International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 04 | Apr 2021 www.irjet.net p-ISSN: 2395-0072

# Lens Scanner System

**Kanchan Thakur[1], Rutuja Pawar[2], Swapnali Pise[3], Mayuri Lonkar[4]**

[5]***Prof.Hod. Sayali Shivarkar***, *Dept. of Computer Engineering, Dhole Patil College of Engineering, Maharashtra, India.*

---

**Abstract -** Lens Scanner System is the System of scanning images of handwritten, typewritten, or printed text into a PDF format. Concept of OCR Optical Character Recognition is used for same. The purposes of Optical Character Recognition are editing, indexing/searching, and reduction in storage size. This is achieved by first scanning the photo of the text character-by-character, then it is followed by analysis of the scanned image, and finally the translation of the character image into character codes. In this paper, we have used segmentation algorithm to divide the image into lines, words and then characters. Survey towards recognition of characters using different algorithm and perspective of researchers worked in this field is basis of this paper.

**Keywords**: OCR, CNN, Handwritten, SVM, ANN

## I. INTRODUCTION

Humans compose documents to record and preserve information. As information carrying vehicles, documents are written using different layouts to represent diverse sets of information for a variety of different consumers. In this work, we look at the problem of document understanding for documents written in English. Here, we take the term document understanding to mean the automated process of reading, interpreting, and extracting information from the written text and illustrated figures contained within a document's pages. Optical Character Recognition (OCR) is a piece of software that converts printed text and images into digitized form such that it can be manipulated by machine. Unlike human brain which has the capability to very easily recognize the text/ characters from an image, machines are not intelligent enough to perceive the information available in image. Therefore, a large number of research efforts have been put forward that attempts to transform a document image to format such as PDF. OCR is a complex problem because of the variety of languages, fonts and styles in which text can be written, and the complex rules of languages etc. Hence, techniques from different disciplines of computer science (i.e. image processing, pattern classification and natural language processing etc. are employed to address different challenges. This paper introduces the reader to the problem. It enlightens the reader with the historical perspectives, applications, challenges and techniques of OCR.

Many improvements are occurring in the area of Deep Learning. OCR is one of the active areas in where Deep Neural Network is used. Recognition of handwriting is not much difficult process for humans. It is a complicated process in case of computers. The reason is that handwriting varies between person to person and there are various characters. OCR is the fascinating area where the pattern recognition and image processing is used. The real time application of OCR includes Automatic number plate recognition, transforming the handwritten document into the structural text form, etc. The aim of OCR is to identify the digits, characters and special symbols. There are various steps which are to be carried out. They are Pre-processing, Scale Region Detection, Segmentation, Classification. In this process, we can use MATLAB toolbox which help us to identify the parameters. OCR is an electronic or mechanical conversion of typed images or, printed text or handwritten into machine encoded text. It is used as data entry from the data records of the printed paper, whether passport documents, printouts of static data, bank statements, computerized receipts, documentation or mail.

## II. LITERATURE SURVEY

### A. Image processing based optical character recognition using MATLAB

Character Recognition is one of the vital tasks in Pattern Recognition. Character recognition techniques associate a symbolic identity with the image of character. In a typical OCR system input characters are digitized by an optical scanner. Each character is then located and segmented, and the resulting character image is fed into a pre-processor for noise reduction and normalization. Certain characteristics are the extracted from the character for classification. The feature extraction is critical and many different techniques exist, each having its strengths and weaknesses. After classification the identified characters are grouped to reconstruct the original symbol strings, and context may then be applied to detect and correct errors.

### B. Improved Optical Character Recognition with Deep Neural Network

Optical Character Recognition (OCR) plays an important role in the retrieval of information from pixel-based images to searchable and machine-editable text formats. In old or poorly printed documents, printed characters are typically broken and blurred, making character recognition potentially far more complex. In this work, deep

neural network using Inception V3 is used to train and perform OCR. The Inception V3 network is trained with 53,342 noisy character images, which were collected from receipts and newspapers. Our experimental results show that the proposed deep neural network achieved significantly better recognition accuracy on poor quality text images [4]

### C. Assistance Vision for Blind People Using K-NN Algorithm and Raspberry Pi

Authors researched for blind people by providing them assistance for reading text from the documents and papers. They divided the process into 3 main stages Training the data, testing the data i.e classification using KNN and then text to speech conversion of the recognized data. Raspberry Pi was chosen as the hardware interface.

