**Imperial Journal of Interdisciplinary Research (IJIR)**
**Vol-3, Issue-4, 2017**
**ISSN: 2454-1362,** http://www.onlinejournal.in

# A Brief Review on Text Traces using OCR

Anuj Garg[*], Amal Rastogi[*], Kartik Rastogi[*], Dr. Avdhesh Gupta[#]
Bachelor in Technology, Computer Science Engineering, IMSEC Ghaziabad[*]
Associate Professor, Department of Computer Science Engineering, IMSEC Ghaziabad[#]

***Abstract:*** *In this paper, we propose the technology for text recognition using Optical Character Recognition (OCR) for the mobile phone application. The camera within android mobile phone scan the text written on document and then the OCR is applied which can easily recognized the text written on that document with various languages. OCR is the machine replication of human reading and has been the subject of intensive research for more than three decades. OCR can be described as mechanical or electronic conversion of scanned text where text can be handwritten, typewritten or printed form. It is a method of digitizing printed texts so that it can be electronically searched and used in various machine processes. It converts the images into machine-encoded text that can be used in machine translation, text-to-speech and text mining.*

***Keywords:*** *OCR technology, Character recognition, Mobile phone, Android.*

## 1. INTRODUCTION

Most of the character recognition program will be recognized through the input image with a scanner or a digital camera and computer software. There is a problem in the spatial size of the computer and scanner. If you do not have a scanner and a digital camera, a hardware problem occurs. In order to overcome the limitations of computer occupying a large space, character recognition system based on mobile phone is proposed.

Character recognition application developed by mobile phones with an emphasis on mobility and portability, spatial, hardware, financial limitations can be solved. But because the performances of smart phone and computer are different, the speed of massive character recognition is different but hardware speeds up the development of mobiles phones. In this paper, the character recognition method is presented by using OCR technology and mobile phone to first scan the text and then convert it into speech.

## 2. OCR ON MOBILE PHONES

Our interest is in enabling OCR on mobile phones. Mobile phones are one of the most commonly used electronic devices today. Commodity mobile phones with powerful microprocessors, high resolution cameras, and a variety of embedded sensors (accelerometers, compass, GPS) are widely deployed and becoming global. By fully exploiting these advantages, mobile phones are becoming powerful portable computing platforms, and therefore can process computing intensive programs in real time.

In this paper, we explore the possibility to build a OCR-based application on mobile phones. We believe this mobile solution to extract information from physical world is a good match for future trend. However, camera-captured documents have some drawbacks. They suffer a lot from focus loss, uneven document lighting, and geometrical distortions, such as text skew, bad orientation, and text misalignment.

## 3. OCR HISTORY

Most people think getting machines to read human text is a relatively recent innovation, but it's older than you might suppose. Here's a whistle-stop tour through OCR history:

**1928/9:** Gustav Tauschek of Vienna, Austria patents a basic OCR "reading machine." Paul Handel of General Electric files a patent for a similar system in the United States in April 1931. Both are based on the idea of using light-detecting photocells to recognize patterns on paper or card.

**1949:** L.E. Flory and W.S. Pike of RCA Laboratories develop a photocell-based machine that can read text to blind people at a rate of 60 words per minute. (Read all about it in the February 1949 issue of Popular Science.)

**1950:** David H. Shepard develops machines that can turn printed information into machine-readable form for the US military and later founds a pioneering OCR company called Intelligent Machines Research (IMR). Shepherd also develops a machine-readable font called Farrington B (also called OCR-7B and 7B-OCR), now widely used to print the embossed numbers on credit cards.

**1960:** Lawrence (Larry) Roberts, a computer graphics researcher working at MIT, develops early text recognition using specially simplified fonts such as OCR-A.

**1950s/1960s:** Reader's Digest and RCA work together to develop some of the first commercial OCR systems.

**1974:** Raymond Kurzweil develops the Kurzweil Reading Machine (KRM) that combines a flatbed scanner and speech synthesizer in a machine that can read printed pages aloud to blind people. Kurzweil's OCR software is acquired by Xerox and marketed under the names ScanSoft and (later) Nuance Communications.

**1993:** The Apple Newton MessagePad (PDA) is one of the first handheld computers to feature handwriting recognition on a touch-sensitive screen. During the 1990s, handwriting recognition becomes an increasingly popular feature on cellphones.

