Let's Textify

A PROJECT REPORT

Submitted by

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201250107501

In partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

In

Computer Engineering

Shree Swaminarayan Institute of Technology, Bhat

Gujarat Technological University, Ahmedabad

May, 2023

Shree Swaminarayan Institute of Technology

Bhat, Gandhinagar

CERTIFICATE

This is to certify that the project report submitted along with the project entitled **Let's Textify** has been carried out by **Pandya Ajaykumar Mahendrabhai** under my guidance in partial fulfillment for the degree of Bachelor of Engineering in **Computer Engineering**, 8th Semester of Gujarat Technological University, Ahmadabad during the academic year 2022- 23.

Prof. Darshankumar Solanki	**Prof. Niraj Thakor**	**Dr. Ramesh Prajapati**
Internal Guide	Project Co-ordinator	Head of the Department
Computer Engineering	Computer Engineering	Computer Engineering

GUJARAT TECHNOLOGICAL UNIVERSITY

CERTIFICATE FOR COMPLETION OFALLACTIVITIES AT ONLINE PROJECT PORTAL

B.E. SEMESTER VIII, ACADEMIC YEAR 2022-2023

Date of certificate generation: 14 May 2023 (10:53:59)

This is to certify that, *Pandya Ajaykumar Mahendrabhai* (Enrolment Number - 201250107501) working on project entitled with *LetsTextify* from *Computer Engineering* department of *SHREE SWAMINARAYAN INSTITUTE OF TECHNOLOGY, BHAT, GANDHINAGAR* had submitted following details at online project portal.

Internship Project Report	**Completed**

Name of Student: Pandya Ajaykumar Mahendrabhai

Name of Guide: Mr. DARSHANKUMAR NARENDRABHAI SOLANKI

Signature of Student: _____

*Signature of Guide: _____

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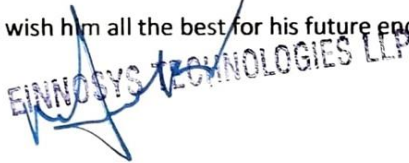
eInnoSys

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ajaykumar Pandya**, a student of **Shree Swaminarayan Institute of Technology**, has successfully completed his internship during the period **27 January, 2023 to 29 April, 2023** under the guidance of **Mr. Bhavik Patel** at eInnoSys Technologies LLP.

His internship activities include Project: LetsTexify

During the period of his internship program with us, he had been exposed to different processes and was found diligent, hardworking and inquisitive.

We wish him all the best for his future endeavors.

Authorized Signatory
eInnoSys Technologies LLP.

Shree Swaminarayan Institute of Technology

Bhat, Gandhinagar

DECLARATION

We hereby declare that the Internship report submitted along with the Internship entitled **Let's Textify** submitted in partial fulfillment for the degree of Bachelor of Engineering in Computer Engineering to Gujarat Technological University, Ahmedabad, is a Bonafede record of original Internship work carried out by me at **eInnoSys Technologies LLP** under the supervision of Bhavik Patel and that no part of this report has been directly copied from any students' reports or taken from any other source, without providing due reference.

	Name of the Student	Sign of Student
1	AjayKumar Pandya	

ACKNOWLEDGEMENT

I sincerely feel the credit of the project work could not be narrowed down to only on individual. The development of this project involves many valuable contributions. Getting the opportunity for this project of "**Let's Textify**" as fulfilment of Bachelor of Engineering (Computer Engineering) has been brightening experience for the near future to come and a focus on excellence in this venture, we are constantly guided and encouraged by Mr. **Bhavik Patel** who is our external guide.

I would also thank our Head of the Department **Mr. Ramesh Patel** for giving us such a wonderful chance to work in this Internship for the entire duration of the Internship-2023 and also thanks to Internal Guide **Mr. Darshankumar Solanki** for technical guidance and giving an inspiration in all the way during Internship period. Finally, I would like to thank our parents, friends and almighty for being with us to support directly or indirectly during this Internship period.

ABSTRACT

Nowadays everything is getting in digital format, so to make everything digital we need to put manual efforts.

Suppose, I have a document (ex. A books page) and I need to make it in a digital document so I need to write everything manually. But if we have a solution which can identify the texts from an image, that would be a very easy and faster process. That's why I have decided to choose this project as my final year project.

This Project basically does takes input as an image and performs OCR operation on it & gives the result back. If I have multiple same types of pages and I need to extract the text then this will be the perfect solution. I take an Image for teaching the algorithm and after the teaching process done you can easily start the batch and get your data into word format.

All just I need to say that this is going to be the challenging task I like to take challenges that's the reason behind selecting this project.

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CHAPTER-1: INTRODUCTION

1.1 COMPANY INTRODUCTION

- eInnoSys is a pure play automation company for semiconductor and other related industries such as PV (solar), MEMS, Flat Panel Display (FPD), LED and other such electronics industries. We serve Equipment Manufacturers (OEMs) and factories – Fabs, ATMs (Assembly Test Manufacturing).

- eInnoSys is a customer centric and solution-oriented company, offering automation products as well as custom automation solutions for OEMs and factories.

- This company has their own patented product from India as well has a global appearance.

- This is an MNC company that works over many countries.

CHAPTER-2: INTERNSHIP MEANS

- A period of time during which someone works for a company or organization in order to get experience of a particular type of work.

- Typically undertaken by students and graduates looking to gain relevant skills and experience in a particular field.

- Employers benefit from these placements because they often recruit employees from their best interns who have known capabilities.

- An internship is a professional learning experience that offers meaningful, practical work related to students' field of study or career interest.

- An internship gives a student the opportunity for career exploration and development and to learn new skills.

2.1   AIM OF THE INTERNSHIP

- To prepare our self and to work individually.

- To get the knowledge of each team member in various subject which we have studied up till.

- To develop an attitude of inquiry.

- To develop skill in various functions of manufacturing.

- To develop problem solving skill.

- To develop skill of process planning & decision – making.

- To develop ability of report writing.

- To develop interdisciplinary exposure.

- To develop the skill of analyzing & evaluating of available data.

- Apply knowledge about practical situation.

- To adopt the change of environment.

- To understand & accept information and information of running technology

- Quality control standard may be strong.

- To calculate the cost, cost estimation, & costing.

- To select the good ideas & good thinking.

- To provide & develop the decision making.

- To improve unity & discipline.

CHAPTER-3: INTRODUCTION TO PROJECT

3.1   PROJECT SUMMARY & PROFILE

- This application can help you to extract texts from a digital image.
- We just need to provide an image & some related preprocessing parameters.
- Anyone who is in need of text extraction this is the perfect solution.

3.2   PURPOSE

Let's Textify project in .net (C#) is planned for Text extraction, needy people who just have lots of images and that needs to be converted to text. This application is going to help them. There are various image processing fundamentals are used. I have used one of the popular OCR algorithms and tried to improve it.

3.2.1 FEATURES

- **Performs Image Processing.**

  This converts image to better readable format, so it will be easily readable by OCR algorithm.

- **Image to Text**

  Converts image to text using OCR.

- **Convert QR code to the text**

  Converts QR code image to its original text.

- **Convert PDF to a Word file**

  Converts PDF to a word file.

3.3 OBJECTIVES

A World is getting digital in all the areas and filed. For being digitalized we need all the current information based on paper to an electronic document. For doing that we have to apply too much of manual efforts. But if we have this solution, then this process will speed up and the world is going to be changed faster.