### D. Detecting text lines in handwritten documents.

Authors have experimented on a method to detect text lines in a handwritten document. They have blurred the image in the horizontal direction for multiple times and then thresholded the image so that the words get connected with each other. They then took the thresholded image and grouped them. Each group is a line. There may be some cases that the text has more separation between words. In those cases, the line is segmented. They have used thresholding to find if the two segments are in the same line or different lines.

### E. Handwritten English Character Recognition using Neural Network.

Neural Networks are being used in different kinds of pattern recognition. Handwriting varies from person to person. Therefore, it is tedious to recognize handwritten characters. In handwritten character recognition, Neural network plays an important role. In this paper, for English character recognition the developmental outcome shows that the way used gives better recognition accuracy and reduced training time.

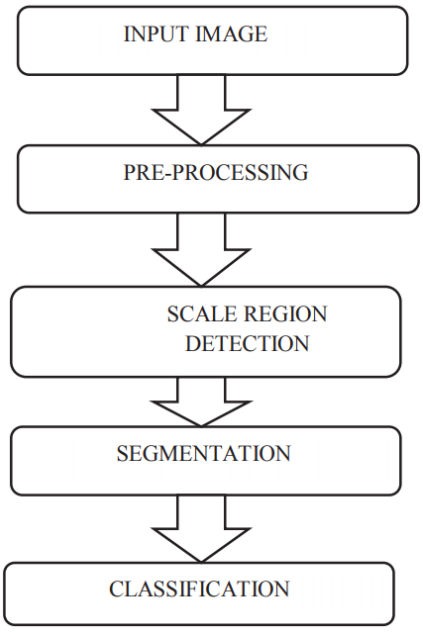
### F. Arduino Object Follower with Augmented Reality

This paper proposes that using handheld devices documents which contains camera captured images containing texts can be recognized using Optical Character Recognition (OCR) system. Initially, the text regions of the image are extracted and skew corrected. After binarizing these regions, they segmented into lines and characters.

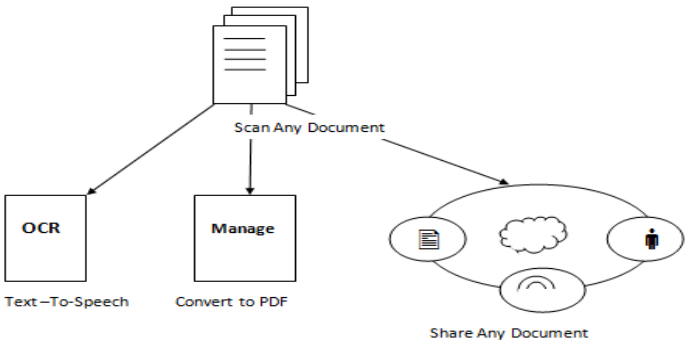
### G. Implementation of Randomized Test Pattern

In the recognition module the characters are passed. The maximum recognition accuracy of 92.74% is obtained when captured using cell phone camera. This technique consumes low memory and computationally efficient and hence applicable on handheld devices.

## III. System Flow




## IV. System Architecture




## V. Algorithm

The traditional neural network is not capable of dealing with images. Consider in case of the regular network, imagine each pixel is connected to one neuron and there will be thousands of neurons which will be computationally expensive. Convolutional Neural Network (CNN) handles images in different ways, but still, it follows the general concept of Neural Network. In

constructing the CNN, it mainly consists of three parts – Convolution, Polling, Flattening. The fundamental purpose of convolution is to select characteristics from the input image. It conserves the spatial relationship between pixels by learning image characteristics using small squares of input data. The output obtained is a matrix known as the feature map. A further operation called ReLU is used after every convolution operation. The next step is of Pooling which is also known as sub-sampling or down-sampling. Pooling reduces the length of each feature map but maintains the most important information. In Max Pooling, it defines a spatial neighbourhood and takes the biggest element from the rectified feature map within that window. The other method is to take the average of all elements in that window. After pooling, next stage comes is flattening. In this step, the matrix is converted into a linear array so that to input it into the nodes of the neural network. The full connection is connecting a convolutional network to a neural network and then compiling network. The usage of CNN helps in minimizing the number of parameters needed for images. It also helps to do the parameter sharing as it can possess translation invariance.

