VIVEKANAND EDUCATION SOCIETY'S
INSTITUTE OF TECHNOLOGY

Department of Computer Engineering

Project Report on

Text Extraction and Translation from Image using Machine Learning in Android App

In partial fulfillment of the Fourth Year, Bachelor of Engineering

(B.E.) Degree in Computer Engineering at the University of Mumbai

Academic Year 2017-2018

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Submitted by

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(2017-18)

VIVEKANAND EDUCATION SOCIETY'S
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Certificate

This is to certify that _____
of Fourth Year Computer Engineering studying under the University of Mumbai have satisfactorily completed the project on "***Text Extraction and Translation from Image using Machine Learning in Android App***" as a part of their coursework of PROJECT-II for Semester-VIII under the guidance of their mentor ***Mrs. Vidya Zope*** in the year 2017-2018 .

This thesis/dissertation/project report entitled ***Text Extraction and Translation from Image using Machine Learning in Android App*** by ***Dinesh Ahuja***, ***Jai Amesar, Abhishek Gurav, Sagar Sachdev*** is approved for the degree of ***Bachelor of Engineering***.

Programme Outcomes	Grade
PO1,PO2,PO3,PO4,PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12 PSO1, PSO2	

Date:

Project Guide:

Project Report Approval
For
B. E (Computer Engineering)

This thesis/dissertation/project report entitled ***Text Extraction and Translation from Image using Machine Learning in Android App*** by ***Dinesh Ahuja , Jai Amesar , Abhishek Gurav , Sagar Sachdev*** is approved for the degree of ***Bachelor of Engineering***.

Internal Examiner

External Examiner

Head of the Department

Principal

Date:
Place:

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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(Signature)	(Signature)
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Date:

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We wish to express our profound thanks to all those who helped us in gathering information about the project. Our families too have provided moral support and encouragement at several times.

Computer Engineering Department

COURSE OUTCOMES FOR B.E PROJECT

Learners will be able to,

Course Outcome	Description of the Course Outcome
CO 1	Able to apply the relevant engineering concepts, knowledge and skills towards the project.
CO2	Able to identify, formulate and interpret the various relevant research papers and to determine the problem.
CO 3	Able to apply the engineering concepts towards designing solution for the problem.
CO 4	Able to interpret the data and datasets to be utilized.
CO 5	Able to create, select and apply appropriate technologies, techniques, resources and tools for the project.
CO 6	Able to apply ethical, professional policies and principles towards societal, environmental, safety and cultural benefit.
CO 7	Able to function effectively as an individual, and as a member of a team, allocating roles with clear lines of responsibility and accountability.
CO 8	Able to write effective reports, design documents and make effective presentations.
CO 9	Able to apply engineering and management principles to the project as a team member.
CO 10	Able to apply the project domain knowledge to sharpen one's competency.
CO 11	Able to develop professional, presentational, balanced and structured approach towards project development.
CO 12	Able to adopt skills, languages, environment and platforms for creating innovative solutions for the project.

ABSTRACT

There are several OCR applications and Translation applications available for various OS i.e. iOS and android. But there isn't an Application that combines both these unique features in one application. An Android application will be developed to translate the text which is present in an image and generate a new file for translated text. This application will be different from other applications in terms of efficiency and accuracy. And an extra feature of translating text(English) to Braille language file i.e. (.brf) file which is used by handicapped (partially blind/ blind) people. The prime objective of this project is to provide user with multiple functionalities in a single application such as text extraction from an image, translating the text present in an image, generating the text file from translated text and speech out the translated text for handicapped/ illiterate people.

Keywords- OCR; Smartphone; Image Processing; accuracy; Text Extraction; Machine Learning.

Table of Contents

Chapter 1: Introduction

1.1 Introduction to the project :

As we know Today smartphones Camera have developed so much that it can capture minute details and are able to capture Image of as high quality as of Digital Camera. Which gives user tons of options that that can be performed on these images. These Images can be used to develop a printed books from a soft copy and can be used for editing a text printed papers.

Using OCR for Extraction of text from an Image is really useful for today's life as everything cannot be memorized or can be written. Capturing an Image is the best alternate option to save important Information. By updated Data from WHO (World Health Organization) Obtained on October 2017, estimated 253 million people live with Visual impairment. So, to help them to read text, they need Braille language to understand words.

Hindi, the official language of India, used by 400 million people in world. This project provides an English to Hindi Text Translation because, many legal Government documents, Hospital bills, papers, etc are printed in English language. Carrying a pocket Dictionary is not a solution to this problem. So, to provide a handy solution for this problem is provided in this project.

1.2 Motivation :

Today's world is united by humanity but divided by languages. It is difficult for a person to read or understand something written on a page or some banner in a language which he/she cannot read/understand. Even though there are pocket dictionaries available which a person can carry but searching each word and getting its meaning is time consuming and person does not get the exact translation of the sentence. There are online translators available which can translate the text but if a person don't know how to write in particular language then how can he/she will write that text in online translator to translate it in his/her known language. The above problem is solved by the proposed project. A simple process which make it easy for users to overcome the language barrier. That is by just clicking an image of the text which they want to translate/understand.

1.3 Drawbacks of the existing system:

The existing system/application in comparison with the proposed project is Google Translate, which doesn't provide image cropping, option to download translated file, translation from English to Braille language and generation of .brf file, no option to cloud upload the desired output file and is not good with the images with low brightness or image with noise.

1.4 Problem Definition :

In today's world language can be a barrier to understand things. Documents which need to be translated to understand better. The proposed project will extract text from image which is either captured or selected from gallery. After capturing/selecting image, user will be provided an option for cropping and the text will be extracted from the selected image. This text will then be translated to Hindi Language or Braille language as per the user's choice, after that a file will be generated from the translated text in a user specified format and further downloading the translated file options, uploading the translated file to Google cloud. The translated file will make user understand the document in a better way. A special Braille document for handicapped people can also be generated and Text to speech option for reading the translated file will also be provided.

1.5 Relevance of the Project :

There are many applications available online that provide extraction of text from an image (OCR) and translation of extracted text/ user provided text to some other language or Braille language. There are also services that provide online document saving to cloud features but not into another language. But keeping different applications for different purposes is not the proper solution to the problem. The proposed project will combine all the above mentioned features in a single application and save user's time.

1.6 Methodology used :

An android application will be developed to make work easy for people. Using 2 libraries i.e Google vision API, Tesseract library to implement OCR , Before that we will apply image processing to improve the quality of image to increase the efficiency to detect text. Then this will Translate the text (English) first in Hindi language. For special option voice input from user to download (.brf) file directly. And then other options of download and upload is implemented by android studio sd methods.

Chapter 2: Literature Survey

2.1 Papers or Books:

2.1.1. DESIGNING OF ENGLISH TEXT TO BRAILLE CONVERSION SYSTEM: A SURVEY

Abstract :

In the current era, the world around us is going to be electronic. Everything is at present available at digital and virtual world and the whole world is taking the advantages of that but the problem is arising when the visually impaired person will be concerned about the electronic and digitized world. Approximately 84 million people in this world are not able to see and those blind persons could not be able to take the advantage of the electronic world like reading of digital data from the electronic thing. They use the Braille language to read the data with the sense of touching to it but the problem is arisen when the reading has to be done from the electronic content as they cannot sense it by touching to it. This paper is hammered out to concatenate the problem of blind people regarding their reading of e-book and e-text and the paper will be beneficial for the blind person to read the digital book in their English Braille language.

Inference Drawn :

Thus, here the Automated value Thresholding algorithm discussed considering the text to Braille conversion. Also different techniques are analyzed upon the cost affectivity, low error rate and also the hardware implementing system.

It is found that the Automated value Thresholding algorithm is best suitable in designing and implementing a proposed system architecture for visually handicapped person with efficient way of text to Braille conversion with flexibility, low cost and portability.

2.1.2. An Efficient English to Hindi Machine Translation System Using Hybrid Mechanism

Abstract :

India is a multilingual country; different states have different territorial languages but not all Indians are polyglots. There are 18 constitutional languages and ten prominent scripts. The majority of the Indians, especially the remote villagers, do not understand, read or write English, therefore implementing an efficient language translator is needed. Machine translation systems, that translate text from one language to another, will enhance the knowledgeable society of Indians without any language barrier. English, being a universal language and Hindi, the language used by the majority of Indians, we propose an English to Hindi machine translation system design based on declension rules. This paper also describes the different approaches of Machine Translation.

Inference Drawn :

They have proposed a new approach to MT system design which has not been considered in any of the existing MT systems so far. In order to make the translation process more efficient, new rules can be added to the system. This technique can relinquish better level of efficiency compared to other approaches over English to Hindi language. For example,the result of Google translator while translation is that Hindi language has not got its perfection in terms of grammar rules. So our proposed system design shows the accurate results than other systems. The system design proposed here is just in an initial state, once successfully implemented it can be evaluated using BLEU score and other techniques.

2.1.3. Optical Character Recognition

Abstract :

At the present time, keyboarding remains the most common way of inputting data into computers. This is probably the most time consuming and labour intensive operation. 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 images where images can be handwritten, typewritten or printed text. It is a method of digitizing printed texts so that they can be electronically searched and used in machine processes. It converts the images into machine-encoded text that can be used in machine translation, text-to-speech and text mining. This paper presents a simple, efficient, and less costly approach to construct OCR for reading any document that has fix font size and style or
handwritten style. To achieve efficiency and less computational cost, OCR in this paper uses database to recognize English characters which makes this OCR very simple to manage.

Inference Drawn :

The systems have the ability to yield excellent results. Preprocessing techniques used in document images as an initial step in character recognition systems were presented. The feature extraction step of optical character recognition is the most important. It can be used with existing OCR methods, especially for English text. This system offers an upper edge by having an advantage i.e. its scalability, i.e. although it is configured to read a predefined set of document formats, currently English documents, it can be configured to recognize new types.

2.1.4. Color Image Enhancement Using Histogram Equalization Method without Changing Hue and Saturation

Abstract :

In this paper, a color image enhancement method is presented by using intensity histogram equalization (HE) approach without changing hue and saturation in HSI color space. The proposed method has better visual colorfulness than the conventional HE method because hue and saturation are preserved in the enhancement process. The backlighting image and night-time

image are used to demonstrate the effectiveness of the proposed color image enhancement method.

Inference Drawn :

A color image enhancement method has been presented by using intensity histogram equalization approach without changing hue and saturation in HSI color space. However, only the histogram of intensity is considered in the proposed enhancement method. Therefore, it is an interesting topic to use the combined information of color and depth to solve color image enhancement problem in the future.

