed, they have just been effectively connected in numerous ventures. Neural systems have been effectively connected to wide range of information escalated applications, for example, Voice Recognition - Transcribing verbally expressed words into ASCII content.

• Target Recognition - Military application which uses video and additionally infrared picture information to decide whether an adversary target is available.

• Medical Diagnosis - Assisting specialists with their conclusion by investigating the detailed manifestations as well as picture information, for example, MRIs or X-beams.

• Process Modeling and Control - Creating a neural system model for a physical plant at that point utilizing that model to decide the best control settings for the plant.

• Credit Rating - Automatically allocating an organization's or people credit rating dependent on their money related condition.

• Targeted Marketing - Finding the arrangement of socioeconomics, which have the most astounding reaction rate for a specific promoting effort.

• Financial guaging - Using the verifiable information of a security to foresee the future development of that security. Presently we will investigate a couple of fascinating applications created over the world.

7. RESULTS

The program was thoroughly tried on around test pictures, manually written on Microsoft Paint, interface. Since the examples were written by hand the test results give a decent gauge of the exhibition of the program. GUI created as a component of this work, initial a square attracting territory is introduced to the client. The client would now be able to draw a solitary character utilizing a mouse and close the illustration region. Next, a scaled double picture of the entered character is produced on a 100×100 pixel network.

Table-1: Result of character recognition in percentage.

INPUT CHARACTER IMAGE	% SUCCESS IN RECOGNITION
KA	90
TA	60
NA	80
LA	50
PA	40
FA	80
MA	70
BHA	80
THA	70
DHA	40
GHA	60
KHA	50

8. CONCLUSION:

In this paper, we have elaborated on a system for OCR of script which is printed in English and numeric material. The recognition precision level of the prototype implementation is satisfactory but leaves some improvisation scope which will ensure good quality. If the fine-tuning is done in the system the quality would be better. So does the character segmentation is left desired to be better, so to increase its ability to address a large variety of touching parameters, which is frequent case in images obtained from low quality printed material. The actual sample size of test should have large variety of images containing different characters, different font types and fonts sizes. AS this extensive exercise could identify some loopholes in the system and will enable us to rectify and improvise it.

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