3.4   TECHNOLOGIES

3.4.1 SOFTWARE & TOOLS USED

C# (Windows Form)

C# is a popular object-oriented programming language developed by Microsoft. It is commonly used for developing Windows desktop applications, web applications, and games. When used with Windows Forms, C# provides a powerful framework for building graphical user interfaces (GUIs) that run on the Windows operating system.

Windows Forms is a part of the .NET Framework, a software development framework developed by Microsoft.

When building a Windows Forms application with C#, developers use a drag-and-drop interface builder to create the visual components of the user interface, such as buttons, textboxes, and menus. They then write code to handle events, such as button clicks, and to perform operations based on user input.

Feature of C# includes:

- Strong typing: C# is a strongly-typed language, which means that variables and functions must be explicitly defined with a data type. Object-oriented programming: C# is an object-oriented language, which means that code is organized around objects that represent real-world concepts.

- Automatic memory management: C# uses a garbage collector to automatically manage memory, which helps prevent memory leaks and other memory-related errors.

- Exception handling: C# provides a powerful exception handling mechanism that allows developers to gracefully handle errors and prevent their applications from crashing.

- Overall, C# with Windows Forms provides a powerful and easy-to-use platform for building Windows desktop applications. Its strong typing, object-oriented programming, and automatic memory management features make it a popular choice for developers.

EMGUCV

EMGU CV is a cross-platform .NET wrapper for the popular computer vision library OpenCV. It provides a set of tools and libraries that allow developers to easily integrate computer vision and image processing capabilities into their .NET applications.

EMGU CV allows developers to access the vast collection of image processing and computer vision algorithms provided by OpenCV, such as image filtering, feature detection, object recognition, and more. It also provides an easy-to-use interface for working with images and videos, including support for common image file formats.

Some of the key features of EMGU CV include:

- Cross-platform compatibility: EMGU CV is compatible with both Windows and Linux, and can be used with a variety of programming languages, including C#, VB.NET, and F#.

- Object-oriented programming: EMGU CV provides a simple and intuitive object-oriented programming interface that makes it easy to work with images and videos.

- Real-time image processing: EMGU CV is optimized for real-time image processing and can handle high-speed video streams with ease.

- GPU acceleration: EMGU CV provides support for GPU acceleration, allowing developers to take advantage of the processing power of modern graphics cards.

EMGU CV is used in a wide range of applications, including robotics, surveillance systems, medical imaging, and more. It is widely regarded as one of the best computer vision libraries for .NET, and is a popular choice for developers looking to add image processing and computer vision capabilities to their applications.

Tesseract

Tesseract is a popular open-source optical character recognition (OCR) engine. It was originally developed at Hewlett-Packard in the 1980s, but has since been maintained by Google and a community of contributors.

Tesseract is designed to recognize text in images and convert it into machine-readable text that can be used by other applications.

It is capable of recognizing text in over 100 languages, and can handle a wide variety of image formats, including scanned documents, photographs, and screenshots.

While Tesseract is a popular and widely-used open-source OCR engine, there are some potential drawbacks and limitations to consider:

- Accuracy can be inconsistent: While Tesseract is known for its high accuracy, the quality of its output can vary depending on the quality of the input image and the language being recognized.

- Limited support for handwriting recognition: Tesseract is primarily designed for recognizing printed text, and may struggle with recognizing handwriting or other non-standard fonts.

- Lack of built-in user interface: Tesseract provides a command-line interface, but does not come with a graphical user interface out of the box. This can make it more difficult to use for developers who are not comfortable working with command-line tools.

- Limited support for layout analysis: Tesseract is primarily focused on recognizing text, and does not provide robust tools for analyzing document layouts or identifying page elements such as tables, columns, or images.

- Limited support for document formats: While Tesseract can handle a wide variety of image formats, it does not provide built-in support for common document formats such as PDF or Microsoft Word.

    Overall, while Tesseract is a powerful and widely-used OCR engine, it may not be the best choice for all OCR use cases, particularly those involving handwriting or complex document layouts. Additionally, developers may need to invest additional time and resources in developing custom tools and interfaces to work with Tesseract effectively.

MYSQL

- MySQL is a popular open-source relational database management system that is used by many organizations for storing, managing, and retrieving large amounts of data. MySQL is known for its speed, reliability, and scalability, and it is used in a wide range of applications, from small websites to large enterprise systems.

- One of the main benefits of MySQL is its ease of use. With its simple and intuitive syntax, even beginners can quickly learn to use MySQL for their database needs. MySQL also offers a range of tools and features that make it easy to manage and monitor your database, such as the MySQL Workbench, which provides a visual interface for designing and managing your database schema.

- MySQL is also highly scalable, meaning it can handle large amounts of data and a high volume of requests. This makes it an ideal choice for web applications that need to handle large amounts of traffic and user data. Additionally, MySQL supports a variety of storage engines, allowing you to choose the one that best fits your needs.

- Another advantage of MySQL is its strong security features. MySQL allows you to control user access to your database, set up encrypted connections, and audit database activity to ensure that your data is secure and protected.

- Overall, MySQL is a powerful and versatile database management system that offers a range of benefits for organizations of all sizes. Whether you are building a small website or a large enterprise system, MySQL can help you manage your data more efficiently and effectively.

CHAPTER-4: PROJECT MANAGEMENT

4.1   PROJECT PLANNING

4.1.1   PROJECT DEVELOPMENT APPROACH

Software Process Model: To solve actual problem in industry, software

developer or a team of developer must incorporate a development strategy

that encompasses the process, methods and tools layer and generic phases.

Our Project Follows the Increment Model Because

- Increment model easy to implement
- Step by step development
- Less costly
- Easy to test and debug
- Flexible
- Easy to manage risk
- Easy to solve query on any phase.

STEP OF INCREAMENT MODEL ARE:

- Requirement & feasibility study
- Analysis
- System Design
- Coding
- Testing
- Maintenance

INCREMENT MODEL:

The increment model applies the waterfall model incrementally.

The series of releases is referred to as "increment", with is increment

providing more Functionality to the customer. After the first increment, a

core product is delivered, which can already be used by the customer.

Based on customer feedback, a plan is developed for next increments, and

modifications are made accordingly.

This process continues, with increment being delivered until the complete product
is delivered.

4.1.2 PROJECT PLAN

There are several phases in project plan:

- **Feasibility study**
- **Requirement analysis and specification**
- **Design**
- **Coding and Unit testing**
- **Integration and System Testing**
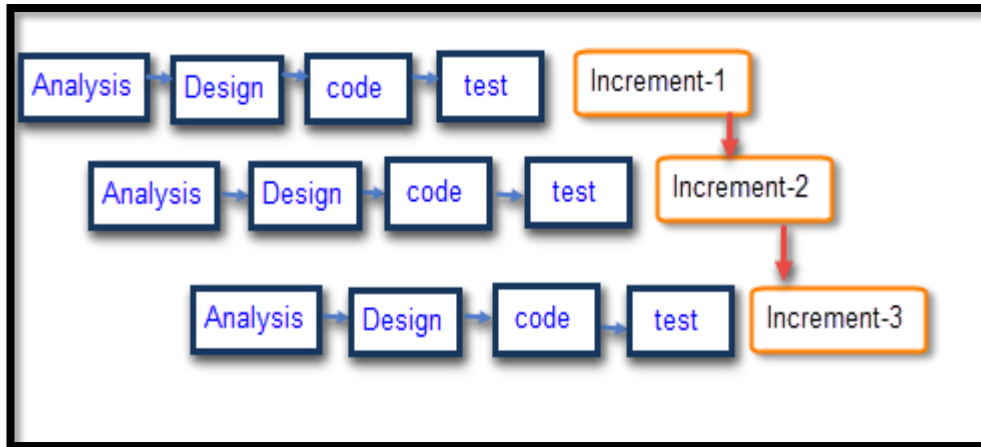- **Maintenance**

FIGURE 4.1: INCREMENTAL MODEL

Feasibility Study

- The main aim of feasibility study is to determine whether it would be financially and technically feasible to develop the product.