2.1.5. Improving Quality of Machine Translation Using Text Rewriting

Abstract :

Machine Translation may be defined as the task of transformation of source text from one language to another. In the following paper, we have discussed the improvement in quality of Machine Translation (MT) using Source text Rewriting. We have performed English to Hindi translation on our MT system and also translation of rewritten English text to Hindi and then compared their performances and evaluated MT system based on 11 features sets as well as using automatic evaluation metrics such as BLEU, METEOR and F-Measure. We found that the performance of MT improved by using Text Rewriting approach.

Inference Drawn :

Quality of Machine Translation has been improved by using source text rewriting approach. The average BLEU score obtained while performing English-Hindi translation and Simple English Hindi translation are 0.45 and 0.47.

2.1.6. Detecting Text Based Image With Optical Character Recognition for English Translation and Speech using Android

Abstract :

Smartphones have been known as most commonly used electronic devices in daily life today. As hardware embedded in smartphones can perform much more task than traditional phones, the smartphones are no longer just a communication device but also considered as a powerful computing device which able to capture images, record videos, surf the internet and etc. With advancement of technology, it is possible to apply some techniques to perform text detection and translation. Therefore, an application that allows smartphones to capture an image and extract the text from it to translate into English and speech it out is no longer a dream. In this study, an Android application is developed by integrating Tesseract OCR engine, Bing translator and phones built-in speech out technology. Final deliverable is tested by various type of target end user from a different language background and concluded that the application benefits many users. By using this app, travelers who visit a foreign country able to understand messages

portrayed in different language. Visually impaired users are also able to access important message from a printed text through speech out feature.

Inference Drawn :

The project demonstrated an Android application to capture text, translate and voice it out has been designed and developed. Final deliverable has been tested and results obtained are promising which demonstrate that this study successfully addressed the problems discussed in Section I. This study proves that the application is mainly convenient for travelers to reduce the language barrier during their visit to another country which uses different language to portray information. Not to forget that speech out feature is beneficial for visually impaired users to access printed text which may carry significant messages. This application developed as a prototype to obtain users feedback in the first iteration and it can be further improved and enhanced.

2.1.7. Optical Character Recognition (OCR) Performance in Server-based Mobile Environment

Abstract :

There are several Optical Character Recognition (OCR) mobile applications on the market running on mobile devices, both android and iOS (iPhone, iPad, iPod) platforms. The limitations of mobile device processor hinder the possible execution of computationally intensive applications that need less time of process. This paper proposes a framework of Optical Character Recognition (OCR) on mobile device using server-based processing. Comparison methods proposed by this paper by conducting a series of tests using standalone and server-based OCR on mobile devices, and compare the results of the accuracy and time required for the entire OCR processing. Server-based mobile OCR obtains 5% higher character recognition accuracy than the standalone OCR and its format recognition accuracy is 99.8%. The framework tries to overcome the limitation of mobile device capability process, so the devices can do the computationally intensive application more quickly.

Inference Drawn :

The discussion focused on how to produce a format and character accuracy from OCR application and also its time of process. Although the time required is longer than using standalone OCR application, the method delivers a better results in both character and text format. The problem on longer time required, however can be solved with reducing captured image file before uploading to server. This paper also has not yet built the application that can run all the processes automatically, starting from the capturing of images on mobile device until combining the text resulting from the OCR server.

2.1.8. An Efficient Framework for Searching Text in Noisy Document Images

Abstract :

An efficient word spotting framework is proposed to search text in scanned books. The proposed method allows one to search for words when optical character recognition (OCR) fails due to noise or for languages where there is no OCR. Given a query word image, the aim is to retrieve matching words in the book sorted by the similarity. In the offline stage, SIFT descriptors are extracted over the corner points of each word image. Those features are quantized into visual terms (visterms) using hierarchical K-Means algorithm and indexed using an inverted file. In the query resolution stage, the candidate matches are efficiently identified using the inverted index. These word images are then forwarded to the next stage where the configuration of visterms on the image plane are tested. Configuration matching is efficiently performed by projecting the visterms on the horizontal axis and searching for the Longest Common Subsequence (LCS) between the sequences of visterms. The proposed framework is tested on one English and two Telugu books. It is shown that the proposed method resolves a typical user query under 10 milliseconds providing very high retrieval accuracy (Mean Average Precision 0.93). The search accuracy for the English book is comparable to searching text in the high accuracy output of a commercial OCR engine.

Inference Drawn :

Offline processing for a document image (12 megapixel) takes about 30 seconds. 96% of the processing is the extraction of SIFT descriptors. The remaining time is spent on locating corner points and discretization. Efficient indexing of visterms ensures that resolving a single query takes about 0.01 second.

Chapter 3: Requirements

3.1 Functional Requirements

3.1.1 Transfer Data

Device should be able to transfer the sensor data and camera feed to the web server for further processing of the image.

3.1.2 Capture Image

Device should be able to capture image on mounted camera in order to extract the text from image and perform translation on the extracted image.

3.1.3 Confirm Image

After capturing the image using camera, user will be asked whether to send the captured image for extraction of text or to re-capture the image.

3.1.4 Language Selection

After capturing/selection of image, user will be asked to choose the language in which they want to translate the text i.e English or Hindi, and special option for translation of text from English language to Braille language.

3.1.5 Download file

After translation of the text present in the image to user selected language, the translated text will be saved in a file and user will be given Download option for generated(Translated) file.

3.1.6 Share file

After the generation of translated file in user specified format from translated text, user will be given an option to share that file with others using different sharing apps present on his/her device.

3.1.7 Generation of .brf file

After capturing/selecting an image, if user chooses an option to translate the text from image to Braille language, then .brf file will be generated which is used to store the braille language and option for downloading that file will be provided to user.

3.1.8 Text to Speech

An option for text to speech of the translated text will be provided to the users using the in-built text to speech feature of android device.

3.1.9 Upload file

The translated file which is generated after the translation of text present in an image, can be uploaded to the Google cloud platform using user's Google account credentials.

3.2 Non-Functional Requirements

3.2.1 Robust UI

An android application of text extraction and translation from image should not crash at any point when used by the user.

3.2.2 Security

The text which is extracted from an image and the translated file should only be available to the user who is using the application.

3.2.3 Accessibility

The data present in the application i.e. text extracted from image, translated text/ translated file should be available to the user at any point of time.

3.2.4 Availability

An android application which is built for functionalities like text extraction, text translation, etc should be available to user all the time.

3.3 Constraints:

3.3.1 Textless Image cannot be translated

If the captured image does not contain any text in it, then it cannot be translated since no text would be extracted from image.

3.3.2 Only two languages can be translated

For basic implementation of the project, only two languages will be taken in consideration for translation i.e. English and Hindi.

3.3.3 Download option for .pdf is only available

After translating the text extracted from an image, only .pdf format file can be generated from the translated text for basic implementation of project.

3.3.4 Upload to only google drive only

Only Google cloud i.e Google drive service will be available for uploading of the translated file which is generated from the translated text.

3.4 Hardware & Software Requirements:

3.4.1 Hardware Requirements:

3.4.1.1 Android Device equipped with a Camera

An android smartphone is required in order to run the application and capture/select image for text extraction and translation purpose.

3.4.1.2 All core components of the Android Device should be properly functioning

In order to get the proper results from android application for text extraction and translation, all the functions of android device should be in working condition.

3.4.1.3 Braille Printer

For printing the .brf format file which is generated from the Braille language, a special printer i.e Braille printer is required since normal printer cannot be used for printing of .brf file.

3.4.2 Software Requirements:

3.4.2.1 Android studio

To create an android application for text extraction and translation, android studio software is required which helps in creation of android project.

3.4.2.2 Python libraries

Different python libraries are required to perform the text translation from one language to another language and this will be integrated with the android application for text extraction and translation.

Chapter 4: Proposed Design

4.1 System Design / Conceptual Design (Architectural)

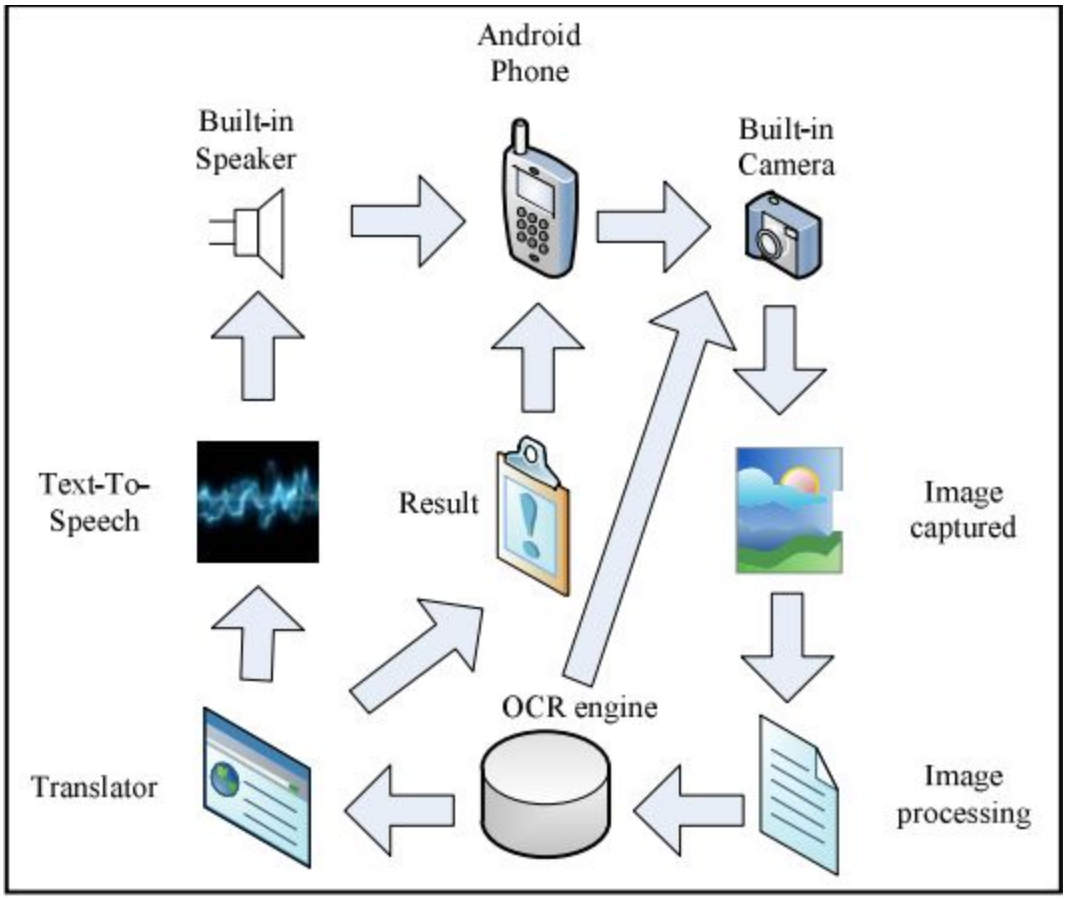

Figure 1 : System Architecture

Description: The picture taken from camera will enhanced and processed for OCR. After which the translator will translate the text and forward it for documentation and/or TTS engine.