**2000:** Researchers at Carnegie Mellon University flip the problem of developing a good OCR system on its head and develop a spam-busting system called CAPTCHA.

## 4. TYPES OF RECOGNITION

OCR is generally an "offline" process, which analyzes a static document. Handwriting movement analysis can be used as input to handwriting recognition. Instead of simply using the shapes of glyphs and words, this technique is able to capture motions, such as the order in which segments are drawn, the direction, and the pattern of putting the pen down and lifting it. This additional information can make the end-to-end process more accurate. This technology is also known as "on-line character recognition", "dynamic character recognition", "real-time character recognition", and "intelligent character recognition".

The types of recognition that are generally used for text and word recognition in mobile phones.[1]

### 4.1. Optical character recognition (OCR)

Targets typewritten text, one glyph or character at a time.

### 4.2. Optical word recognition (OWR)

Targets typewritten text, one word at a time and used for languages that use a space as a word divider (Usually just called "OCR").

### 4.3. Intelligent character recognition (ICR)

Targets handwritten print script or cursive text one character at a time, usually involving machine learning.

### 4.4. Intelligent word recognition (IWR)

Targets handwritten print script or cursive text, one word at a time. This is especially useful for languages where glyphs are not separated in cursive script.

## 5. OCR ALGORITHM

There are two basic types of core OCR algorithm, which may use to recognize the characters.

### 5.1. Matrix matching [3]

Matrix matching involves comparing an image to a stored character on a pixel-by-pixel basis, it is also known as "pattern matching" or "pattern recognition".

This relies on the input character being correctly isolated from the rest of the image, and on the stored character being in a similar font and at the same scale.

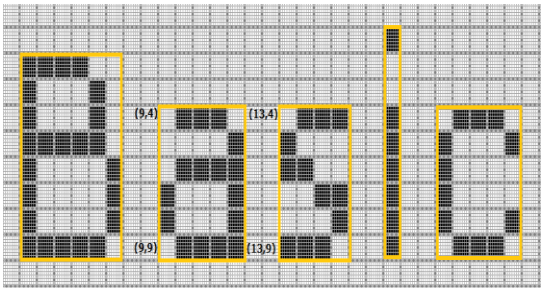


**Fig 5.1.1. Matrix matching** [3]

This technique works best with typewritten text and does not work well when new fonts are encountered.

### 5.2 Feature extraction [4]

Feature extraction decomposes characters into "features" like lines, closed loops, line direction, and line intersections. These are compared with an abstract vector-like representation of a character, which might reduce to one or more character prototypes. General techniques of feature detection in computer vision are applicable to this type of OCR, which is commonly seen in "intelligent" handwriting recognition and indeed most modern OCR software. Nearest neighbour classifiers such as the k-nearest neighbour's algorithm are used to compare image features with stored character features and choose the nearest match.

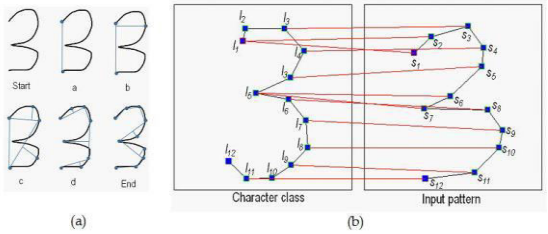


**Fig 5.2.1. Feature extraction** [4]

## 6. TEXT STRUCTURE

The Text Recognizer segments text into blocks, lines, and words. Roughly speaking:

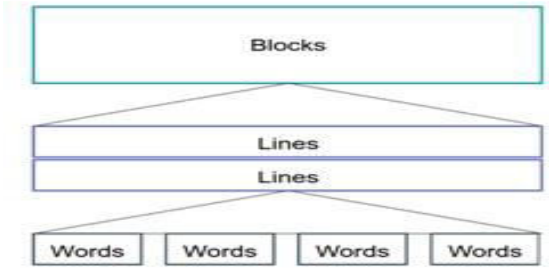


**Fig 6.1. Text structure**

6.1. **Block** is a contiguous set of text lines, such as a paragraph or column,
6.2. **Line** is a contiguous set of words on the same vertical axis, and
6.3. **Word** is a contiguous set of alphanumeric characters on the same vertical axis.