- At first project managers or team leaders' study different input data to the system and output data to be produced by the system. The feasibility study concentrates on the following area.

- **Operational Feasibility:** Operational feasibility study tests the operational scope of the software to be developed. The proposed software must have high operational feasibility. The usability will be high.

- **Technical Feasibility:** The technical feasibility study compares the level of technology available in the software development area and the level of technology required for the development of the product. Here the level of technology consists of the programminglanguage, the hardware resources, other software tools etc.

- **Economic Feasibility:** The economic feasibility study evaluates

The cost of the software development against the income or benefitsgets from the developed system. There must be scopes for profit after the successful Completion of the project.

- **Requirements analysis and specification:**

  The aim of the requirements analysis and specification phase is to understand the exact requirements of the customer and to document them properly. This phase consists of two

  - ✓ distinct activities, namely
  - ✓ Requirements gathering and analysis, and
  - ✓ Requirements specification

- **Requirements gathering:** The goal of the requirement's gathering activity is to collect all relevant information from the customer regarding the product to be developed. This is done to clearly understand the customer requirements so that incompleteness and inconsistencies are removed.

- **Requirements analysis:** This activity is begun by collecting all relevant data regarding the product to be developed from the users of the product and from the customer through interviews and discussions.

- **Requirements specification:** During SRS activity, the user requirements are systematically organized into a Software Requirements Specification (SRS) document.

- **Design**

  During the design phase the software architecture is derived from the SRS document. Two distinctly different approaches are available.

- **Coding and unit testing (Implementation)**

  The purpose of the coding and unit testing phase of software development is to translate the software design into source code.

  Each component of the design is implemented as a program module. The end-product of this phase is a set of program modules that have been individually tested.

  Each module is unit tested for determine the correct working of all the individual modules.

- **Integration and system testing**

  Integration of different modules is done once they have been coded

  and unit tested. During the integration and system testing phase,

  the modules are integrated.

  Finally, when all the modules have been successfully integrated

  and tested, system testing is carried out. The goal of system testing

  is to ensure that the developed system conforms to its requirements

  specifies in the SRS document.

  System testing usually consists of three different kinds of testing activities.

- **α – testing:** It is the system testing performed by the development team.

- **β – Testing:** It is the system testing performed by a friendly set of customers.

- **Acceptance testing:** It is the system testing performed by the

  customer himself after the product delivery to determine whether

  to accept or reject the delivered product.

- **Maintenance**

- Maintenance involves performing any one or more of the

  following three kinds of activities:

- Correcting errors that were not discovered during the product

  development phase. This is called **corrective maintenance**.

- Improving and enhancing the functionalities of the

  system according to the customer's requirements. Thisis

  called **perfective maintenance**.

Porting the software to work in a new environment. For example, porting may be required to get the software to work on a new computer platform or with a new operating system. This is called adaptive maintenance.

4.1.3 ROLES AND RESPONSIBILITIES

This whole system is designed and developed by me under guidance of my project guide and internal guide. They are providing   good information for how to build the project to all the basic fundas.
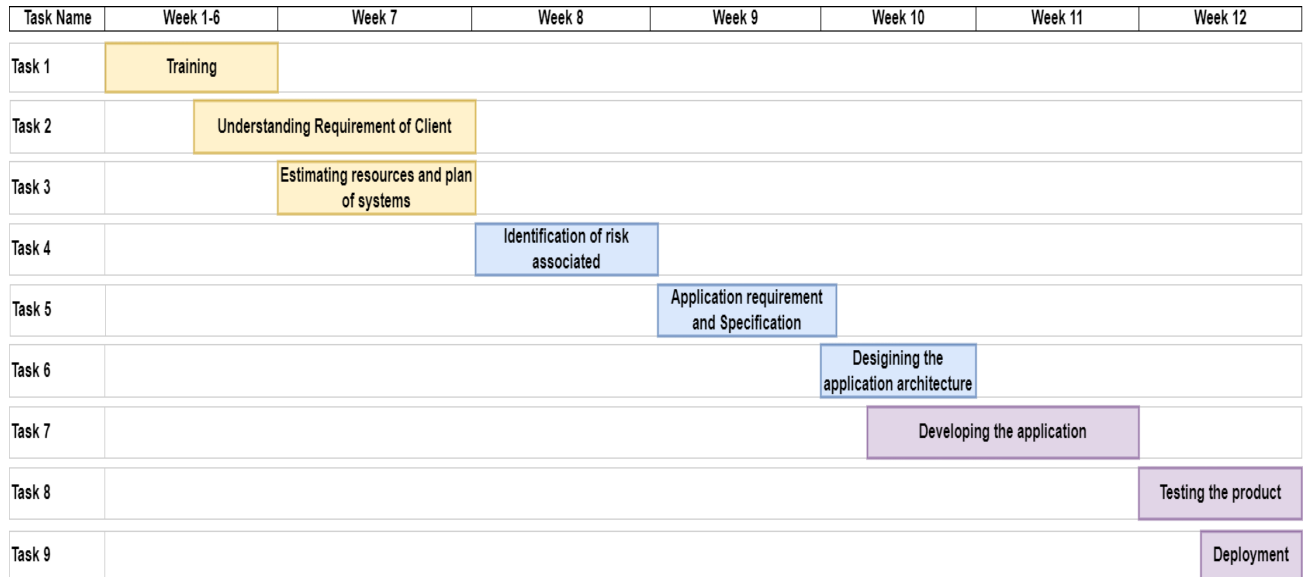
4.2   PROJECT SCHEDULING

Task Name	Week 1-6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Task 1	Training						
Task 2		Understanding Requirement of Client					
Task 3		Estimating resources and plan of systems					
Task 4			Identification of risk associated				
Task 5				Application requirement and Specification			
Task 6					Designing the application architecture		
Task 7						Developing the application	
Task 8							Testing the product
Task 9							Deployment

FIGURE 4.2: GANTT CHART

4.3   RISK MANAGEMENT

4.3.1   RISK IDENTIFICATION

Risk identification is a systematic attempt to specify threats to the project plan. There are two types of risks are there: Generic and Product Specific. One method for identifying risks is to create a risk item checklist.

- Technical Risk
- People Risk
- Organization Risk
- Estimation Risk

Risk Analysis: Risk Analysis is the process of defining and analyzing threats or dangers of project and impact on project. Risk Analysis could be Quantitative or Qualitative.

Quantitative Method: It is often used for decision making in project. This method can be used when the level of risk is low.

Qualitative Method: It is often used when the level of risk is high.

4.3.2   RISK PLANNING

- **Risk Planning:** it is the plan for forecast the risk, estimate impact and define responses to issues.

- Consider each risk and develop a strategy to manage that risk.

- **Avoidance Strategies:** the probability that the risk will arise is reduced.