4.2 Block Diagram Representation of proposed system

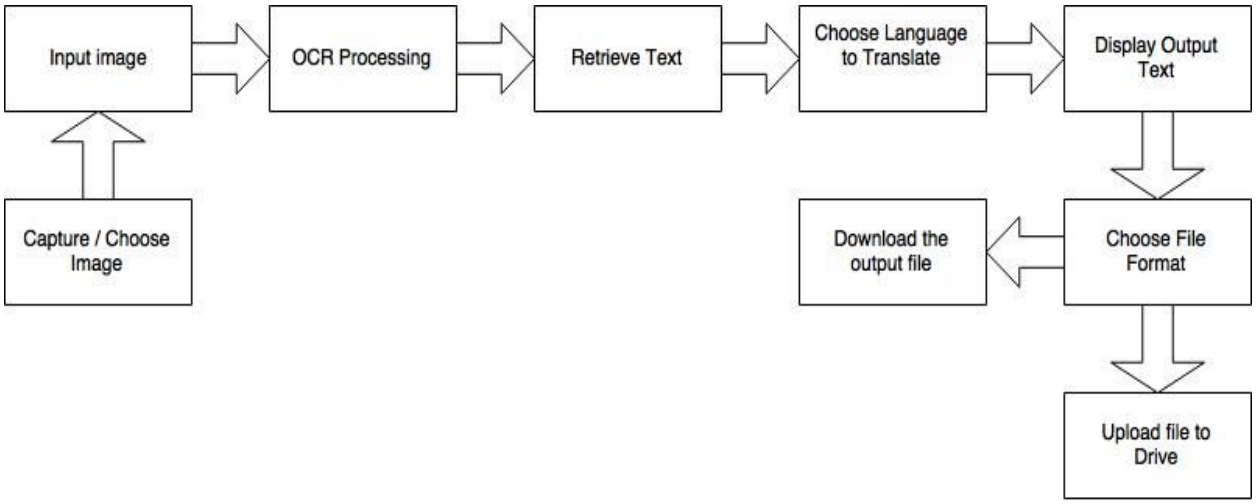

Figure 2 : Block Diagram of the System

Description: The desired image undergoes OCR processing to generate text. This text goes through the translator, to translate into chosen language. Further according to choice of the user the output file is generated.

4.3 Detailed Design (DFD, Flowchart, State Transition Diagram)

4.3.1. Flowchart:

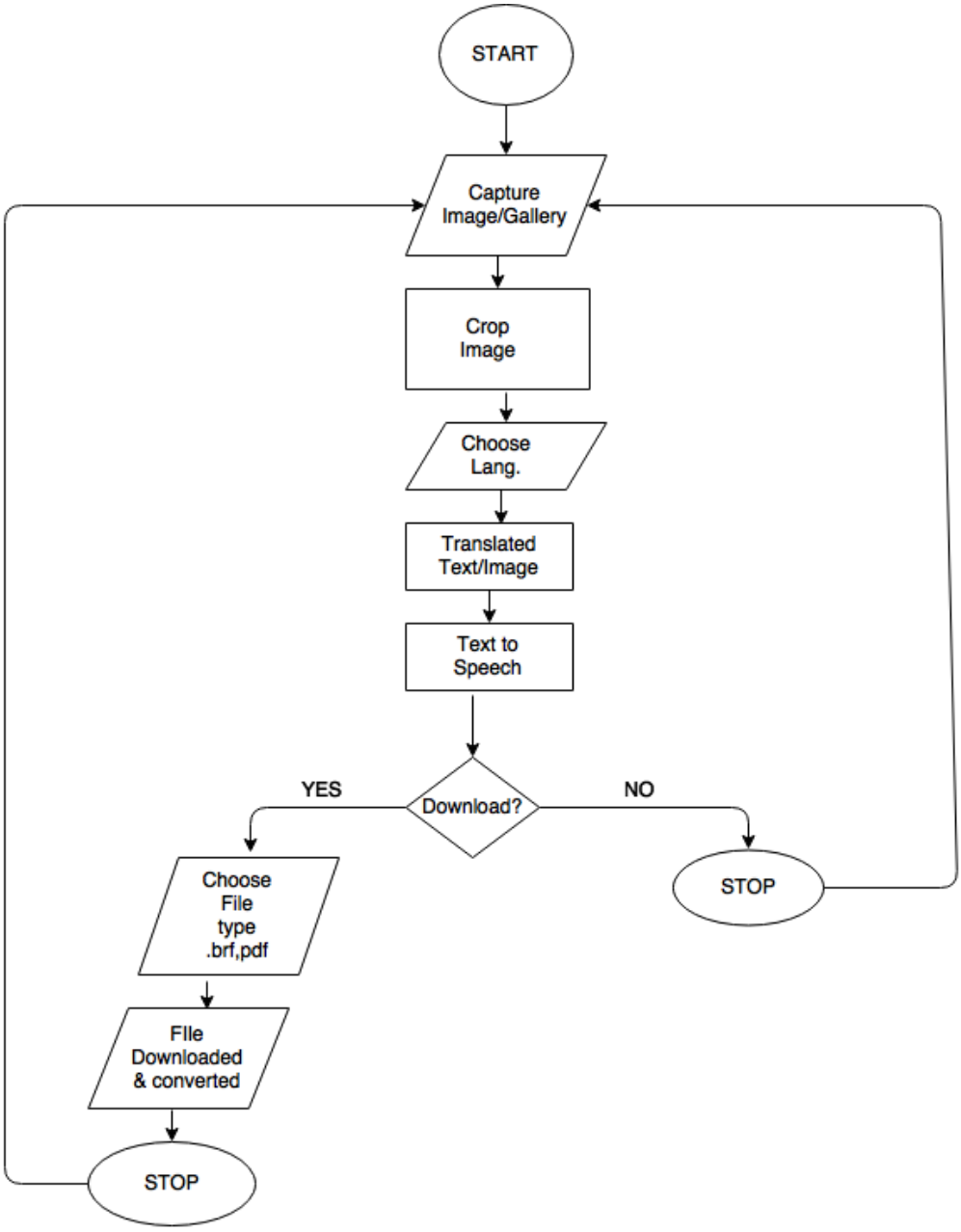

Figure 3 : Flowchart of the system

Description: There are two backjumps in the flow. First, If the user doesn't want to save the translated file. Second, after the translated file is saved and converted.

4.3.2. State Transition Diagram

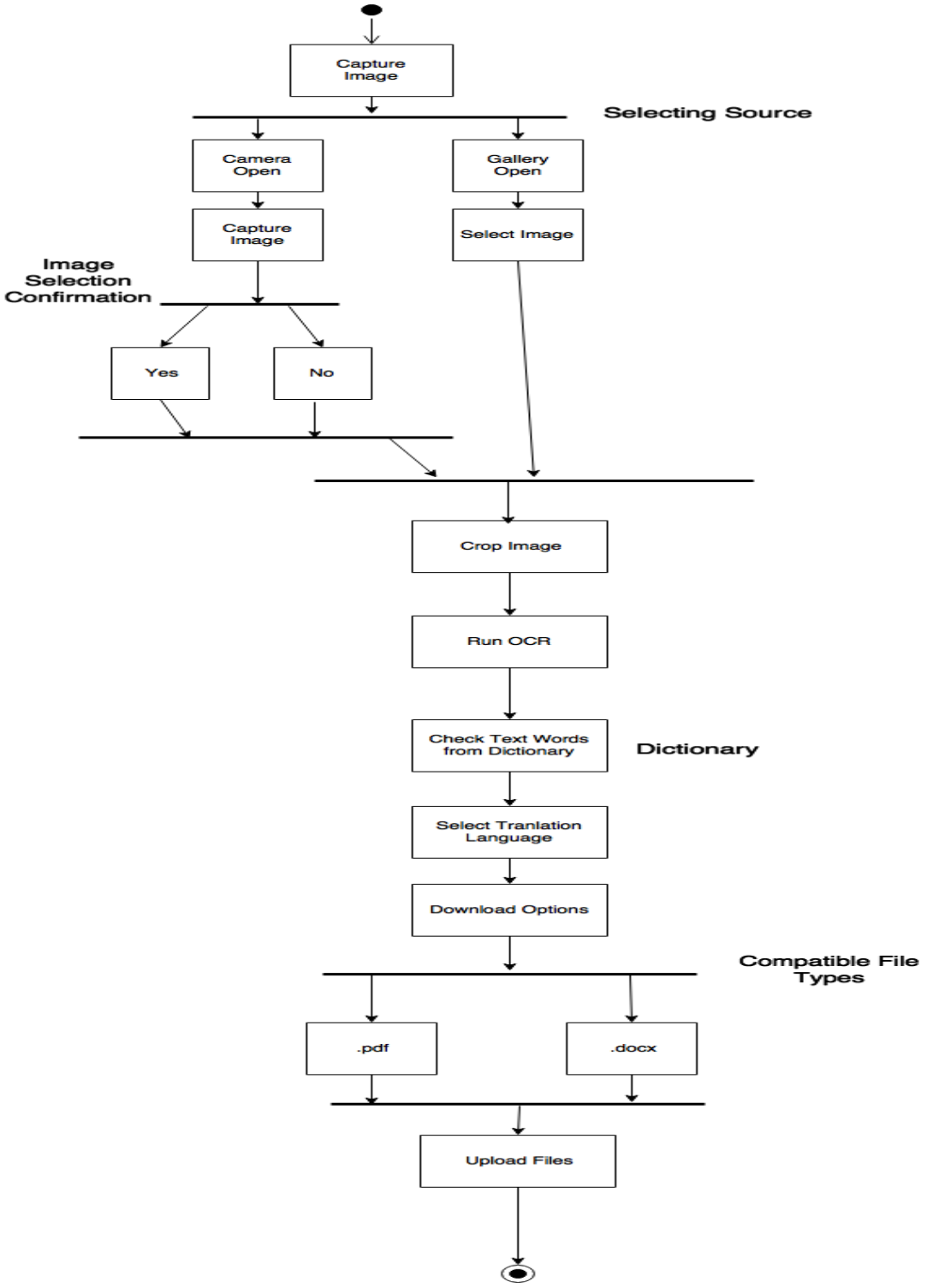

Figure 4 : State Transition Diagram of the system

Description: Image Confirmation, save format confirmation and saving process are the stages where synchronisation of the paths is necessary.

