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AN ANDROID APP OCR+: FOR TEXT TRANSLATOR, DOCUMENT EDITOR, BUSINESS CARD READER & EQUATION SOLVER

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ABSTRACT: OCR+ refers to the OCR and its different Applications. OCR+ can be recognized as a mobile application. The platform or operating system it works on is Android. This paper combines the functionality of the Optical Character Recognition and its Applications. Our main motto is to develop a user friendly app that is capable of performing image to text conversion system using android phones and thereafter we can use this data for various applications of this OCR like Business card reader, Equation solver, Language translator etc.. The OCR takes image as input from already existing image or from the image captured by the camera and processes it as per our requirements using the APIs needed. **Keywords:** OCR+, API, ABBYY

I. INTRODUCTION

OCR also referred as Optical Character Recognition allows to automatically recognizing characters through scanning the image of text and characters. The Image scanned is read pixel by pixel and the characters identified are further converted to their ASCII code which gives us the editable text which was present in the image. Our android application focuses on the different ways and uses of this editable text we receive after scanning the image. The performance of this application is directly dependent on quality of input documents or the quality of image. This application is for the Android mobile operating system that combines Google's open-source translator API, ABBYY cloud storage and API's, Wolfram Alfa API and produces the final android application. Google's language translation service, Wolfram Alfa equation solving API, ABBYY cloud for processes and Business card are the main functionalities.

There is a hardware limitation to this that is scanner or a digital camera. Images captured by a digital camera are not exactly similar to the real image. The images captured from camera may have defects like edges are distorted or light is not appropriate, making it difficult for most of the OCR applications, to correctly recognize the text. Initially we started with the Tesseract Library [1] which did not give us the accurate result and thus we shifted to ABBYY because of its accurate result and scanning, extensibility and flexibility, its community of active developers, and the fact that it "just works" out of the box. It has 70% accuracy of the text conversion process which is very much higher than tesseract library. To perform the character recognition, the ABBYY API[6] goes through three important steps. Firstly, it does SEGMENTATION, i.e., if a binary image is given as input, it identifies the various individual glyphs (basic units representing one or more characters, usually contiguous). Thereafter for second step it does FEATURE EXTRACTION, i.e. it computes vectors of numbers from each glyph that will serve as input features. This step is the most difficult in the sense that there is no obvious way to obtain these features. The final step is CLASSIFICATION.

II. ABBYY

ABBYY[6] is an international software company that provides optical character recognition, document capture and language software for both PC and mobile devices .It has its own OCR type application called as ABBYY Fine Reader which is based and runs on the similar concepts. ABBYY also provides language-based software products and services. ABBY provides you with a unique Key which is used when you send the image for scanning .The image you take is been



sent to the ABBY server which processes the image pixel by pixel and returns you the output in the form of text .This text we receive form ABBY is further used for useful purposed depending on the needs of the user.

III. HOW TO USE APP

Using OCR+ is easy: the process generally consists of three steps: Open (Scan) the document, the document then goes to the ABBYY cloud storage for any processing and recognizes the data and then Save in a convenient TXT format in the phones memory and so can be accessed afterwards . In addition, the image clicked also gets saved in the gallery of the phone. The figure1 Shows the basic working of our app OCR+.

IV. WHAT BENEFITS DOES OCR BRING TO YOU?

The major benefit that brings to us is the conversion of written or printed data in image form into a text form that can be edited later on and used for various applications. It allows you to save a lot of time and effort when creating, processing and writing the whole image text again for any purpose for various documents. You can extract quotes from books and magazines and use them for creating your course studies and papers without the need of retyping.

In case you are a student, you can edit the notes and make it yours if it belongs to someone else and you took a picture of it. With a digital camera and OCR, you can capture text outdoors from banners, posters and timetables and then use the captured information for your purposes. It is also beneficial in the sense that if there are no scanners available nearby and you need urgent change of paper data or image doc then you can just click a picture and edit it and save it as your work.

The entire process of data conversion from original paper document, image or file takes less than a minute, and the final recognized document looks just like the original.

