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Design and Implementation Recognition System for Handwritten Hindi/Marathi Document

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ABSTRACT: In the present scenario most of the importance is given for the “paperless office” there by more and more communication and storage of documents is performed digitally. Documents and files which are present in Hindi and Marathi languages that were once stored physically on paper are now being converted into electronic form in order to facilitate quicker additions, searches, and modifications, as well as to prolong the life of such records. Because of this, there is a great demand of such software, which automatically extracts, analyze, recognize and store information from physical documents for later retrieval. Skew detection is used for text line position determination in Digitized documents, automated page orientation, and skew angle detection for binary document images, skew detection in handwritten scripts, in compensation for Internet audio applications and in the correction of scanned documents.

I. INTRODUCTION

In the present scenario most of the importance is given for the “paperless office” there by more and more communication and storage of documents is performed digitally. Documents and files that were once stored physically on paper are now being converted into electronic form in order to get quicker additions, searches, and modifications, as well as to prolong the life of such records. Because of this, there is a great demand for software, which automatically extracts, analyze, recognize and store information from physical documents for later retrieval.

In document image processing, skew angle detection is a very important part in data processing and it's the foundation of image analysis and recognition. In image based digital identification systems, the reliability of recognition is closely related to the quality of image data. Therefore, in most real-time document image processing, skew angle should be confirmed quickly and accurately to improve the accuracy of collection and entry for document information, mean while, to reduce the rejection rate and improve reliability and adaptability of systems. Most scanners have the capabilities of automatic de-skew which can segment the skew document images from the background, However, skew is often happened due to print in practice, the result is that the images can't be de-skewed correctly. Therefore, the research about de-skew algorithm content-based of document images could better reflect the nature of the problem and have a great significance in document image processing.

The different types of skews within a document page can fall into these categories:-

- **Global Skew:** - assuming that all page text has the same skew angle.
- **Multiple-Skew:**-when certain area of the page has one angle and other have different angle.
- **Non- Uniform text line skew:** - when the skew angle is fluctuates in the page.

Skew detection is used for text line position determination in Digitized documents, automated page orientation, and skew angle detection for binary document images, skew detection in handwritten scripts and in the correction of scanned documents. The largest classes of methods for skew detection are available which based on projection profile analysis, Hough transform, nearest-neighbor clustering, Fourier- transformation, histogram analysis and Neural Network.

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In order to improve the readability and the automatic and quick recognition of handwritten Hindi and Marathi document images, preprocessing steps are imperative. These steps in addition to conventional steps of noise removal and filtering include text normalization such as baseline correction, slant normalization and skew correction and detection. These steps make the feature extraction process more reliable and effective.

II. LITERATURE REVIEW

Ruby singh , Ramandeep Kaur , "Skew Detection in Image Processing", [1] tells different methodologies for the text skew estimation in binary and gray scale images. They have been used widely for the skew identification of the printed text. Some of available algorithms provide better accuracy but they are slow in speed, others have angle limitation drawback. So a new technique for skew detection in the paper, will reduce the time and cost.

Trupti A. Jundale, Ravindra S. Hegadi, "Skew Detection and Correction of Devanagari Script Using Hough Transform", [2] tells a method for skew detection and correction of handwritten Devanagari script using Hough transformation it works at word level which is applied on each word for skew detection and rotation transformation is used for correcting that skew. If skew of the word is in positive angle then it is corrected by rotating it in clockwise and in anti-clockwise direction.

Ambica Rani, Er. Harinderpal Singh, "A Review On Various techniques for Skew Detection And Correction In Handwritten Text Documents", [3] tells skew detection and correction methods are used to align the handwritten text document by making the rectangular shape such as paragraph, text lines and tables. This new technique for skew detection will reduce the time and cost.

Tanuja K , Usha Kumari V. And Sushma T. M. , " Handwritten Hindi Character Recognition System Using Edge detection and Neural Network", [4] tells that handwritten recognition has been one of the active and challenging task. Handwritten characters are written in various curved & cursive ways with different sizes, orientations, thickness and dimensions which is most difficult task to recognize such handwritten characters by any machine. In this paper a novel technique for Handwritten Hindi Character Recognition System is implemented using Canny Edge Detection technique and artificial neural network.

A. Papandreou and B. Gatos, "A coarse to Find Skew Estimation Technique for Handwritten Words", [5] tells The estimation and correction of skew is a difficult and challenging task in handwritten word since it has to be independent of the variations due to handwriting style and writing conditions of different persons. In this paper, a coarse-to-fine technique that integrates core-region information is presented. At first, a rough estimation and correction of the skew is accomplished by cutting vertically for detecting the center of mass in each part and calculating the inclination of the line that connects the two centers of mass of the overlapping area. To detect the core-region of the word (ascenders and descenders). The inclination of the line that connects the updated centers of mass corresponds to a finer estimation of the word skew. After correcting the detected skew the last step of core-region detection and skew correction is repeated iteratively.