4.3.3.1. DFD Level 0:

Figure 5 : DFD Level 0

Description: DFD level 0 represents basic processing of the application

4.3.3.2. DFD Level 1:

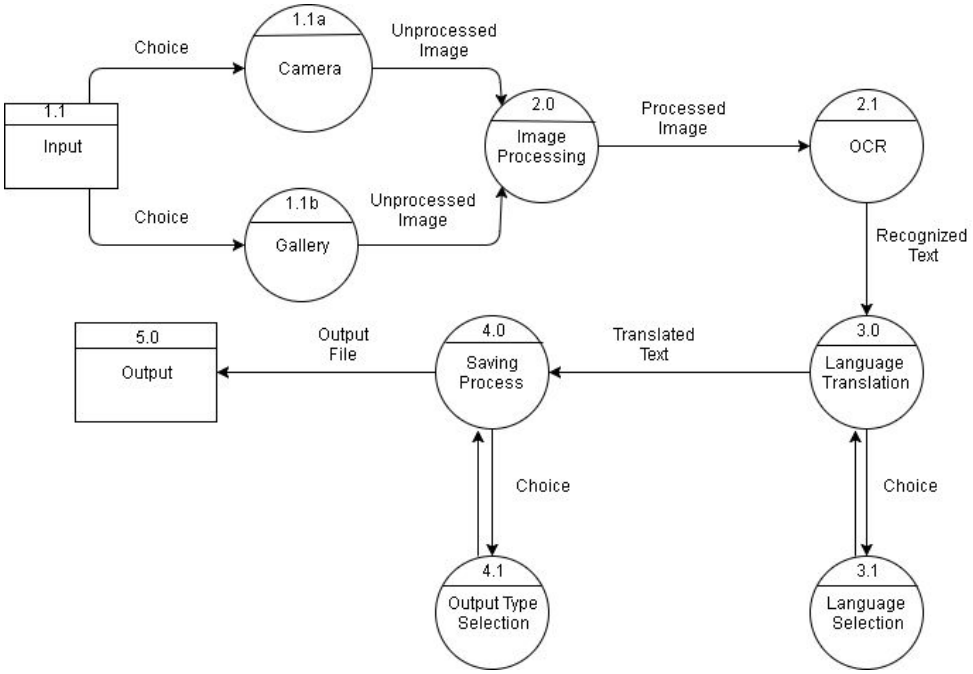

Figure 6 : DFD Level 1

Description: Image input has two possible sources i.e. Camera and Gallery. The processed image will be run through OCR and recognized text is forwarded to language translation phase. The translated text is the data forwarded to saving module, which is done by user's choice.

4.3.3.3. DFD Level 2:

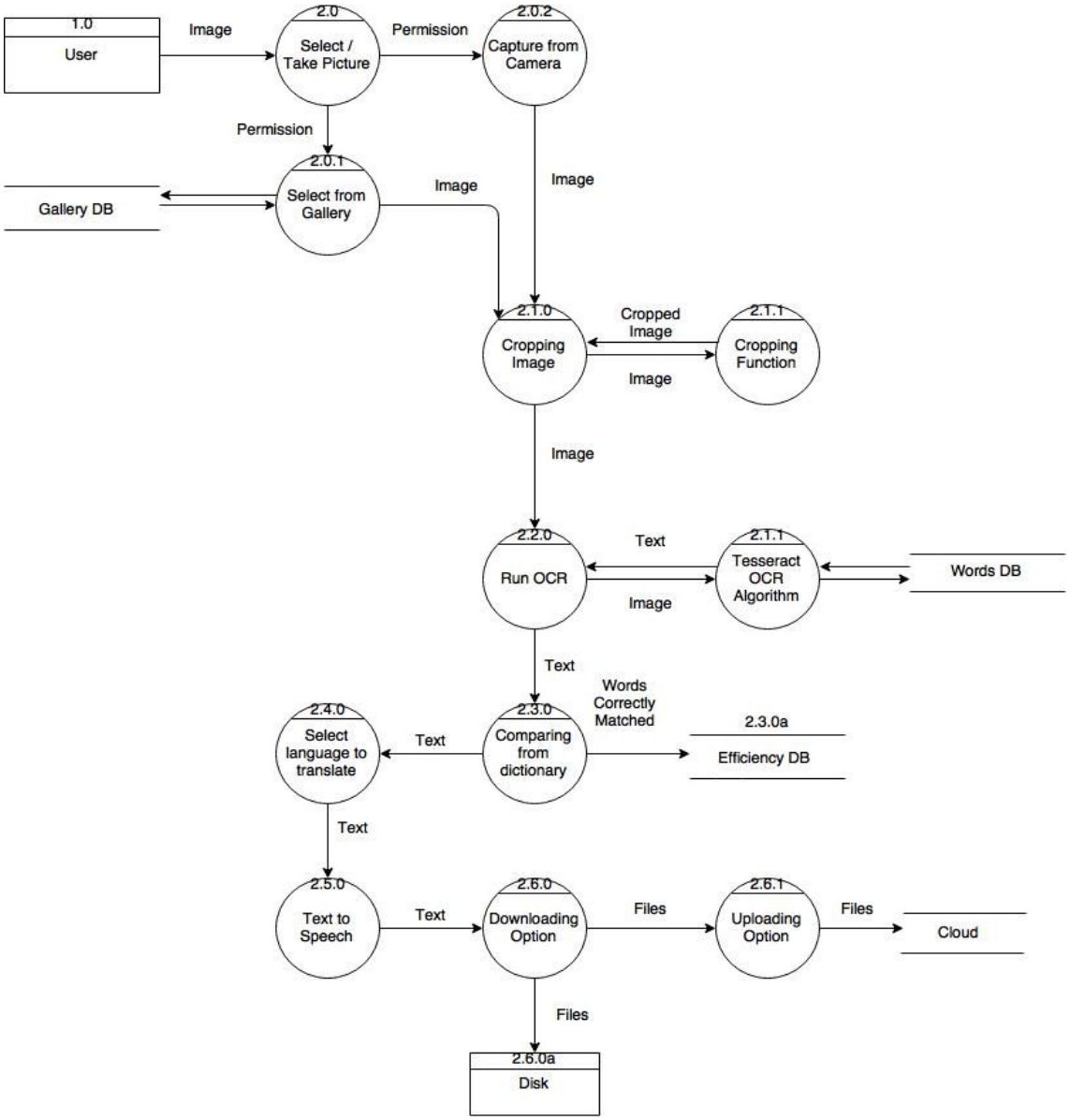

Figure 7 : DFD Level 2

Description: The input image either comes from Camera or Gallery DB. Then it is cropped using crop function for OCR processing. The OCR processing library used is Tesseract which tries to match detected vectors with existing characters in Words DB. After OCR, words detected are compared with the dictionary by Efficiency DB which helps us determine the words that are correct in existence. The text is then translated to the language chosen by the user, and is made available for saving and TTS purposes. Final output is then saved to disk or cloud according to user's preferences.

4.4 Project Scheduling & Tracking using Time line / Gantt Chart:

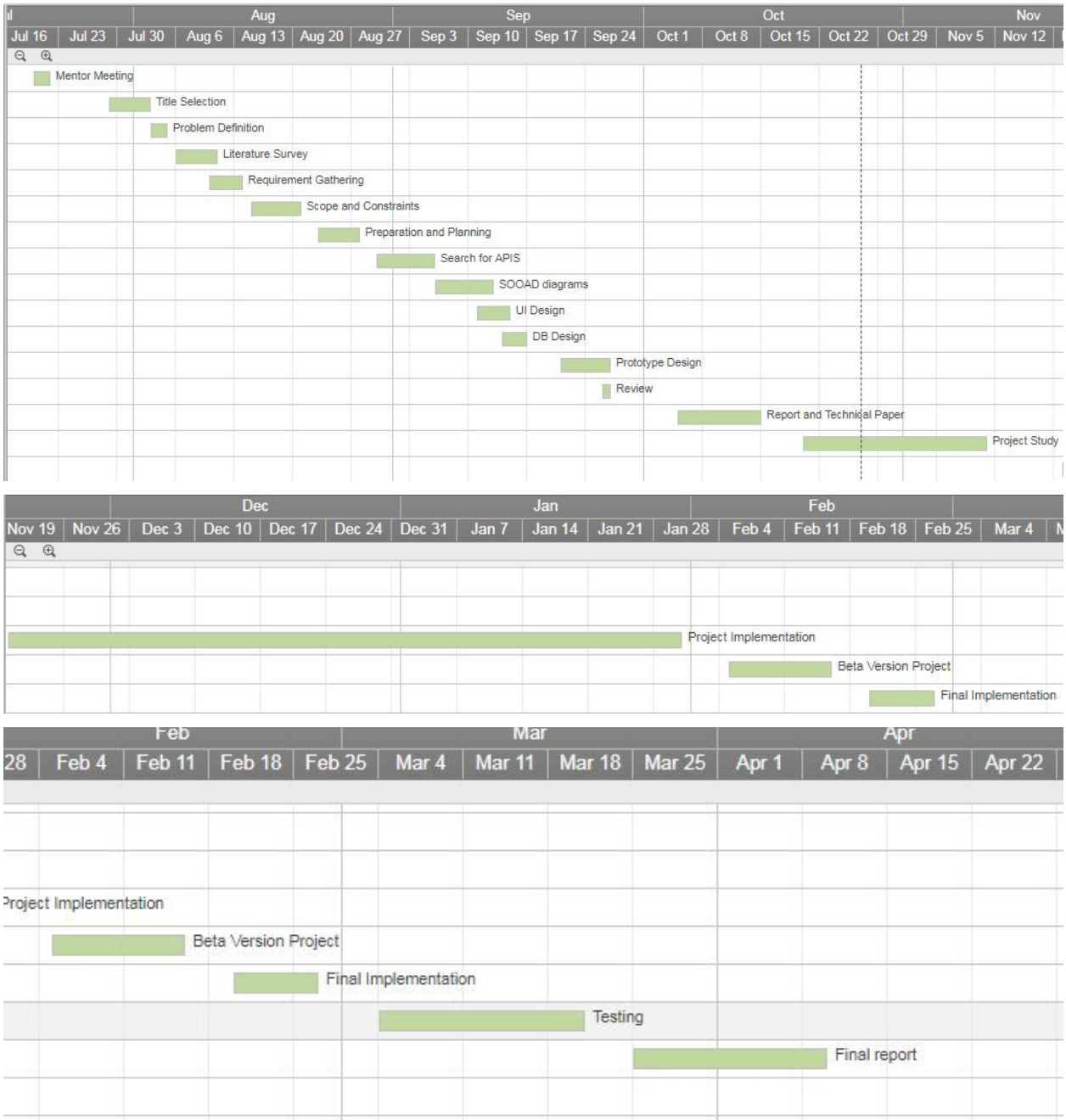

Figure 8 : Gantt Chart

Chapter 5: Implementation Details

5.1 Algorithms for the respective modules developed:

i) Python Goslate Library:

This library has been used to translate the text into chosen language. With the help of Goslate library, we can translate the text in more than 40 languages.

ii) Google Vision API:

Google Cloud Vision API allows us to integrate vision detection feature within our application i.e.Optical Character Recognition(OCR). OCR technique is used to extract text from the image.

iii) Volley Library:

Volley Library is used to make networking in application faster and easier. With this, we can perform network requests, connect our application with server and can transfer data from client side to the server database. Volley also provides powerful customization abilities, debugging and tracing tools. Volley is up to 10 times more faster as compared to other networking libraries.

iv) iText Library:

iText library is used for creating and manipulating PDF files in java. With this, we are dynamically generating PDF files in our application for the user to download the translated text.