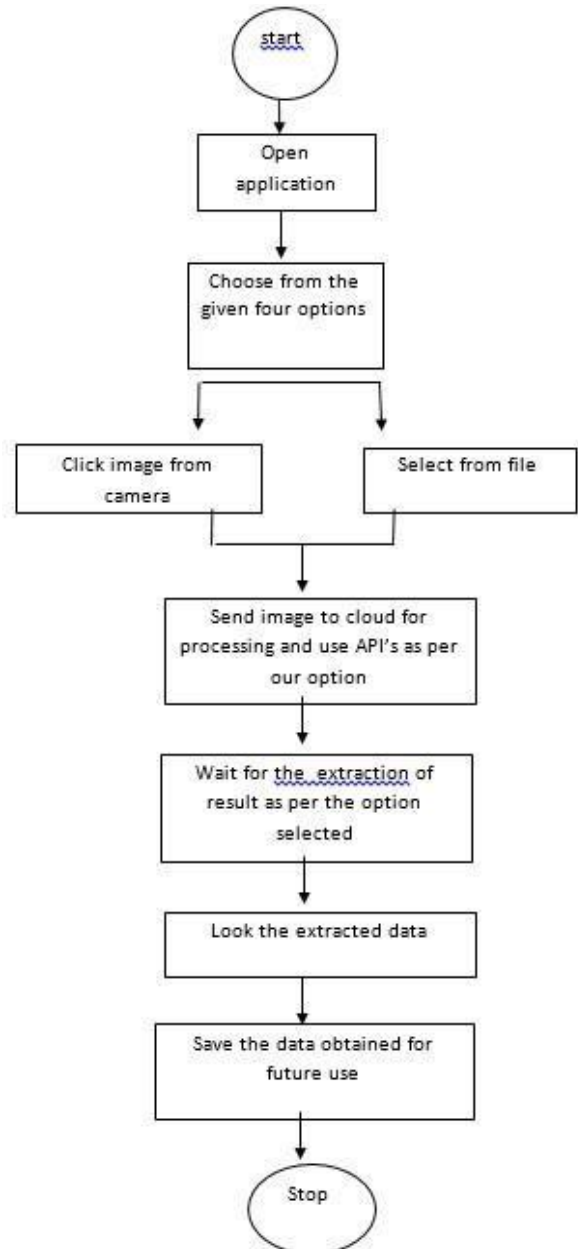


FIGURE 1: WORKING OF APPLICATION

V. APPLICATIONS

EDITOR: The editor shows the basic functionality of any OCR i.e. reading the captured image and converting it into text document. The document is received in an editable text field that can be manipulated as per our needs and thereafter be saved and accessed afterwards.

API used- ABBYY cloud storage. The description of ABBYY has already been mentioned in the earlier sections.



FIGURE 2. EDITOR

A. EQUATION SOLVER: In equation solver we take a picture of any equation with single variable with different powers and our app gives the value of that variable by solving the equation and is received to us that can be saved and accessed later on.

API used- Wolfram Alfa [3]

This API allows client to submit freeform queries similar to the queries one might enter at the Wolfram Alfa website, and for computed results be returned in variety of formats. The API implemented in standard REST protocol using HTTP GET requests. Each result is returned as a descriptive XML structure wrapping the requested content format.

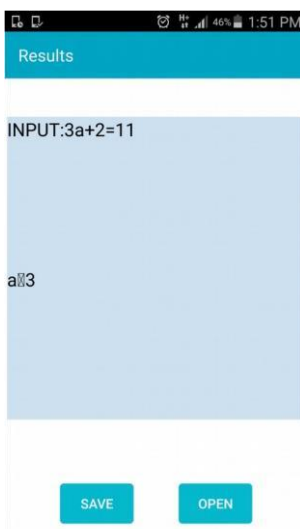


FIGURE 3. EQUATION SOLVER

B. TRANSLATOR: The translator feature of our app takes the input of any image in any language and

converts into the text in the language selected by the users amongst the language provided by us. **API used-** Google Translate API [9] [10]

This API accepts the parameters passed to website and then converts into the translated language desired.

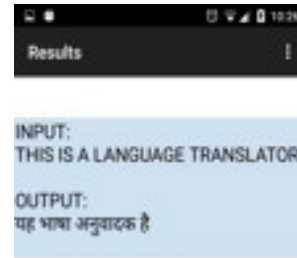


FIGURE 4. TRANSLATOR

C. BUSINESS CARD: This feature of the app reads any business card in English language and automatically saves the contact name, number, email, address, secondary number and other details into the phone's contact list and memory.

API used- ABBYY cloud storage and API. [6]

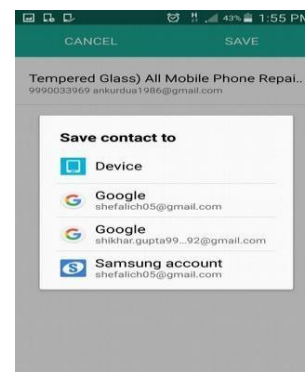


FIGURE 5. BUSINESS CARD READER

VI. FUTURE SCOPE

The future scope our application OCR+ may cover the end lines recognition (i.e. edges of letters) of our input or text so that its accuracy may rise and we can better output most of the time. Also use of text post-processing techniques to detect the noise and to correct



bad-recognized words will be implemented. Recognizing signatures can also be implemented. Also in our next work on OCR+ we plan to make our application recognize image of hand written text in the best manner. Moreover we will be adding certain applications as (A) Speech Output (B) Note/Currency Recognition System.[14] (C) Running all applications with hand written text.

VII. ADVANTAGES

1. This approach uses Android Operating System.
2. Android is free and open software. Thus OCR mobile application is significantly of lower cost.
3. Early OCR requires expensive scanners and special purpose electronic or optical hardware, but this approach is a mobile application having inbuilt camera.
4. Converts raster image to text and text to voice using OCR techniques
5. As Android based on Linux kernel it has feature of safety from virus infection. 6. Integration of many features in a single application.

VIII. LIMITATIONS

1. The major limitation of this application is that it uses internet to communicate with the ABBYY cloud storage.
2. Accuracy of an OCR system is directly dependent on the quality of input document. 3. The output from OCR systems is often quite “noisy” and garbled. In order to correct this, the application will perform some post processing on the text after it has received a response from the OCR package.

IX. CONCLUSION

Thus the application OCR+ is based on basic functionality of OCR and uses majorly the ABBYY API for its image to text conversion. The implementation of its applications i.e. Equation Solver, Business Card and Language Translator helps general public to great extent by solving many of its problems. Although many applications are incorporated in this single app and more are to be added lie speech, hand written recognition etc. which will be implemented soon.

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