- **Minimization Strategies:** the impact of the risk on the project or produce will be reducing.

- **Contingency Plan**: if the risk arises, contingency plans are plans to deal with that risk.

4.4   ESTIMATION

4.4.1 EFFORT ESTIMATION

- Effort Estimation is the process of forecasting the approximate time, cost and effort to complete project.

- Various Methods are used for effort Estimation. E.g.

- Factor Analysis

- Multiplication method

- Delphi Method etc.

CHAPTER-5: SYSTEM REQUIREMENTS STUDY

5.1 SRS DOCUMENT

R: - Let's Textify

R1: - Image to Text

R1.1: - Recipe Management

Input: - Recipe

Name

Output: - Create, Update or Delete and Show recipe.

Process: - Creates a recipe with given Recipe name. Able to update
and delete it too. Also shows the recipe list for selection.

R1.1: - Image Teaching

Input: - Image ROI, Pre-Processing and recognition parameters.

Output: - Extracted Text based on parameters given

Process: - Performs the Pre-Processing on image after cropping the
Image. Now Pre-Processed will be passed to Recognition
algorithm and then the post-Processing will do its work and OCR
text will be viewed on the screen.

R1.2: - Compare OCR

Input: - Image with and without pre-processing

Output: - Shows the Pre-Processed and A normal cropped
image with its OCR output

Process: - Performs OCR on both the images and show the
comparing result on the screen

R1.2: - Preview

Input: - An Image with all the params saved in teaching screen

Output: - Show the Image and extracted text on the screen with continuous moving images

Process: - Performs OCR on the images and shows the result on the screen.

R2: - PDF to Word

R2.1: - Converts a PDF file to word

Input: - PDF File

Output: - Converted Word File

Process: - Takes a PDF file as a Input and converts it to word by doing the copy pasting the texts and images on the same page.

R3: - QR code reader

R3.1: - Converts a QR code image to readable text

Input: - Image file

Output: - Extracted text from an image,

Process: - Takes an image file as a Input and converts it to text.

R4: - About

Shows the about form in the application.

R5: - Exit

Exits the application.

5.2 EXISTING SYSTEM / SCENARIO

For doing everything in digital format we need to do out manual efforts, this can be minimized by the current available systems. But all the current available systems are not that reliable or accurate.

There is some problems in current OCR algorithm and that can be solved by some of the pre and post processing.

Many available OCR does the same job but the training is the must thing that needs to be performed.

So one time training is good but we can't do training for all the same pages.

5.3 PROPOSED SYSTEM

5.3.1 WHAT'S NEW?

- **Pre-Processing:** Preprocessing in image processing involves techniques such as image enhancement, image resizing, noise reduction, and color correction. Its main goal is to improve the quality of the image and make it suitable for further analysis or manipulation.

- **Post-Processing:** Post processing in image processing involves techniques such as image filtering, segmentation, and object detection. Its main goal is to extract useful information from the image and produce an output that is more meaningful and easier to interpret for human or machine understanding.

5.3.2 HARDWARE & SOFTWARE REQUIREMENTS

HARDWARE REQURIEMENTS:

- Standard Pc
- No Internet connection
- At least 5000 MB Hard Disk space
- System type: 64-bit Operating System,
- x64 base processor
- Installed memory (RAM):128MB (At least)

SOFTWARE REQURIEMENTS:

- Platform used: Windows like windows, windows 7, windows 8, windows 8.1, Windows 10.
- .Net 4.7.2
- MYSQL

5.3.3 ASSUMPTIONS AND DEPENDENCIES

Following are the assumptions and dependencies:

- This project is standalone project so it will not affect the system.

- We can easily access the application by just clicking the .exe

- But one thing we need to keep in mind is same resolution image is required in preview mode as based in teach mode.

- Image quality should be decent.

- There should very minimally noise on the image.

CHAPTER-6: SYSTEM ANALYSIS

6.1   FEASIBILITY STUDY

Feasibility is defined as the practical extent to which a project can be performed successfully.

To evaluate feasibility, a feasibility study is performed, which determines whether the solution considered to accomplish the requirements is practical and workable in the software. Information such as resource availability, cost estimation for software development, benefits of the software to the organization after it is developed and cost to be incurred on its maintenance are considered during the feasibility study. The objective of the feasibility study is to establish the reasons for developing the software that is acceptable to users, adaptable to change and conformable to established standards. Various other objectives of feasibility study are listed below.

- To analyze whether the software will meet organizational requirements
- To determine whether the software can be implemented using the current technology and within the specified budget and schedule
- To determine whether the software can be integrated with other existing software.

TECHNICAL FEASIBILITY:

Technical feasibility assesses the current resources (such as hardware and software) and technology, which are required to accomplish user requirements in the software within the allocated time and budget. For this, the software development team ascertains whether the current resources and technology can be upgraded or added in the software to accomplish specified user requirements. Technical feasibility also performs the following tasks.

- Analyzes the technical skills and capabilities of the software development team members
- Determines whether the relevant technology is stable and established

  Ascertains that the technology chosen for software development has a large number of users so that they can be consulted when problems arise or improvements are required.

OPERATIONAL FEASIBILITY:

Operational feasibility assesses the extent to which the required software performs a series of steps to solve business problems and user requirements. This feasibility is dependent on human resources (software development team) and involves visualizing whether the software will operate after it is developed and be operative once it is installed. Operational feasibility also performs the following tasks.

- Determines whether the problems anticipated in user requirements are of high priority
- Determines whether the solution suggested by the software development team is acceptable
- Analyzes whether users will adapt to a new software
- Determines whether the organization is satisfied by the alternative solutions proposed by the software development team.

ECONOMICAL FEALIBILITY

Economic feasibility determines whether the required software is capable of generating financial gains for an organization. It involves the cost incurred on the software development team, estimated cost of hardware and software, cost of performing feasibility study, and so on. For this, it is essential to consider expenses made on purchases (such as hardware purchase) and activities required to carry out software development. In addition, it is necessary to consider the benefits that can be achieved by developing the software. Software is said to be economically feasible if it focuses on the issues listed below.