5.2 Evaluation of the developed system:

i)Efficiency:

OCR efficiency depends on light conditions.So,Images taken in all possible light conditions provides an average Efficiency of about 75%.In suitable light condition, Efficiency is about 97%.

ii)Accuracy:

For Sentences and small paragraphs OCR can detect 90% of words.But,for large paragraphs OCR detects about 85% of words.Translating English Text to Hindi produces correct Output for small paragraphs.But,for large text there are minor grammatical mistakes.

iii) System Compatibility:

Developed Android Application is compatible for 4.0 Android to 7.1 Android System Software.

Chapter 6: Testing

6.1 Unit Testing:

In computer programming, unit testing is a software testing method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine whether they are fit for use. Intuitively, one can view a unit as the smallest testable part of an application.

Test Case No.	Test case	Description	Input	Expected Output	Actual Output	Pass OR Fail
1.	Speech to text	Understanding the speech and converting it to text	Speech	Spoken words as text on screen	Spoken words as text on screen	Pass
2.	Text Extraction	Extracting text from Image and displaying it on screen	Image containing text	Text gets extracted and is displayed on screen	Text gets extracted and is displayed on screen	Pass
3.	Text Translation	Translate the text into target language	Text	Text is translated to desired language	Text is translated to desired language	Pass
4.	PDF generation	Generating PDF of the translated text	Text	PDF gets generated of the translated text	PDF gets generated of the translated text	Pass

Table 1 : Unit Testing Results

6.2 Integration Testing:

Integration testing is the phase in software testing in which individual software modules are combined and tested as a group. It occurs after unit testing and before validation testing. Integration testing takes as its input modules that have been unit tested, groups them in larger aggregates, applies tests defined in an integration test plan to those aggregates, and delivers as its output the integrated system ready for system testing.

6.3 Black Box Testing:

In case of Black box testing, the internal system design is not considered. Hence, this type of testing mainly concerns with the output that must satisfy the needs of the user.

6.4 White Box Testing:

White Box testing commonly known as “Glass Box Testing” is based on knowledge of the internal logic of the code. The feature extraction and classification of default can be considered as white box testing in our project.

6.5 System Testing:

System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system’s compliance with its specified requirements. System testing falls within the scope of black box testing, and as such, should require no knowledge of the inner design of the code or logic.

Testing	Test Case	Status
Integration Test	Testing UI and Server parts of Optic Translator	Valid
Black box	Subsetting dataset only for Good and bad classes and testing accuracies	Valid
White Box	Comparing the accuracy and ratios in confusion matrix with original predicted values and actual output.	Valid
System Test	Testing whole system to ensure that it works efficiently and all the test cases when integrated, are correct.	Valid

Table 2 : System Testing Results

Chapter 7: Result Analysis

7.1 Simulation Model:

In this project, two different user interfaces are created. One for normal people and other for partially blind people. In partially blind people UI, voice commands are provided for every action which user has to perform such as capturing image, holding device over the printed page, etc. After capturing the image, the text extracted from image is translated into braille format which is helpful for blind people for reading purpose. The other interface is for normal people, in which three tabs are available, one for capturing the image, extracting the text from image and then translating into user preferred language, second tab is for viewing the documents which user has created after translation in past and the third tab is for translating the raw text instead of translating the text from image into user preferred language.

7.2 Parameters Considered:

a) Brightness of the Image

Brightness of the image affects the visibility of words to be detected by the application

b) Character Quality

Words should be actually printed and not handwritten, to be detected by the application

c) Size of the image (pixel density of image)

Very low pixel density affects detection accuracy.

d) Basic understanding of language for voice commands

User needs to have a grip over the preferred language to use voice commands.

7.3 Screenshots of User Interface(UI):

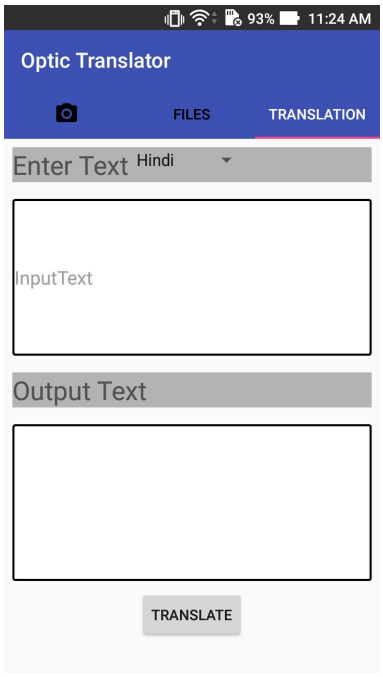

Fig 1

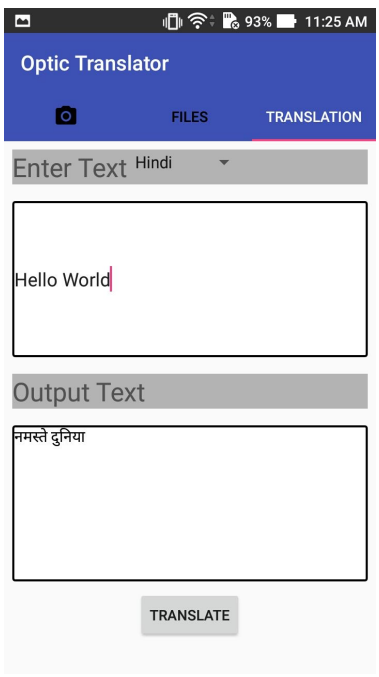

Fig 2

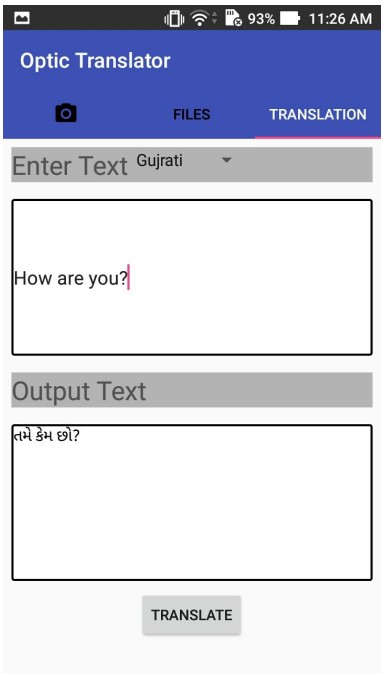

Fig 3

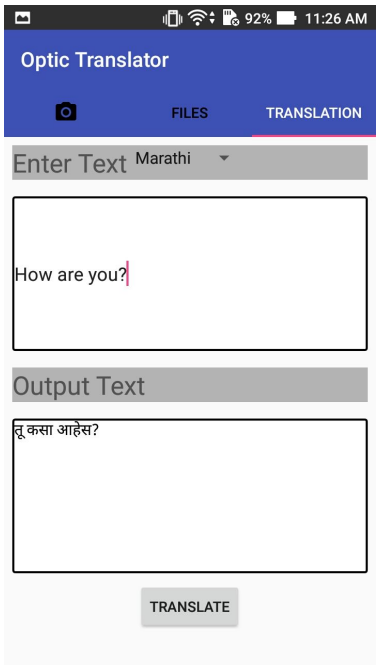

Fig 4

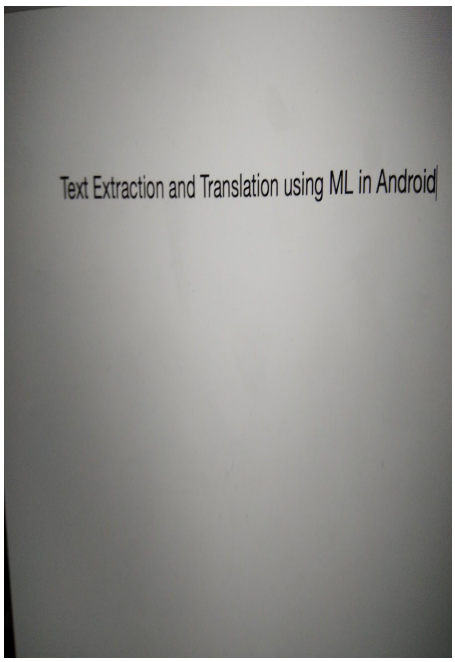

Fig 5

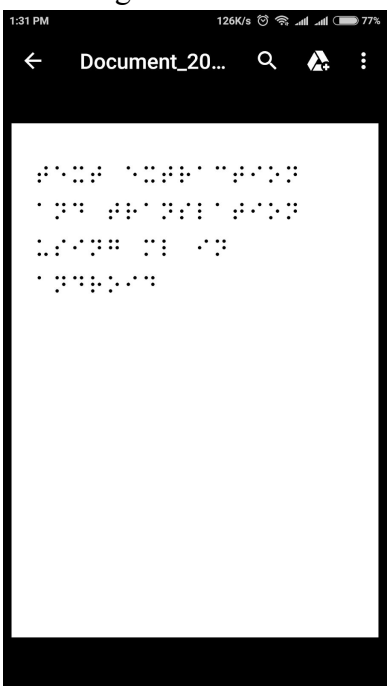

Fig 6

Figure 9 : Screenshots of User Interface (UI)

There is one input text box and one output text box. First, the user enters the text which is to be translated in the input box. After that, user selects the language(from the drop down menu) in which the text is to be translated. The translated text (result) is generated in the output box.

In Fig 1, the user enters text “how are you” as input and selects language “gujrati”. After clicking the ‘TRANSLATE’ button, the output text i.e. translated version of the input text gets generated i.e. “તમે કેમ છો?”.

In Fig 2, the user selects “Marathi” as a translation language from the drop down menu. So, the input text gets translated into Marathi. Input text “how are you” gets translated to “तू कसा आहेस?”.

