Scandroid: A Machine Learning Approach for Understanding Handwritten Notes.

Mukund Kulkarni[1], Swapnil Vhaile[2], Niranjan Doiphode[3], Chandan Prasad[4], Anish Varghese[5]

[1,2,3]Trainee of Android App Developer (TSSDC, Pune)
[4]Android Master Trainer (TSSDC, Pune)
[5]Hospitality Master Trainer (TSSDC, Pune)

---***---

Abstract - *Notes and information plays a very crucial role in Indian society in every profession. Over centuries, the growth of English contributed to the rise of civilizations. This research paper covers major challenges faced by people in India. It includes involvement of quick knowledge transfer. Although, the English language is not the main language in India, it is used mostly by the professionals. This research is about focusing on professionals reducing their human efforts in copying the handwritten notes. The proposed idea would ensure surely maximum accuracy in scanning the words by considering various factors such as focusing on machine learning, different strokes, style of writing decision making on these facts for proper text recognition, having implemented algorithms such as SVM, Naïve Bayes. The entire proposed system will be available free of cost. Taking into consideration various factors, professionals will get best support in knowledge transfer leading to better outcome in both information gain and effort spent. In other words, real development in terms of knowledge transfer shared by all sections of professionals has not taken place. Here is where, this scandroid comes into picture.*

Key Words: **Scanning, OCR, Machine learning, Gesture**.

1. INTRODUCTION

In this world of technology, it is also necessary to introduce technology in the most important part of life i.e. knowledge transfer. Imagine a bunch of notes you have to copy giving it a single thought also seems to be so tiresome. So, thinking of all the efforts which a professional has to put in to copy notes, we gave this automated scanning a shot. Under these circumstances, the professional would get all the information related to his domain on his mobile. Information includes everything related to their domain with help of knowledge transfer by their superior.

In the current environment we need a system which is able to analyses all the attributes which are necessary for professionals such as scanning important Documents, scanning important QR codes, scanning handwritten notes.

2. LITERATURE SURVEY

Before the start of the project we had shepherded the following investigation on different things.

They are as follows:

- To develop an efficient method which uses a custom image to train classifier
  OCR classifying image's contents as characters specifically letters and digits by extracting distinct feature from image. They have use KNN algorithm because of its higher accuracy over non-linear multiclass problems. KNN algorithm used for its easy interpretation and low computation time. There were some limitations to this algorithm like distance-based learning was not clear which type of distance to be used and which attribute to be used to produced best result. Also, computation cost was quite high due to compute distance of each query instance of all training samples.

- The well-known methods for text recognition from images.
  Describing the overall architecture of text recognition system and how text recognition system works. They have also explained different pre-processing operation to improve quality of the input image, image such as noise removal, normalization, and binarization. The different methods they discussed such as Hidden Markov Model based system for English HCR, neural network-based classification of handwritten character recognition system, HCR using associative memory net (AMN), fuzzy membership function-based approach for HC, and single layer neural network for HCR, etc.

- Discussing various optical character recognition techniques that is used for various character recognition
  Optical character recognition is a technique in which a scanned images or handwritten notes are converted into digital format. Optical Character Recognition consists of various stages includes pre-processing, Classification, Post Acquisition, Pre-Level processing, Segmented Processing, Post-Level processing, Feature Extraction.

- Proposing a fast and robust skew estimation method.
  This method is based on low-rank matrix decomposition. Many document image analysis methods such as page layout analysis and optical

character recognition are sensitive to the skew angle of a document. Hence, skew correction of scanned document is important for document analysis and recognition. The method effectively overcame corruptions, such as lines, sphere and so on.

- Presenting a new approach for enhancing the character recognition in degraded historical documents. There are several commercial tools for Automatic optical character recognition in document processing. There is still a lot to be improved due to presence of degradation and noise. This paper presented system for improving the correct transcription rate of historical documents which are damaged by physical noises. The pre-processing scheme have four modules such as Noise Classification, filter Database, Feature Extraction, Image Segmentation The system automatically detects the damaged area. When text is segmented, they are associated with blocks which are replaced with characters of same group of features that increase the probability of being the original damaged character. Dictionary look-up decides which chosen as the most likely transcription.
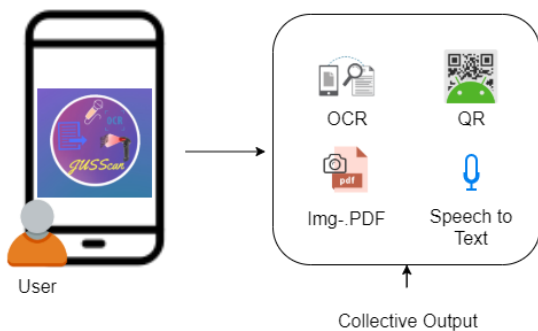
3. EXISTING SYSTEM

Fig 1- Existing System Architecture

A very lightweight application for converting

Your favorite images to pdfs also it gives you the feature of converting your voice and images to text, additionally you can save the information locally.