Mamatha Hosalli Ramappal and Shrikantamurthy Krishnamurthy, "Skew Detection, Correction and Segmentation of Handwritten Kannada Document", [6] In this paper, we have proposed schemes for skew detection and correction, segmentation of handwritten Kannada document using bounding box technique, Hough transform and contour detection respectively.

Panwar, Subhash, and Neeta Nain. "A Novel Approach of Skew Normalization for Handwritten Text Lines and Words." [7] Handwritten text recognition is an active research area for many years. Handwritten text recognition needs to perform some preprocessing steps for better recognition. The main focus of this paper is on the skew normalization of handwritten text lines and propose a new skew normalization approach which is based on orthogonal projection of the segmented line with respect to x-axis. The algorithm detects the exact skew angle, and corrects it efficiently.

Manjunath , G. Hemantha, and P. Shivakumara, "Skew Detection technique for Binary Document Images based on Hough Transform", [8] In this paper, a novel skew detection method is presented for binary document images. The method considered the some selected characters of the text which may be subjected to thinning and Hough transform to estimate skew angle accurately.

Li, Yi, Yefeng Zheng, and David Doermann. "Detecting text lines in handwritten documents." [9] detecting text line is still a challenge to segment handwritten text lines in the general sense given no prior knowledge of script. image

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segmentation problem by enhancing text line structures using a Gaussian window and adopting the level set method to evolve text line boundaries.

P. Shivakumara, G. H. Kumar, D. S. Guru and P. Nagabhushan, "A novel technique for estimation of skew in binary text document images based on linear regression analysis", [10] Variations in inter-line gaps and skewed or curled text-lines are some of the challenging issues in segmentation of handwritten text-lines. Moreover, overlapping and touching text-lines that frequently appear in unconstrained handwritten text documents significantly increase segmentation complexities.

V. N. M. Aradhya, "Document Skew Estimation: An Approach based on Wavelets", [11] Document skew estimation refers to the process of finding the angle of inclination made by the document with respect to horizontal axis. In this paper, we present a novel scheme for estimating document skew based on Wavelets.

III. PROPOSED WORK

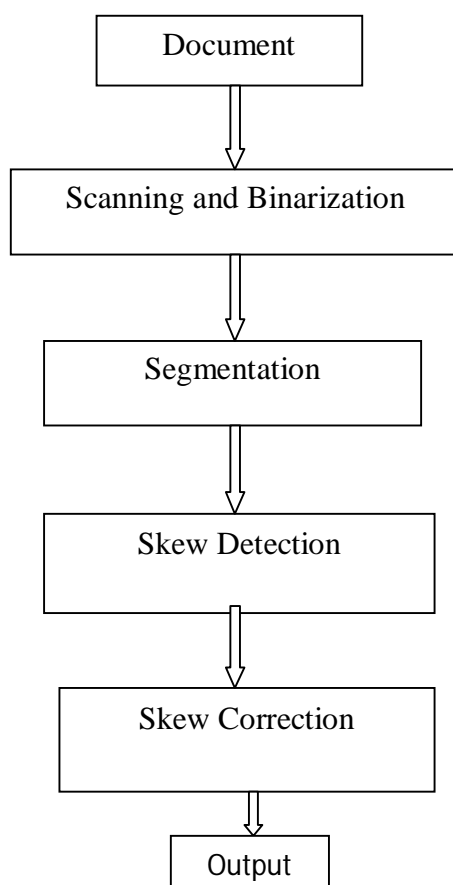


Fig: 1 Proposed System

The proposed methodology of the project includes 5 steps which are input document, pre-processing, segmentation, skew detection and at last skew correction. So that we can recognize scanned handwritten text document accurately.

The handwritten text document can take as an input for this process. This is a first step of this workflow. In which we can take that handwritten text document of Hindi and Marathi languages. The next pre-processing phase converts RGB to Gray scale, then thresholding is applied over for converting given image into binary image containing black and white pixels. In this binarization we can remove the noise separating black as foreground and white as background.

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background pixel. Segmentation is the process of partitioning a digital text image into multiple segments. The goal of segmentation is to simplify or change the representation of an image into something that is more meaningful and easier to analyze. Successful segmentation of word gives more accurate result of skew correction. In this process of skew detection there are some methods are presents which are Hough transformation, nearest-neighbor clustering, Fourier-transformation, neural network. By using Neural Network method the skew get detected. This angle in between 1-3 degree the it get neglected and the angle is above the 5 degree are go to next stage that is skew correction. After the detection of skew angle this angle gets corrected by using the skew correction technique. So, we can use pixel orientation technique to do the skew correction because, this technique is concentrated on the pixel. Due to this reliability and accuracy to recognition of handwritten document is improved.

IV. CONCLUSION

As you all know that handwritten documents in Marathi and Hindi or any language are very difficult to maintain an to store for life long. So it is more important to convert that handwritten text document in digitalize form. So that we can easily perform operation on that handwritten document. To do digitalization we can use the scanning, binarization, segmentation, skew detection, skew correction processes. It gives accuracy and reliability in skew angel detection an correction process.

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