In Fig 3, user wants to translate the text using an Image. So, first the user captures the image of the text which is to be translated and with OCR technique, text is extracted from the image which will serve as input text. And then, user selects language in which text is to be translated.

In Fig 4, user translates the text in “Braille” language. Also, there is an option to download the translated file as pdf. In Fig 5, there is a list of all files which the user has downloaded and this will be easier for the user to refer the files in future.

In Fig 5, Image is been captured and is served as input. In Fig 6, text from the image is first extracted, translated into braille language and PDF document is generated.

7.5 Reports Generated:

A successful PDF is generated of the Extracted Text from an Image of the selected Translated Language.

Chapter 8: Conclusion

8.1 Limitations:

- Handwritten text cannot be extracted.
- For security purposes, user will only receive the .pdf and .brf files
- iii) Limited support to Android Phones, no iOS support.

8.2 Conclusion:

An Android application is developed which provides different functionalities such as image capturing using the inbuilt camera, image enhancement using different image processing algorithms, text extraction using OCR(Optical Character Recognition) and translation from English language to Hindi, Marathi and Gujarati languages (using Python Goslate library for translation). The Application also provides conversion to Braille Language (for Handicapped people) using English language to Braille language API, option for downloading the translated file as PDF and choice for uploading the translated file to the Google cloud.

8.3 Future Scope:

- Handwriting recognition using machine learning.
- iOS support

References :

[1] Mr. Vrushabh S. Dharme, Mrs. S. P. Karmore, “DESIGNING OF ENGLISH TEXT TO BRAILLE CONVERSION SYSTEM: A SURVEY”, IEEE Sponsored 2nd International Conference on Innovations in Information Embedded and Communication Systems ICIIECS’15, 2015.

[2] Jayashree Nair, Amrutha Krishnan K, Deetha R, “An Efficient English to Hindi Machine Translation System Using Hybrid”, 2016 Intl. Conference on Advances in Computing, Communications and Informatics (ICACCI), Sept. 21-24, 2016, Jaipur, India.

[3] Teddy Mantoro, Abdul Muis Sobri, Wendi Usino, “Optical Character Recognition”, International Journal of Advanced Research in Computer and Communication Engineering Vol. 3, Issue 1, January 2014.

[4] Su-Ling Lee1, Chien-Cheng Tseng, “Color Image Enhancement Using Histogram Equalization Method without Changing Hue and Saturation”, 2017 IEEE International Conference on Consumer Electronics - Taiwan (ICCE-TW).

[5] Deepti Chopra, Nisheeth Joshi, “Improving Quality of Machine Translation Using Text Rewriting”, 2016 Second International Conference on Computational Intelligence & Communication Technology, 2016.

[6] Ismet Zeki Yalniz, R. Manmatha, “An Efficient Framework for Searching Text in Noisy Document Images”, 2012 10th IAPR International Workshop on Document Analysis Systems, 2012.

[7] Sathiapriya Ramiah, Tan Yu Liong, Manoj Jayabalan, “Detecting Text Based Image With Optical Character Recognition for English Translation and Speech using Android”, 2015 IEEE Student Conference on Research and Development (SCOReD), 2015.

[8] Shalin A. Chopra, Amit A. Ghadge, Onkar A. Padwal, Karan S. Punjabi, Prof. Gandhali S. Gurjar, “Optical Character Recognition”, International Journal of Advanced Research in Computer and Communication Engineering Vol. 3, Issue 1, January 2014.

Appendix

List of Figures

List of Tables

Paper Publications

A. Paper

ISSN(Online): 2319-8753
ISSN (Print): 2347-6710

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Volume 7, Issue 1, January 2018

Text Extraction and Translation from Image using ML in Android

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U.G. Student, Department of Computer Engineering, VESIT, Mumbai, India[3]
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Assistant Professor, Department of Computer Engineering, VESIT, Mumbai, India[5]

ABSTRACT: There are several OCR applications and Translation applications available for various OS i.e. iOS and android. But there isn't an Application that combines both these unique features in one application. An Android application will be developed to translate the text which is present in an image and generate a new file for translated text. This application will be different from other applications in terms of efficiency and accuracy. And an extra feature of translating text(English) to Braille language file i.e. (.brf) file which is used by handicapped (partially blind/ blind) people. The prime objective of this project is to provide user with multiple functionalities in a single application such as text extraction from an image, translating the text present in an image, generating the text file from translated text and speech out the translated text for handicapped/ illiterate people.

KEYWORDS: OCR, Smartphone, Image Processing, accuracy, Text Extraction, Machine Learning.

I. INTRODUCTION

As we know Today smartphones Camera have developed so much that it can capture minute details and are able to capture Image of as high quality as of Digital Camera. Which gives user tons of options that that can be performed on these images. These Images can be used to develop a printed books from a soft copy and can be used for editing a text printed papers.

Using OCR for Extraction of text from an Image is really useful for today's life as everything cannot be memorized or can be written. Capturing an Image is the best alternate option to save important Information. By updated Data from WHO (World Health Organization) Obtained on October 2017, estimated 253 million people live with Visual impairment. So, to help them to read text, they need Braille language to understand words.

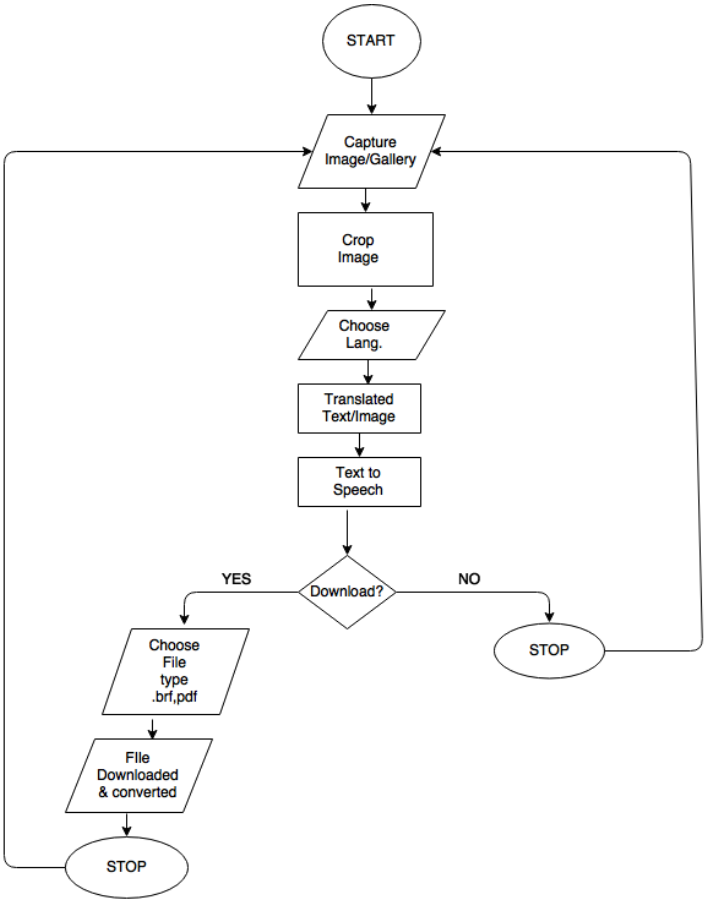
Hindi, the official language of India, used by 400 million people in world. This project provides an English to Hindi Text Translation because, many legal Government documents, Hospital bills, papers, etc. are printed in English language. Carrying a pocket Dictionary is not a solution to this problem. So, to provide a handy solution for this problem is provided in this project.

II. **RELATED WORK**

OCR is the main topic of concern here, here we are implementing the project in Android application. There are apps present to do the same work like Google Translate, Mobile OCR, and simple OCR. But they don't talk about the accuracy of detecting Text. In this project, two different approaches will be chosen for implementation of OCR. One approach is by implementing Tess-Two tesseract library in Android studio and another approach is with Google Vision API. Before performing OCR, different Image processing techniques will be used to enhance the image quality by removing noise from an image, improving contrast and brightness of an image and a cropping image feature will also be provided for increasing the accuracy of detection of text from an image. After image processing, above mentioned two approaches of implementing OCR will be tested and one with higher efficiency and accuracy will be chosen. There are many translation apps available online but none of them provide the translation from English to Braille language. For translation from English language to Braille language, python libraries will be used and will be integrated with the android application. Since the handicapped (blind / partially blind) and illiterate people cannot read the translated text, the project will provide a speech out feature for the problem. The built-in feature of smartphone i.e. text to speech will be used for reading the translated text. A special feature of voice input (yes/no) for handicapped people will be provided for different options like "Download translated file?" etc.

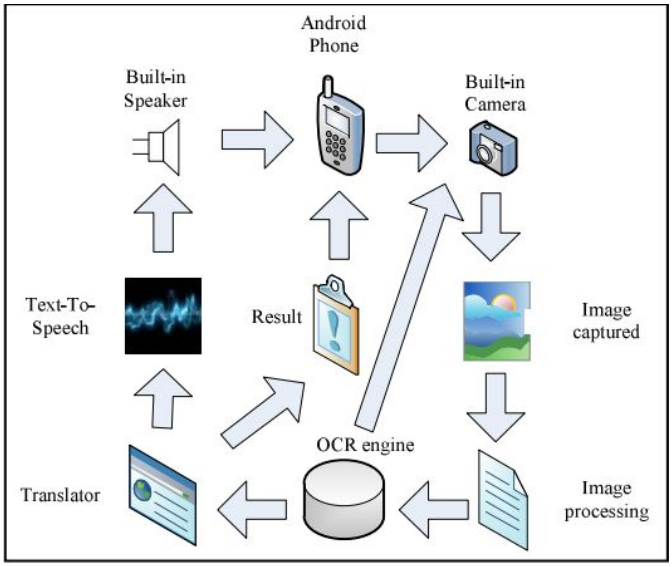
III. **SYSTEM DESIGN**

Fig. 1 Flowchart of the proposed system



There are two back jumps in the flow. First, if the user doesn't want to save the translated file. Second, after the translated file is saved and converted.

Fig. 2 Architecture of the proposed system



The picture taken from camera will be enhanced and processed for OCR. After which the translator will translate the text and forward it for documentation and/or TTS engine.

IV. **TESTING AND EVALUATION**

The applications testing focused on processing speed and accuracy of text recognition compared with original printed text. The image will be captured from any paper-printed book. The device that was used to examine the framework related to OCR is as follows:
(1) ASUS (Android 6.0), (2) Redmi mi 4 (Android 6.0)
First prototype includes a standalone OCR using Tess-two Tesseract Library.

