**TXT SCAN**

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**ABSTRACT**

Data entry has been a hectic job since the era of data accumulation started. Apparently, that is why there is a full-fledged career in data entry. Data entry method varies with requirements. Early days of computers relied on punch cards and gradually keyboards and mouse came into picture which we still use. Touchscreens didn’t take much time to replace the physical keyboard inputs and now as the result of human intelligence and innovation, the era of the optical input is here. Where the user does not even have to take the pain of thinking about entering data but can simply use an optical reader or scanner to input data. Using the computational power the individual elements like text, images, and special characters can be distinguished. OCR-Optical Character Recognizer does the work. OCR works similar to humans when it comes to character recognition as it maintains a database of characters and compares all the scanned elements with the database which makes it really simple to understand. This paper explains the working of an OCR in its different stages. That study helps in finding the various drawbacks of the conventional system. The paper also tells about how those shortcomings can be eliminated and how a better OCR that is future ready can be achieved.

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**INTRODUCTION**

OCR stands for “Optical Character Recognition”, It came into its technical existence in the 20th century since the time scientists and researchers thought of it. The human brain has been using a similar technique to communicate & to create languages since the existence of mankind. The human brain has an ability to recognize and analyze shapes and sizes, with the help of this humans have that eminent capability which distinguishes human race from other living beings and is the major cause of this huge evolution from cavemen to urban and social man.

The OCR system uses a camera which acts like a human eye which that reads the characters from the selected input source in the form light and then the computations are done on the processors of OCR which just does the work of human brain’s character recognition. The output of the OCR varies from system to system, it can be in form of text, speech or even image [1].

The most basic idea behind developing a machine was evolution and help of mankind. In the early 20th century this simple looking but the really complex mechanism was put into its technical and non-living form by putting the similar logic into a machine.

**CONCEPTS AND TECHNOLOGY USED**

Android provides a rich application framework that allows you to build innovative apps and games for mobile devices in a Java language environment. The documents listed in the left navigation provide details about how to build apps using Android's various APIs.

If you're new to Android development, it's important that you understand the following fundamental concepts about the Android app framework:

#### Apps provide multiple entry points

Android apps are built as a combination of distinct components that can be invoked individually. For instance, an individual activity provides a single screen for a user interface, and a service independently performs work in the background.

From one component you can start another component using an intent. You can even start a component in a different app, such as an activity in a maps app to show an address. This model provides multiple entry points for a single app and allows any app to behave as a user's "default" for an action that other apps may invoke.

#### Apps adapt to different devices

Android provides an adaptive app framework that allows you to provide unique resources for different device configurations. For example, you can create different XML layout files for different screen sizes and the system determines which layout to apply based on the current device's screen size.

You can query the availability of device features at runtime if any app features require specific hardware such as a camera. If necessary, you can also declare features your app requires so app markets such as Google Play Store do not allow installation on devices that do not support that feature

**Modules of an OCR system**

* *Pre-Processing*:

As the very first step of using OCR system the camera or scanner or any other optical input device clicks a picture or the document then converts that picture to grayscale popularly Black and White. While doing so it removes all the extra things like images, logos, lines and dust particles or stains on the page or document if any, it converts any shades or colors of black or grey to just black and white leaving a more clear picture which just has text on it in black and white color [3].

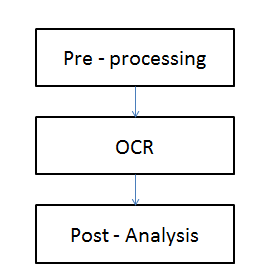


Figure 2. Workflow outline of OCR System

* *Character Recognition:*

The pre-processed image is then taken for character recognition where the individual characters on the captured image are separated.

This is the point at which OCR systems are primarily distinguished. OCR’s can do this in two ways:

* Examining resemblance with characters in database:

In this method of character recognition pixels of individual characters are compared with a database of a known font which helps the system decide which character it is.

This system has a limitation too. The database comparison method isn’t able to recognize the words that are in a different font or are written by hand in some cases as not everybody on this planet has the same yet perfect handwriting.

* Intelligent character recognition system:

This system overcomes the shortcomings of simple yet not so useful method of comparing with a database of a known font.

The Intelligent character recognition system compares the attributes like curves, angles, sizes, corners of characters on the pre-processed image with the template of characters. The template with the maximum number of matched character is considered to be the character on the image. In this way whatsoever the font type or size is the OCR system will be able to recognize the characters[4].

The intelligent system was improved by adding a dictionary to it. So that it not only recognizes characters out of the pre-processed images but also just picks up the meaningful words out of those characters [6].

E.g. ‘I’ and ‘l’ might seem similar but the first one is capital ‘I’ and the other one is small ‘L’. Using dictionary system can make out if it is ‘LOOK’ or ‘IOOK’.

Note: This document primarily focuses on the 1st type of system.

* *Post Processing:*

Once the characters are recognized and words are formed at the logical level the system prepares the document in the desired form whether it be an image, pdf or text file. The point that is to be noted is that the final document is yet to be displayed to the user so post-processing should not be considered as the final output of the system.

* *Output*:

After passing through the post-processing stage the input image gets converted into a document, image or a PDF depending upon the type of OCR system used or the user’s requirement.

Depending upon the type of OCR used the output might or might not be in formats where editing can be done (Text document) or not.

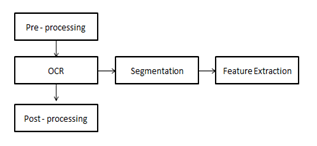


Figure 3. Standard OCR character recognition steps

* *Proofreading*:

Once the entire process of conversion is completed the output needs to be verified as no matter how much the OCR’s have advanced there is always a chance of some error. This thing applies to almost all the things when it comes to dependency on technology. Especially when it comes to paperwork or documents it becomes necessary that it is cross-checked with human eyes [2].

**REFRENCES**

* 1. <https://developer.android.com/>
  2. <https://developers.google.com/vision/text-overview>
  3. <https://codelabs.developers.google.com/codelabs/mobile-vision-ocr>
  4. <https://github.com/>
  5. <https://tutorialspoint.com/android/>