- Cost incurred on software development to produce long-term gains for an organization
- Cost required to conduct full software investigation (such as requirements elicitation and requirements analysis)
- Cost of hardware, software, development team, and training.
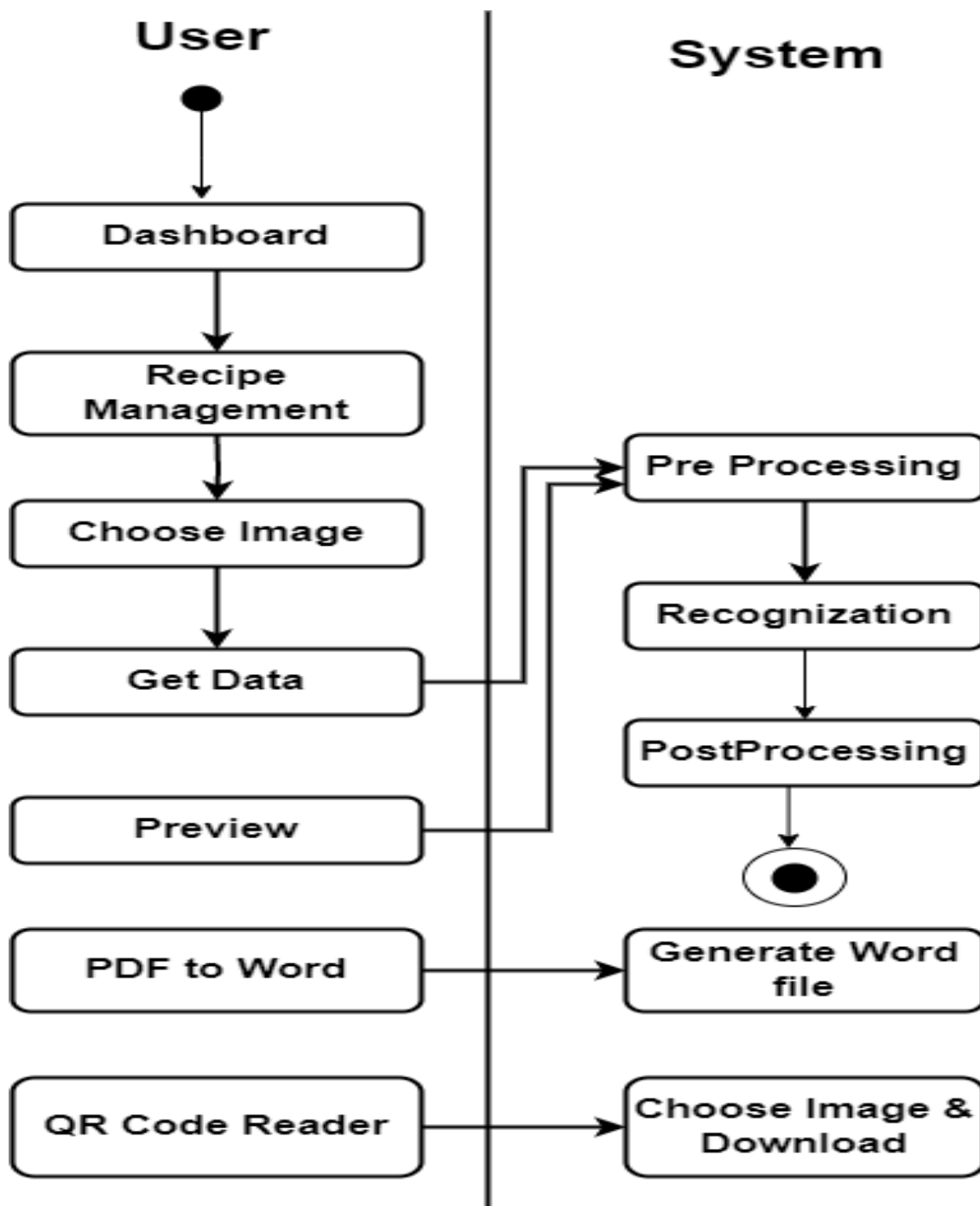
6.2 SYSTEM ACTIVITY DIAGRAM