Research Institute at UNLV for the Fifth Annual Test of OCR Accuracy First formula to count text accuracy:

$$\text{Accuracy} = \frac{NC - EC}{NC}$$

NC= Number of character
EC= Error of read character

Second formula to count format accuracy:

$$\text{Accuracy} = \frac{NW - EF}{NW}$$

NW= Number of word
EF= Error of read format
Format accuracy measures format detection such as Italic, sub/superscript, bold, and underline format. In this case, most of these formats are ignored. When the value of format accuracy is 0%, this indicates that no text format was detected by the application.
When performing OCR on a single page, the application uses the directly captured image and continues to the recognition process.

V. **System Description**

The application will work in both Offline and Online mode. First user will be asked to input an image either from camera or from gallery. Once image is uploaded then crop feature is enabled to apply cropping (if needed) to

translate or extract text from specific part of an image. Then a Voice input is taken from user as “DO YOU WANT A BRAILLE FILE TO BE DOWNLOADED?” this option is for visually impaired people. Then if “YES” then a braille file will be downloaded in system. If “NO” then further language Translation will be asked from user. Once translation is completed then downloadable file type extension will be asked and selected type will be downloaded in system. Google drive upload option will also be enabled to share file with others.

VI. **APPLICATIONS**

[1] This app will be useful for everyone who don’t understand English and want to translate it handy.
[2] The app will help handicapped people (blind / partially blind) in reading and understanding the text either by Braille language or by text to speech feature.
[3] It will help users to share the translated file with other people by downloading the file or by uploading it on Google Cloud.

VII. **CONCLUSION**

In this paper, an Android application was developed which provides different functionalities such as image capturing, image enhancement, text extraction and translation from English language to Hindi Language and Braille Language (for Handicapped people), option for downloading the translated file and choice for uploading the translated to the Google cloud.

REFERENCES

[1] Mr. Vrushabh S. Dharme, Mrs. S. P. Karmore, “DESIGNING OF ENGLISH TEXT TO BRAILLE CONVERSION SYSTEM: A SURVEY”, IEEE Sponsored 2nd International Conference on Innovations in Information Embedded and Communication Systems ICECS’15, 2015.
[2] Jayashree Nair, Amrutha Krishnan K, Deetha R, “An Efficient English to Hindi Machine Translation System Using Hybrid”, Intl. Conference on Advances in Computing, Communications and Informatics (ICACCI), pp.2109-2113, 2016.
[3] Teddy Mantoro, Abdul Muis Sobri, Wendi Usino, “Optical Character Recognition (OCR)
Performance in Server-based Mobile Environment”, International Conference on Advanced Computer Science Applications and Technologies, pp.423-428, 2013.
[4] Su-Ling Lee1, Chien-Cheng Tseng, “Color Image Enhancement Using Histogram Equalization Method without Changing Hue and Saturation”, IEEE International Conference on Consumer Electronics - Taiwan (ICCE-TW), pp.305-306, 2017.
[5] Deepti Chopra, Nisheeth Joshi, “Improving Quality of Machine Translation Using Text Rewriting”, Second International Conference on Computational Intelligence & Communication Technology, pp.22-27, 2016.
[6] Ismet Zeki Yalniz, R. Manmatha, “An Efficient Framework for Searching Text in Noisy Document Images”, 10th IAPR International Workshop on Document Analysis Systems, pp.48-52, 2012.
[7] Sathiapria Ramiah, Tan Yu Liong, Manoj Jayabalan, “Detecting Text Based Image With Optical Character Recognition for English Translation and Speech using Android”, IEEE Student Conference on Research and Development (SCOReD), pp.272-277, 2015.
[8] Shalin A. Chopra, Amit A. Ghadge, Onkar A. Padwal, Karan S. Punjabi, Prof. Gandhali S. Gurjar, “Optical Character Recognition”, International Journal of Advanced Research in Computer and Communication Engineering, Vol. 3, Issue 1, pp.4956-4958, 2014.
[9] Kaveri Kamble, Ramesh Kagalkar, “A Review: Translation of Text to Speech
Conversion for Hindi Language”, International Journal of Science and Research (IJSR), Volume 3, Issue 11, pp.1027-1031, 2014.
[10] Utpal Garain, Atishay Jain, Anjan Maity, Bhabatosh Chanda, “Machine Reading of Camera-Held Low Quality Text Images: an ICA-Based Image Enhancement Approach for Improving OCR accuracy”, IEEE, 2008.
[11] Matteo Brisinello, Ratko Grbic, Matija Pul, Tihomir Andelic, “Improving Optical Character Recognition performance for low quality images”, 59th International Symposium ELMAR, pp.167-171, 2017.
[12] Asit Kumar, Sumit Gupta, “Detection and Recognition of Text from Image using Contrast and Edge Enhanced MSER Segmentation and OCR”, International Journal Online Of Science, Vol. 3, Issue 3, pp.1-7, 2017.

B. Plagiarism Report

Completed: 100% Checked | 0% Plagiarism | 100% Unique

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Text Extraction and Transaction from Image using ML in Android Dinesh Ahuja Jai Amesar Abhishek ...	- Unique
Abstract— There are several OCR applications and Translation applications available for various OS i...	- Unique
This application will be different from other applications in terms of efficiency and accuracy.	- Unique
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These Images can be used to develop a printed books from a soft copy and can be used for editing a ...	- Unique
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When the value of format accuracy is 0%, this indicates that no text format was detected by the applic...	- Unique

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100% Checked

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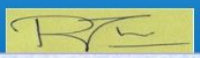

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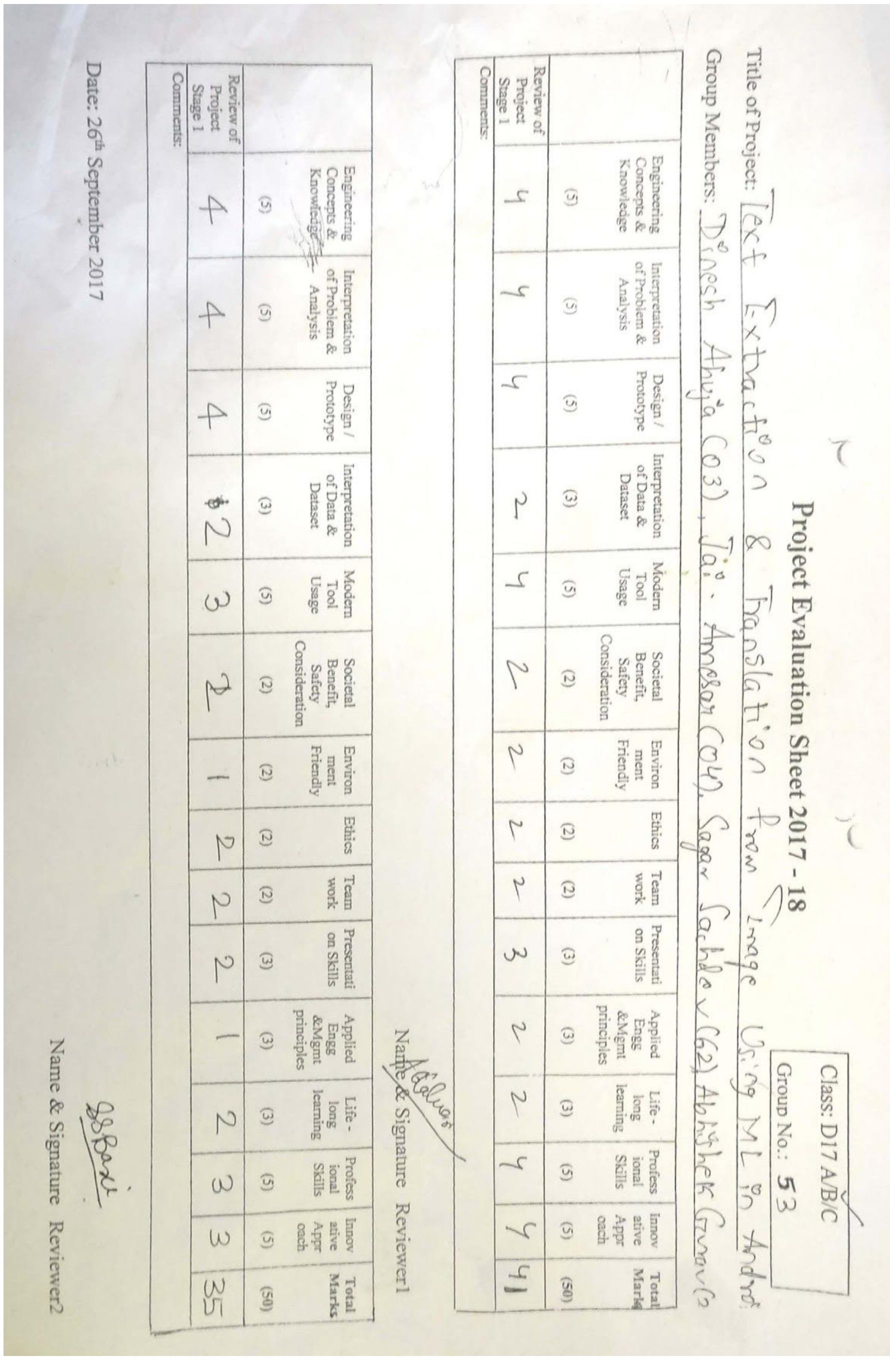
Review 1:



Project Evaluation Sheet 2017 - 18

Class: D17 A/B/C

Group No.: 53

Title of Project: Text Extraction & Translation from Image Using ML in Android

Group Members: Dinesh Ahuja (03), Jai Annsari (04), Sagar Sachdev (62), Abhishek Grover (?)