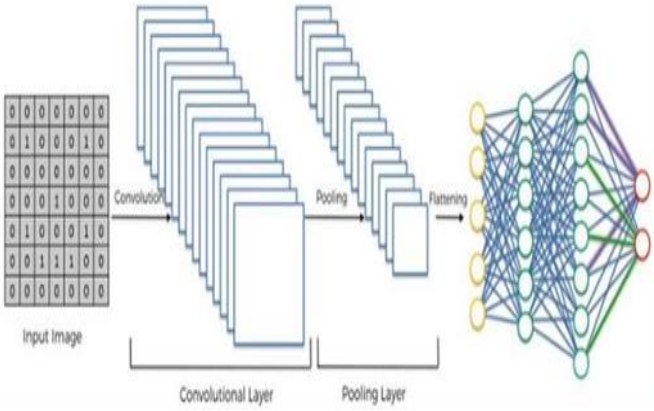



Fig 3: CNN (source Medium)

## VI. CONCLUSION AND FUTURE WORK

In this paper, for system we studied various algorithms which has been already implemented. Using these algorithms, recognition of characters has been done but still having some chances for the improvements in the existing accuracy and efficiency. In order to obtain an accurate result, successful method should be used and this can be done with the help of Deep Neural Network we focused on converting an image to text format. We explored the use various image processing algorithms like thresholding, gaussian blur, median blur, contour detection, etc and a machine learning algorithm.

## VII. REFERENCES

1) Kaiming He, Xiangyu Zhang, Shaoqing Ren, and Jian Sun. Spatial pyramid pooling in deep convolutional networks for visual recognition. In European Conference on Computer Vision, pages 346–361. Springer,2014

2) M. F. Kader and K. Deb, "Neural network based English alphanumeric character recognition", International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.2, No.4, August 2012.

3) Jyoti Dalal and Sumiran Daiya "Image Processing Based Optical Character Recognition Using MATLAB" International Journal of Engineering Sciences & Research Technology, ISSN: 2277-9655, CODEN: IJESS7, Dalal et al., 7(5): May, 2018

4) Tan Chiang Wei, U. U. Sheikh, Ab Al-Hadi Ab Rahman. "Improved Optical Character Recognition with Deep Neural Network", 2018 IEEE 14th International Colloquium on Signal Processing & its Applications (CSPA 2018), 9 -10 March 2018

5) P. Satyanarayana, K. Sujitha, V. Sai Anitha Kiron, P. Ajitha Reddy and M. Ganesh, "Assistance Vision for Blind People Using *k-nn Algorithm and Raspberry Pi",* Proceedings of 2nd International Conference on Micro-Electronics Electromagnetics and Telecommunications*, pp. 113-122, 2017.*

6) Li, Yi, Yefeng Zheng, and David Doermann. "Detecting text lines in handwritten documents." In *18th International Conference on Pattern Recognition (ICPR'06)*, vol. 2, pp. 1030-1033. IEEE, 2006.

7) A. Pal and D. Singh, "Handwritten English Character Recognition using Neural Network", International Journal of Computer Science & Communication, Vol. 1, No. 2, July-December 2010, pp. 141- 144

8) Prem Jacob, T; Pravin, A; Asha, P. Arduino Object Follower with Augmented Reality. International Journal of Engineering & Technology, [S.l.], v. 7, n. 3.27, p. 108-110, aug.2018. ISSN 2227- 524X, doi:http://dx.doi.org/10.14419/ijet.v7i3.27.17665.

9) Dr. T. Prem Jacob, Implementation of Randomized Test Pattern Generation Strategy, Journal of Theoretical and Applied Information Technology 10th March 2015. Vol.73 No.1.