"So forget your paper and pen .....need not worry you've got JUSScan."

4. PROPOSED SYSTEM

We propose a novel system which is a composition of machine learning. In the proposed system with the help of classification algorithm we able to take the decision on the selected features. Machine learning approach in which we are focusing on attributes of strokes, style of writing, curves, straight lines, circles, slanted lines and features which are

able to do various things. We are going to use systems which are:

- QR scanner
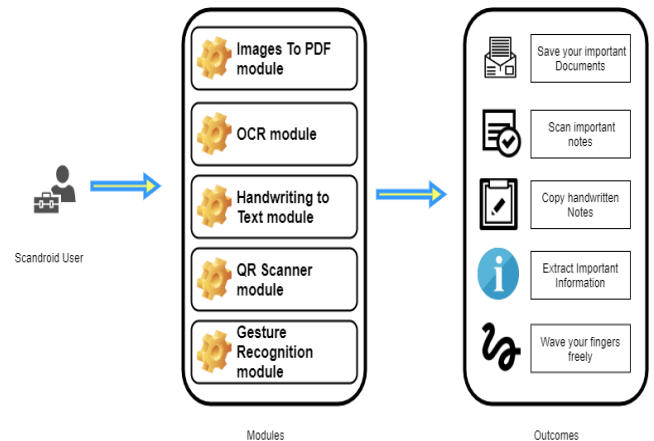- Typed OCR
- Handwritten OCR
- Image to PDF

Fig 2- Proposed System Architecture

A) QR scanner

The scanner functioning base is the inbuilt system libraries that recite across the android. The QR contains critical information such as product details information on the product. The scanner registers all the information on desired document PDF, word or text document.

B) Typed OCR

Printed text recognition

C) Handwritten OCR

Handwritten text recognition

D) Images to PDF

This converts images, which may be important documents, into Portable Document format

5. CONCLUSION

By implementing Scandroid, we can improve the traditional way of knowledge transfer in different region of India. The system will improve the topology assembly to make all notes portable and easily transferable, also to improve the optical character recognition with the help of machine learning. Especially, it is a step towards better learning and quick knowledge transfer based on OCR with the ability to make professionals well equipped by all the tools to face their challenges in this competitive world.

REFERENCES

[1] Tapan Kumar Hazra, Dhirendra Pratap Singh, Nikunj Daga 'Optical Character Recognition using KNN on Custom Image Dataset'2017.

[2] S. Deivalakshmi 'Removal of Border Noise, show through and Shadow Correction in Irregularly Illuminated Scanned Document'2017.

[3] Pratik Madhukar, Dr. Kavita R. Singh 'A Technical Review on Text Recognition from Images'2015.

[4] Jian Yuan, Yi Zhang, Kok Kiong Tan, Tong Heng Lee 'Text Extraction from Images Captured via Mobile and Digital Devices' 2009.

[5] Chu-Sing, Yang, Yung Hsuan, Yang 'Improved local binary pattern for real scene optical character recognition'2017.

[6] Abin M Sabu, Anto Sahaya Das 'A Survey on various Optical Character Recognition Techniques'2018.

[7] Kajaree Das, Rabi Narayan Behera 'A Survey on Machine Learning: Concept, Algorithms and Applications'2017.

[8] Ayon Dey 'Machine Learning Algorithms: A Review'2016.

[9] Heng-You Wang, Rui-Zhen Zhao, Jing-A Cui 'Fast and Ro3bust Skew Correction in Scanned Document Images Based On Low-Rank Matrix Decompositon'2014.

[10] Gabriel Pereira e Silva, Rafael Dueire Lins 'An Automatic Method for Enhancing Character Recognition in Degraded Historical Documents'2011.

BIOGRAPHIES

Name: Mukund Kulkarni
Qualification: B.E Computer Engineering, Trainee of Android App Developer at Tata Strive.

Name: Swapnil Vhaile
Qualification: B.E Computer Engineering, Trainee of Android App Developer at Tata Strive.

Name: Swapnil Vhaile
Qualification: BSc Computer. Trainee of Android App Developer at Tata Strive.

Name: Chandan Prasad
Qualification: M.E Computer Engineering, Android Master Trainer TSSC, (NSDC), Facilitator at Tata Strive.

Name: Anish Varghese
Qualification: BSc in Hotel Management and Catering Technology, Hospitality Master Trainer THSC, (NSDC), Facilitator at Tata Strive.