	Engineering Concepts & Knowledge	Interpretation of Problem & Analysis	Design / Prototype	Interpretation of Data & Dataset	Modern Tool Usage	Societal Benefit, Safety Consideration	Environment Friendly	Ethics	Team work	Presentation Skills	Applied Engg &Mgmt principles	Life - long learning	Professional Skills	Innovative Approach	Total Marks
	(5)	(5)	(5)	(3)	(5)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(5)	(5)	(50)
Review of Project Stage 1	4	4	4	2	4	2	2	2	2	3	2	2	4	4	41

Comments:

Name & Signature Reviewer1

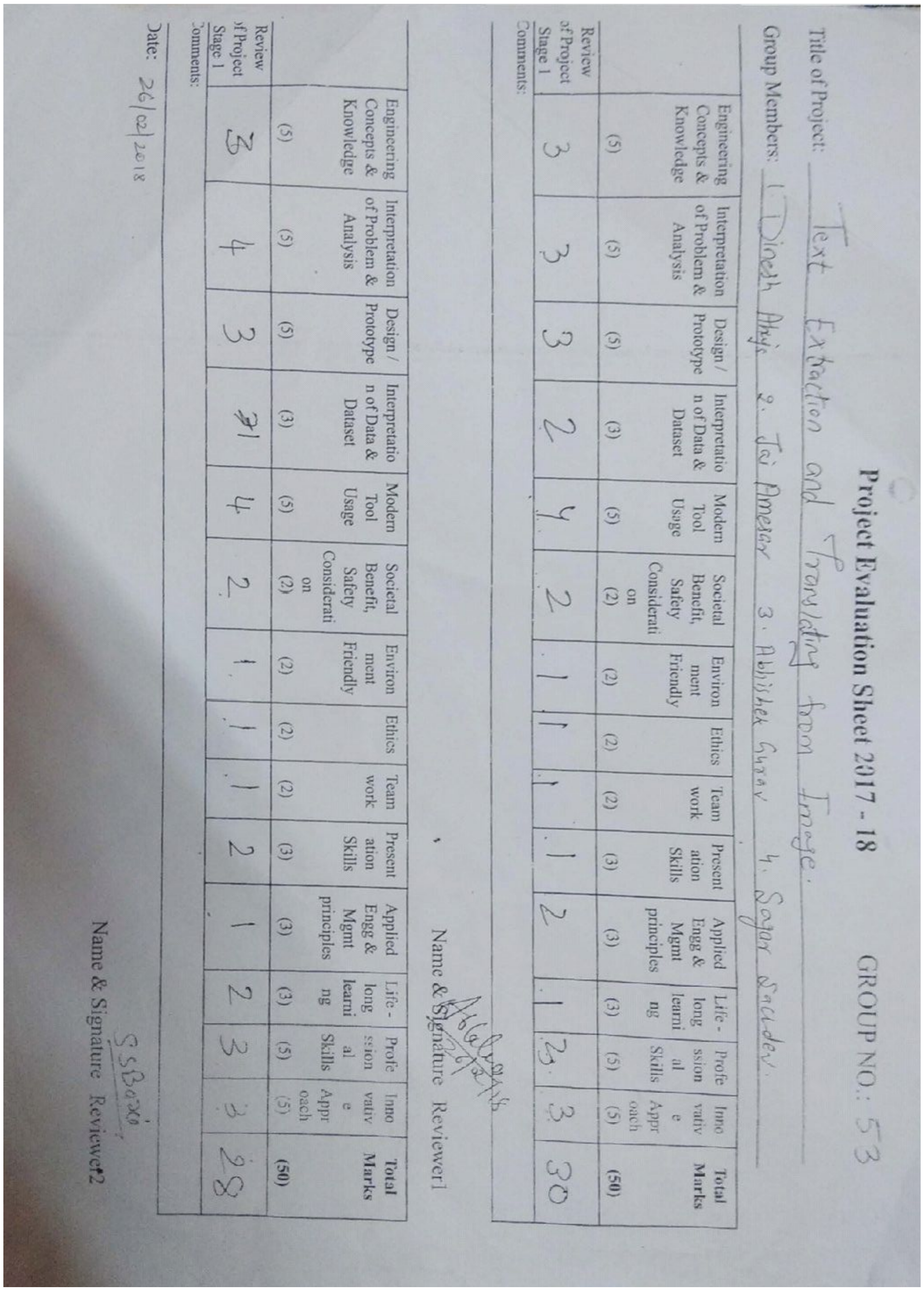
	Engineering Concepts & Knowledge	Interpretation of Problem & Analysis	Design / Prototype	Interpretation of Data & Dataset	Modern Tool Usage	Societal Benefit, Safety Consideration	Environment Friendly	Ethics	Team work	Presentation Skills	Applied Engg &Mgmt principles	Life - long learning	Professional Skills	Innovative Approach	Total Marks
	(5)	(5)	(5)	(3)	(5)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(5)	(5)	(50)
Review of Project Stage 1	4	4	4	2	3	2	1	2	2	2	1	2	3	3	35

Comments:

Date: 26th September 2017

Name & Signature Reviewer2

Review 2:



Project Evaluation Sheet 2017 - 18 GROUP NO.: 53

Title of Project: Text Extraction and Translating from Image.

Group Members: 1. Dinesh Ahuja 2. Jai Ameesar 3. Abhishek Gurav 4. Sagar Sadadev.

Engineering Concepts & Knowledge	Interpretation of Problem & Analysis	Design / Prototype	Interpretation of Data & Dataset	Modern Tool Usage	Societal Benefit, Safety Consideration	Environment Friendly	Ethics	Team work	Presentation Skills	Applied Engg & Mgmt principles	Life-long learning	Professional Skills	Innovative Approach	Total Marks
(5)	(5)	(5)	(3)	(5)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(5)	(5)	**(50)**
3	3	3	2	4	2	1	1	1	1	2	1	3	3	30

Review of Project Stage 1

Comments:

Name & Signature Reviewer1

Engineering Concepts & Knowledge	Interpretation of Problem & Analysis	Design / Prototype	Interpretation of Data & Dataset	Modern Tool Usage	Societal Benefit, Safety Consideration	Environment Friendly	Ethics	Team work	Presentation Skills	Applied Engg & Mgmt principles	Life-long learning	Professional Skills	Innovative Approach	Total Marks
(5)	(5)	(5)	(3)	(5)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(5)	(5)	**(50)**
3	4	3	1	4	2	1	1	1	2	1	2	3	3	28

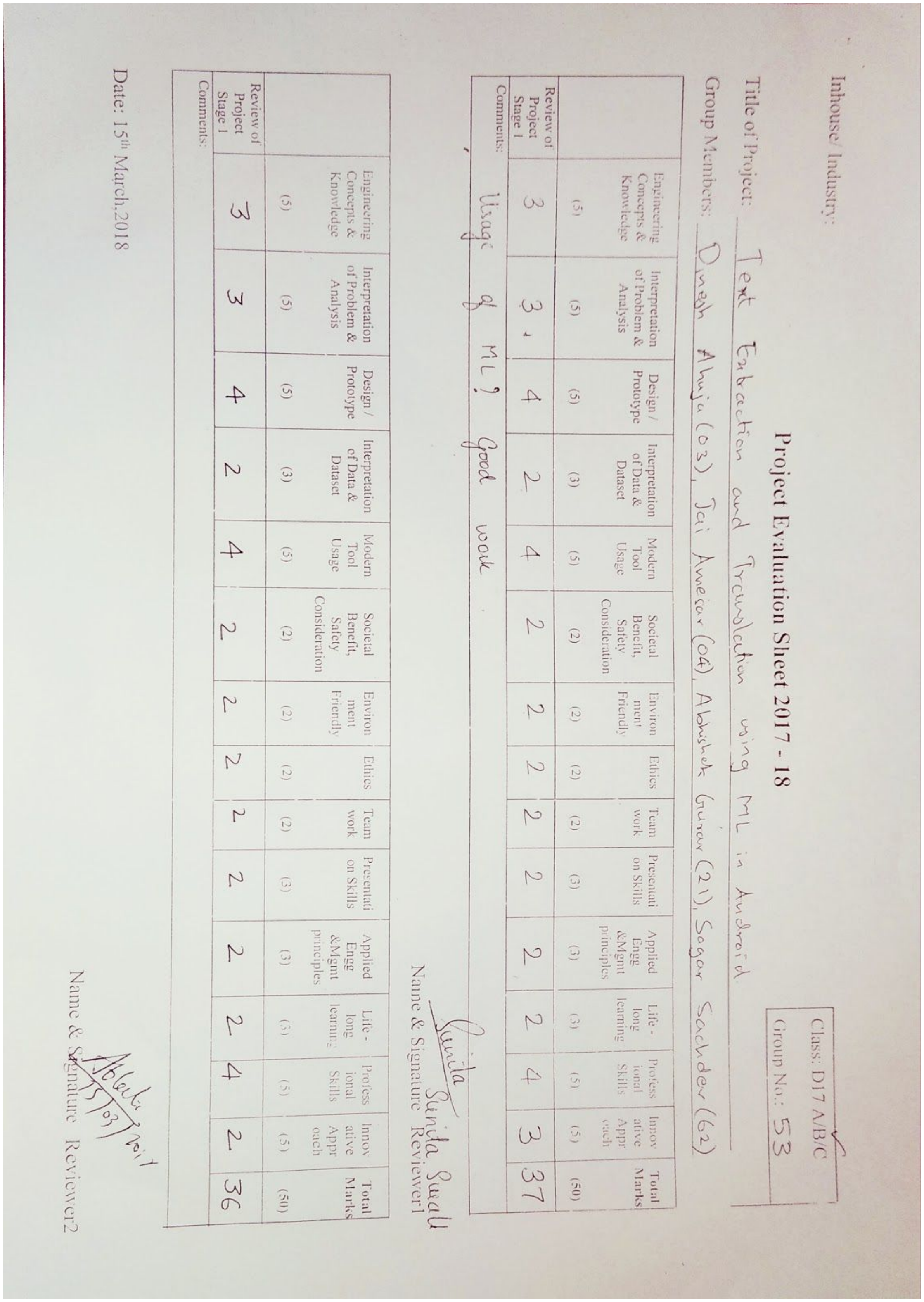
Review of Project Stage 1

Comments:

Date: 26/02/2018

Name & Signature Reviewer2

Review 3:



Inhouse/ Industry:

Class: D17 A/B/C ✓

Group No.: 53

Project Evaluation Sheet 2017 - 18

Title of Project: Text Extraction and Translation using ML in Android

Group Members: Dinesh Ahuja (03), Jai Amesar (04), Abhishek Gurav (21), Sagar Sachdev (62)

	Engineering Concepts & Knowledge (5)	Interpretation of Problem & Analysis (5)	Design / Prototype (5)	Interpretation of Data & Dataset (3)	Modern Tool Usage (5)	Societal Benefit, Safety Consideration (2)	Environment Friendly (2)	Ethics (2)	Team work (2)	Presentation Skills (3)	Applied Engg &Mgmt principles (3)	Life - long learning (3)	Professional Skills (5)	Innovative Approach (5)	Total Marks (50)
Review of Project Stage 1	3	3	4	2	4	2	2	2	2	2	2	2	4	3	37

Comments: Usage of ML? Good work

Sunita Sunita Suralk
Name & Signature Reviewer1

	Engineering Concepts & Knowledge (5)	Interpretation of Problem & Analysis (5)	Design / Prototype (5)	Interpretation of Data & Dataset (3)	Modern Tool Usage (5)	Societal Benefit, Safety Consideration (2)	Environment Friendly (2)	Ethics (2)	Team work (2)	Presentation Skills (3)	Applied Engg &Mgmt principles (3)	Life - long learning (3)	Professional Skills (5)	Innovative Approach (5)	Total Marks (50)
Review of Project Stage 1	3	3	4	2	4	2	2	2	2	2	2	2	4	2	36

Comments:

Date: 15th March,2018

15/03/2017
Name & Signature Reviewer2