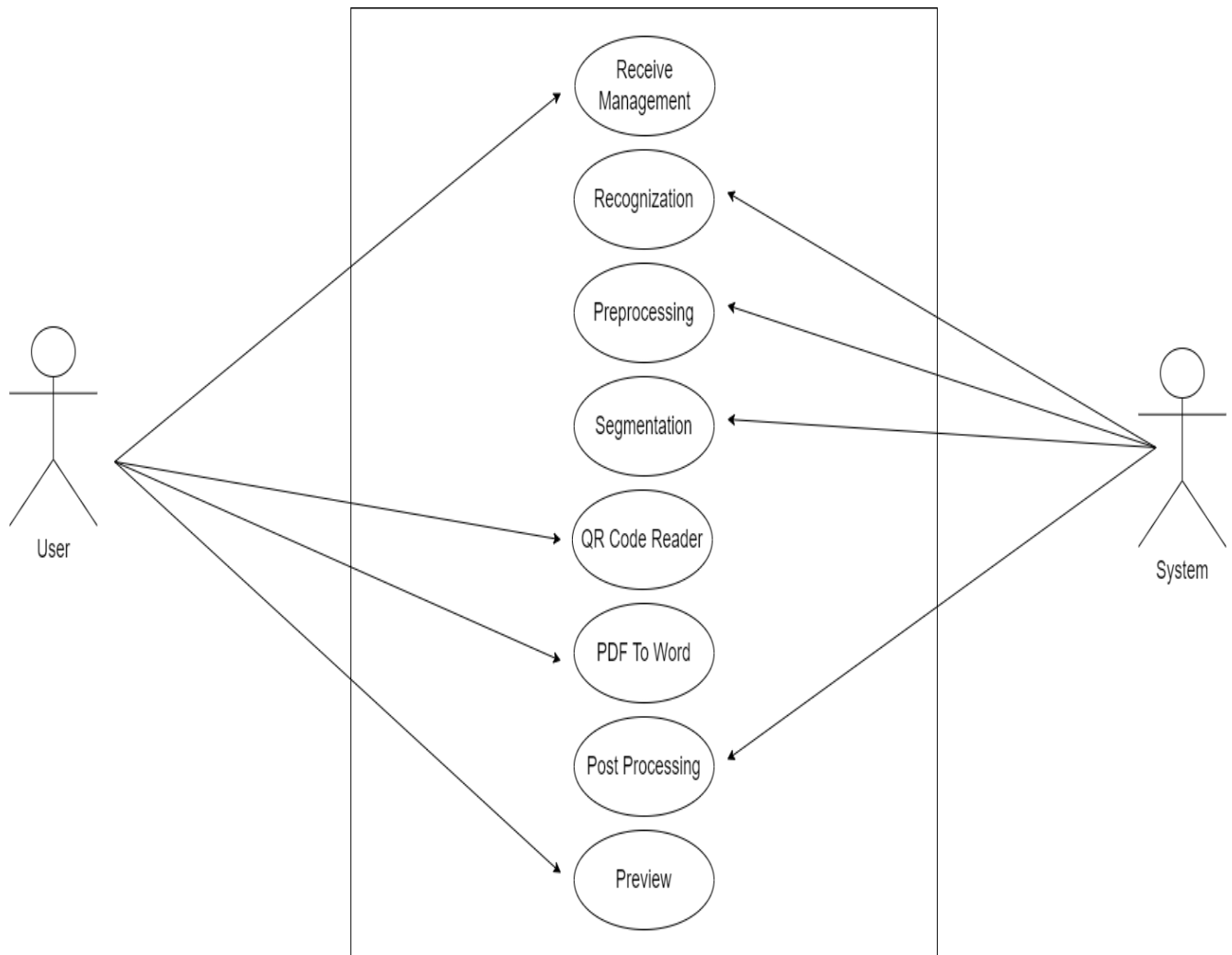**FIGURE 6.1: SYSTEM ACTIVITY DIAGRAM**

6.3   USECASE DIAGRAM

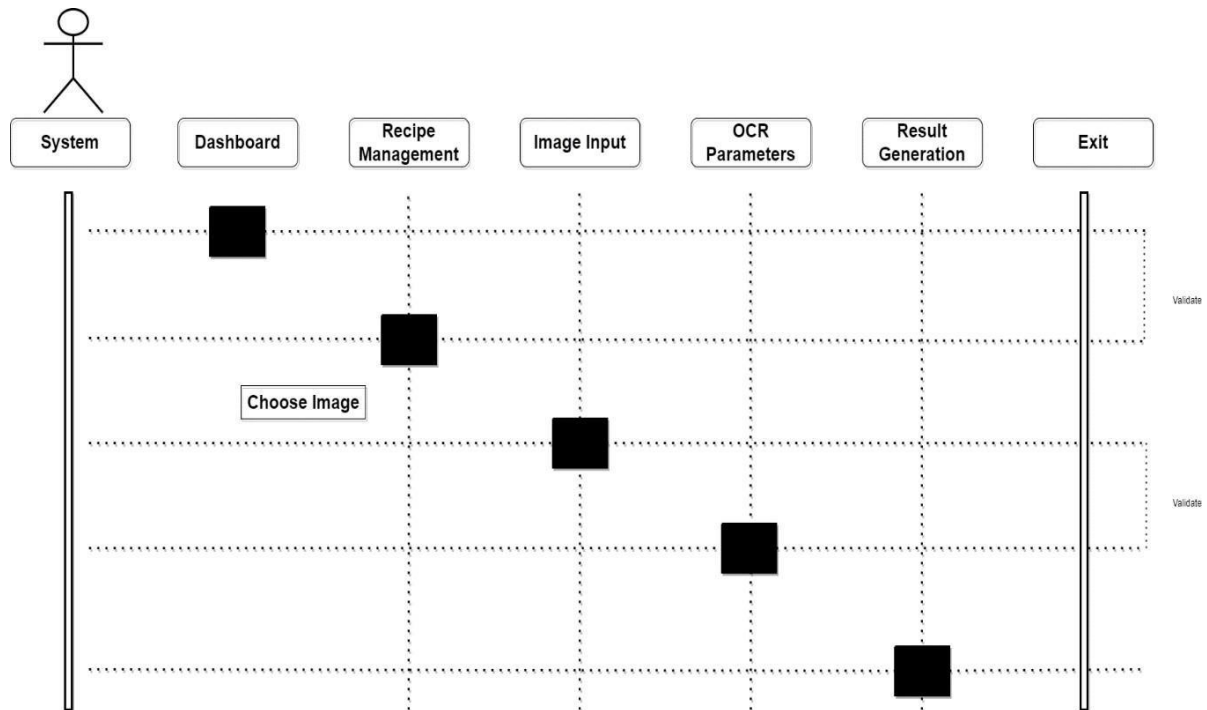**FIGURE 6.2: USECASE DIAGRAM**

6.4 SEQUENCE DIAGRAM

FIGURE 6.3: SYSTEM SEQUENCE DIAGRAM

CHAPTER-7: SYSTEM DESIGN

7.1 DATABASE DESIGN/DATA STRUCTURE DESIGN

7.1.1 DATA DICTIONARY

AUDITTRAIL

DataField	Datatype	Size	Constraint	Description
Audit_id	Int	11	PRIMARY KEY	Audit Id
Operation	Varchar	100	NOT NULL	Operation that performed
Recipe_ID	Int	11	FOREIGN KEY	Operation done on which recipe?
AuditMessage	varchar	500	NOT NULL	Message
Timestamp	TimeStamp		NOT NULL	TimeStamp for Operation

ERRORLOGMASTER

DataField	Datatype	Size	Constraint	Description
ErrorLogID	Int	11	PRIMARY KEY	Error Log Id
Query	varchar	500	NOT NULL	Query in which error occured
Timestamp	TimeStamp		NOT NULL	TimeStamp for Operation

RECIPEMASTER

DataField	Datatype	Size	Constraint	Description
RecipeId	Int	11	PRIMARY KEY	Recipe Id
TrainFile	Varchar	50	NOT NULL	Train File
RecipeName	Varchar	100	NOT NULL	Recipe Name
PSMValue	Int	11	NOT NULL	PSM Value
DataType	Varchar	100	NOT NULL	Data Type
OEMValue	Int	11	NOT NULL	OEM Value
ROIX	Int	11	NOT NULL	ROI X value
ROIY	Int	11	NOT NULL	ROI Y Value
ROIWidth	Int	11	NOT NULL	ROI Width
ROIHeight	Int	11	NOT NULL	ROI Height
Dilate	Int	11	NOT NULL	Dilate Value
Eorde	Int	11	NOT NULL	Erode Value
Smooth	Int	11	NOT NULL	Smooth Value
CharMaxWidth	Int	11	NOT NULL	Char Min Width
CharMaxheight	Int	11	NOT NULL	Char Max Height
CharMinWidth	Int	11	NOT NULL	Char Min Width
CharMinHeight	Int	11	NOT NULL	Char Min Height
IsEnable	Bool	1	NOT NULL	Is Enabled
UpdateDate	Int	11	NOT NULL	Updated Time
ThresholdMethod	Int	11	NOT NULL	Threshold Method
ThresholdMin	Int	11	NOT NULL	Threshold Min
Threshold Max	Int	11	NOT NULL	Threshold Max

7.1.2 ER DIAGRAM

FIGURE 7.1: ER Diagram
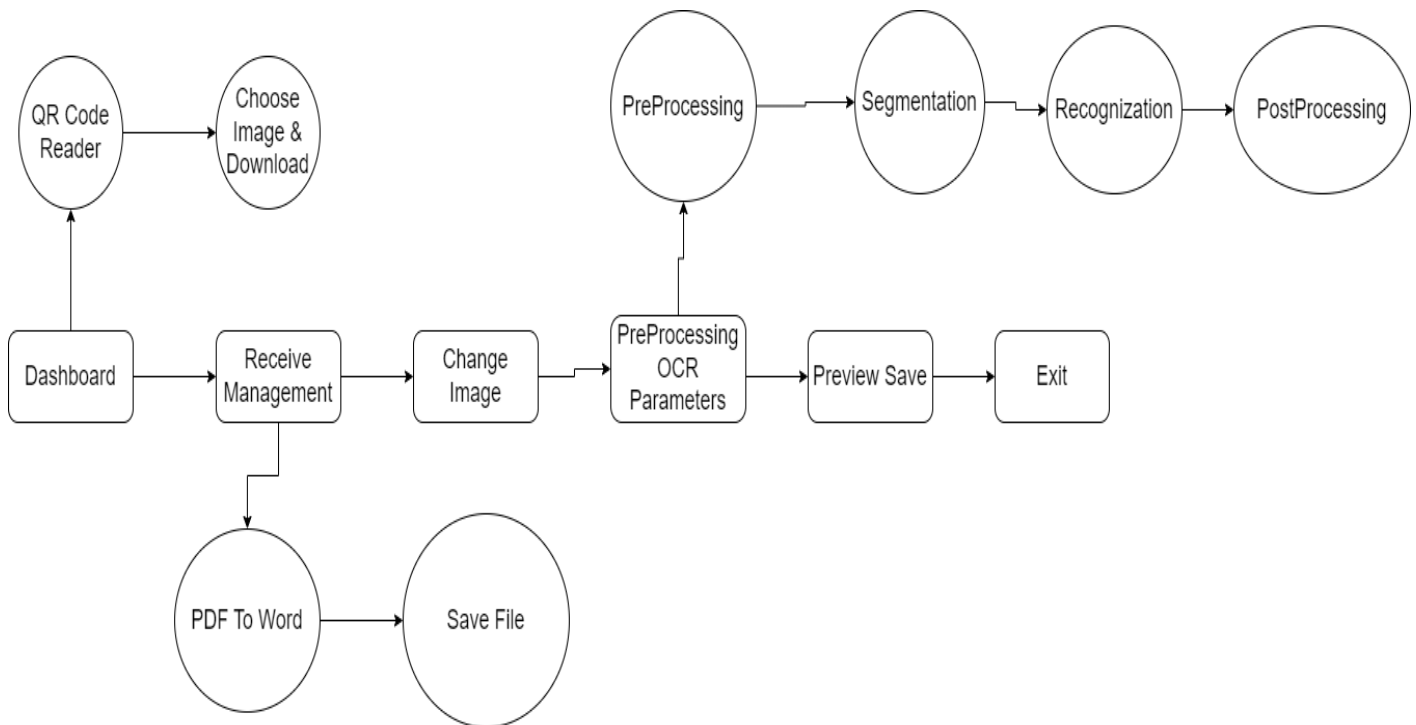
7.2 DATA FLOW DIAGRAM