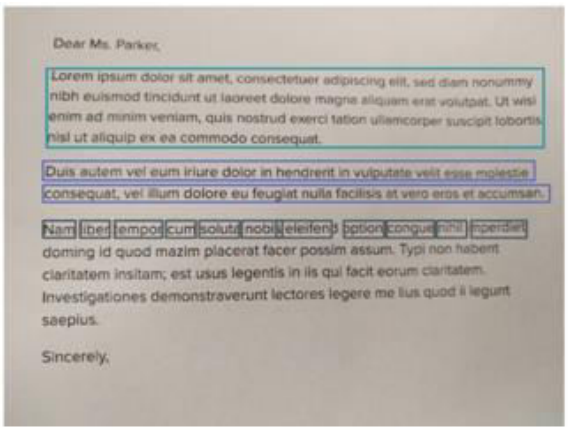


**Fig 6.2. Text structure**

The image above highlights examples of each of these in descending order. The first highlighted block, is a Block of text. The second set of highlighted blocks is Lines of text. Finally, the third sets of highlighted blocks, in dark are Words.

## 7. DATA FLOW DIAGRAMS [5]

The DFD serves two purposes:

7.1. To provide an indication of how data are transformed as they move through the system.
7.2. To depict the function and sub-functions that transforms the data.

They serve as basis for the functional as well as information flow modelling.

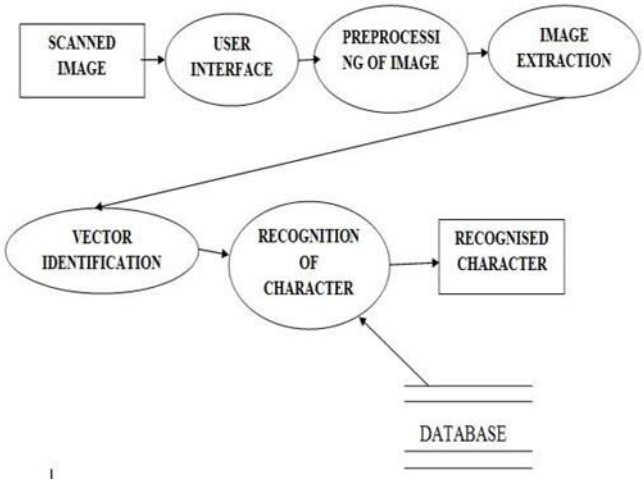


**Fig 7.1. Level 1 DFD** [5]

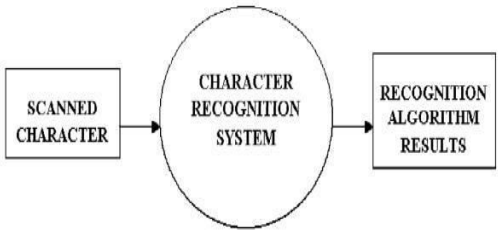


**Fig 7.2. Level 0 DFD** [5]

## 8. CONCLUSION

In this paper, character recognition system was implemented by using the Android mobile phones. The implementation process of the system was described to recognize the characters in the document using the camera screen. Document data scan by a mobile phone can be compared with the database of the system, then the characters can be recognized, the recognized character can be used to take advantage in various form. It can be used in machine translation, text-to-speech and text mining.

## 9. REFERENCES

1. Parker J., Algorithms for Image Processing and Computer Vision, John Wiley & Sons Inc, 1996.

2. A. A. Tayade, Prof.R.V.Mante, Dr. P. N. Chatur, "Text Recognition and Translation Application for Smartphone", Vol. 2, Issue 6, November 2013.

3.http://www.codeproject.com/Articles/476142/Optical-Character-Recognition.

4. http://www.intechopen.com/books/advances-in-character-recognition/online-handwritten-chinese-japanese-character-recognition.

5. Shalin A. Chopra, Amit A. Ghadge, Onkar A. Padwal, Karan S. Punjabi, Prof. Gandhali S.

Gurjar, "Optical Character Recognition", Vol. 3, Issue 1, January 2014.

6. Er. Neetu Bhatia, Optical Character Recognition Techniques: A Review, Volume 4, Issue 5, May 2014.

7. Derek Ma, Qiuhau Lin, Tong Zhang, "Mobile Camera Based Text Detection and Translation".

8.http://www.explainthatstuff.com/how-ocr-works.html.

9. Soon-kak Kwon, Hyun-jun An, Young-hwan Choi, "Character Recognition System Based on Android Smart Phone", Vol.2, Issue.6, Nov-Dec. 2012 pp-4091-4093.