FIGURE 7.2: DATA FLOW DIAGRAM

7.3 INPUT / OUTPUT AND INTERFACE DESIGN
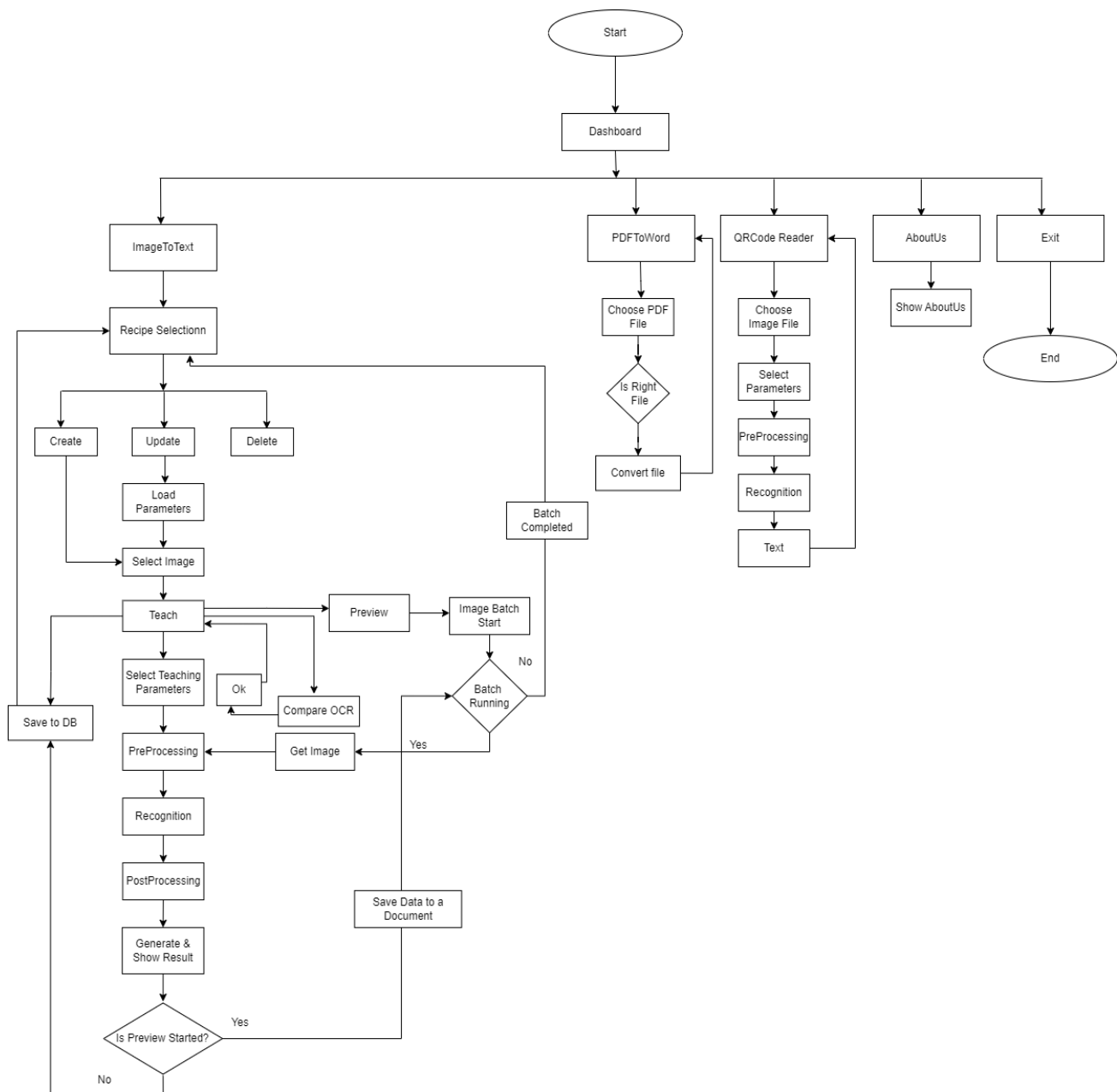
7.3.1 FLOWCHART

FIGURE 7.3: FLOWCHART

CHAPTER-8: IMPLEMENTATION

8.1 IMPLEMENTATION ENVIRONMENT

The implementation of this application will require the utilization of Visual Studio and MySQL on a Windows system. Visual Studio serves as the development environment for creating the application, while MySQL is used for data storage and management.

The implementation process involves two crucial aspects: preprocessing and post-processing. Preprocessing plays a vital role in preparing the data for further analysis and extraction. Drawing from my previous experience in developing an image editing software using OpenCV and C++, I will apply my knowledge to implement the preprocessing phase of this application using C# as the programming language. Although I will be transitioning from C++ to C#, the good news is that EMGUCV, which is built on OpenCV, provides similar functions and can be effectively employed.

On the other hand, the OCR (Optical Character Recognition) component of the application is relatively new to me, and I recognize the need to deepen my understanding of how OCR algorithms work and how they extract textual information from images. Further study and exploration in this area will be required to ensure effective integration of OCR capabilities into the application.

Once the OCR has performed its task of extracting text from images, the post-processing phase comes into play. In this stage, I plan to leverage a dictionary to assist in validating and refining the OCR output. By cross-referencing the extracted text with a comprehensive set of dictionary words, I can enhance the accuracy and reliability of the application's results.

In summary, the implementation of this application involves using Visual Studio and MySQL on a Windows system, with a focus on preprocessing, OCR integration, and post-processing using C# and the support of EMGUCV. Continuous learning and exploration in the field of OCR will be essential to ensure the effectiveness and efficiency of the application.
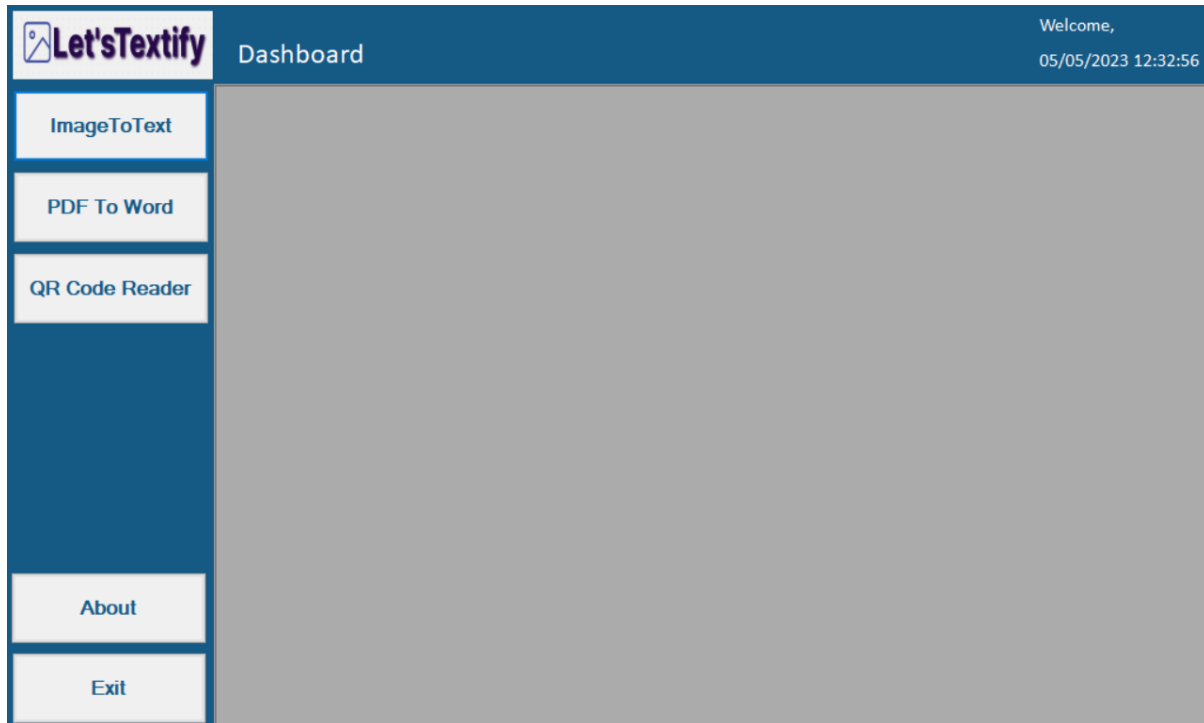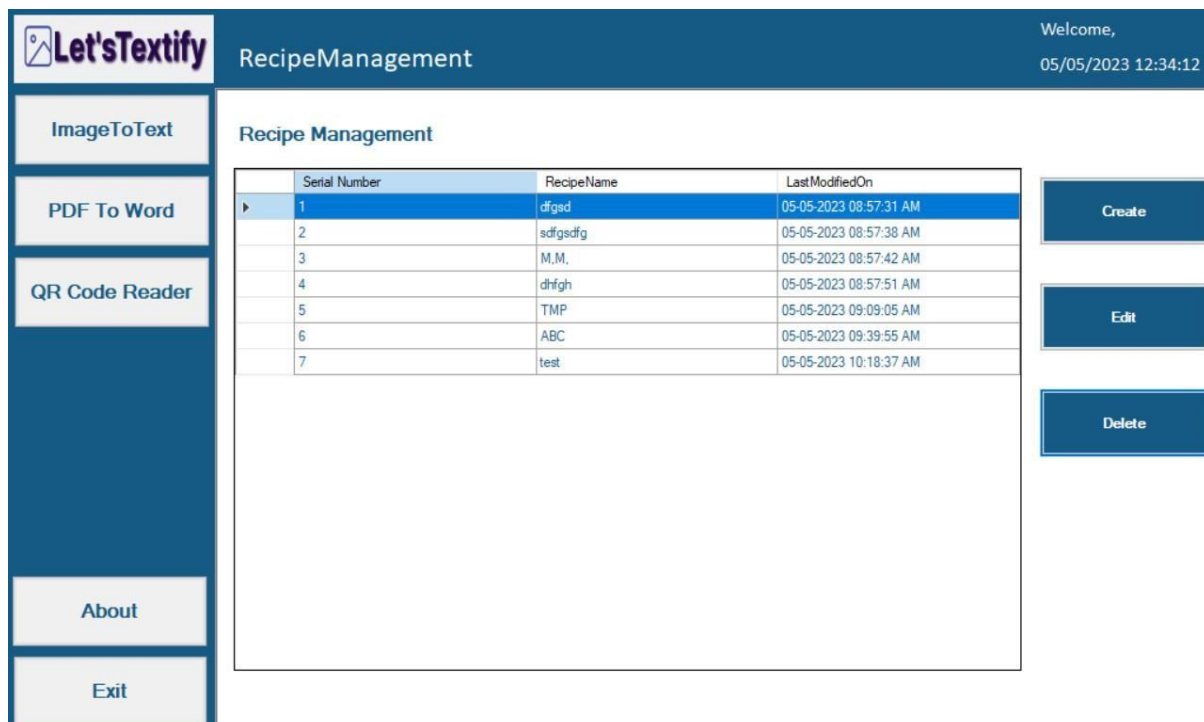
8.2 SCREENSHOTS

FIGURE 8.1: DASHBOARD
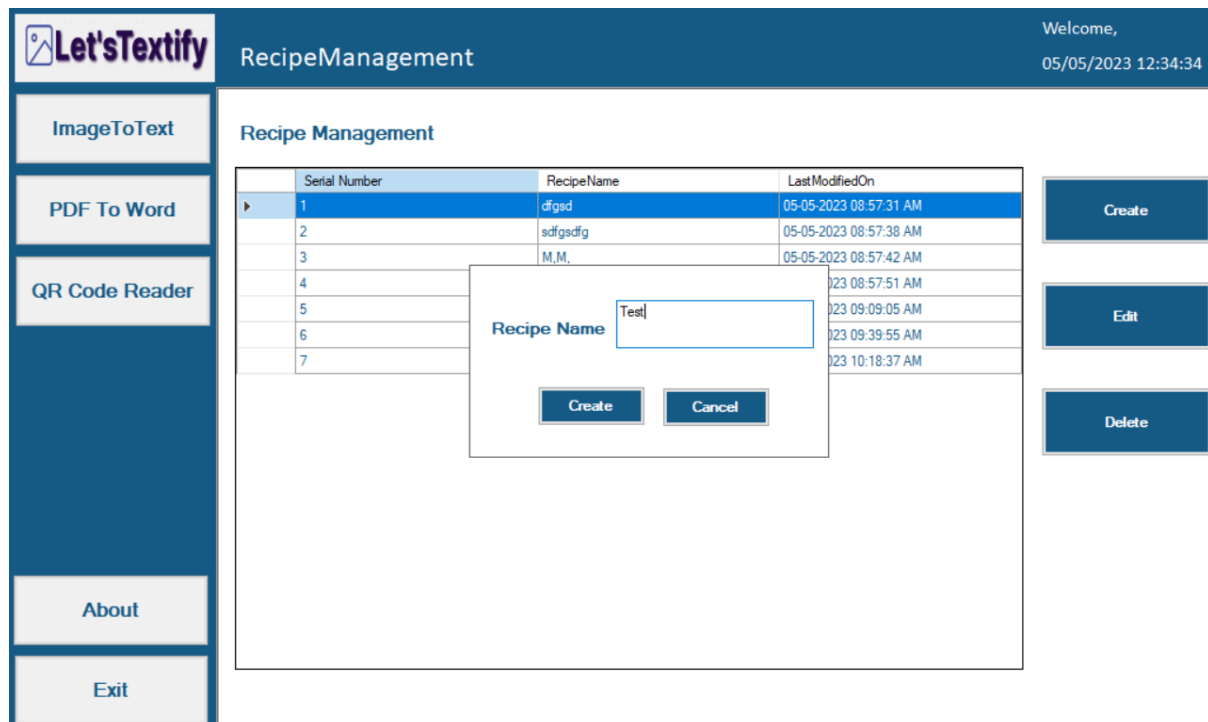

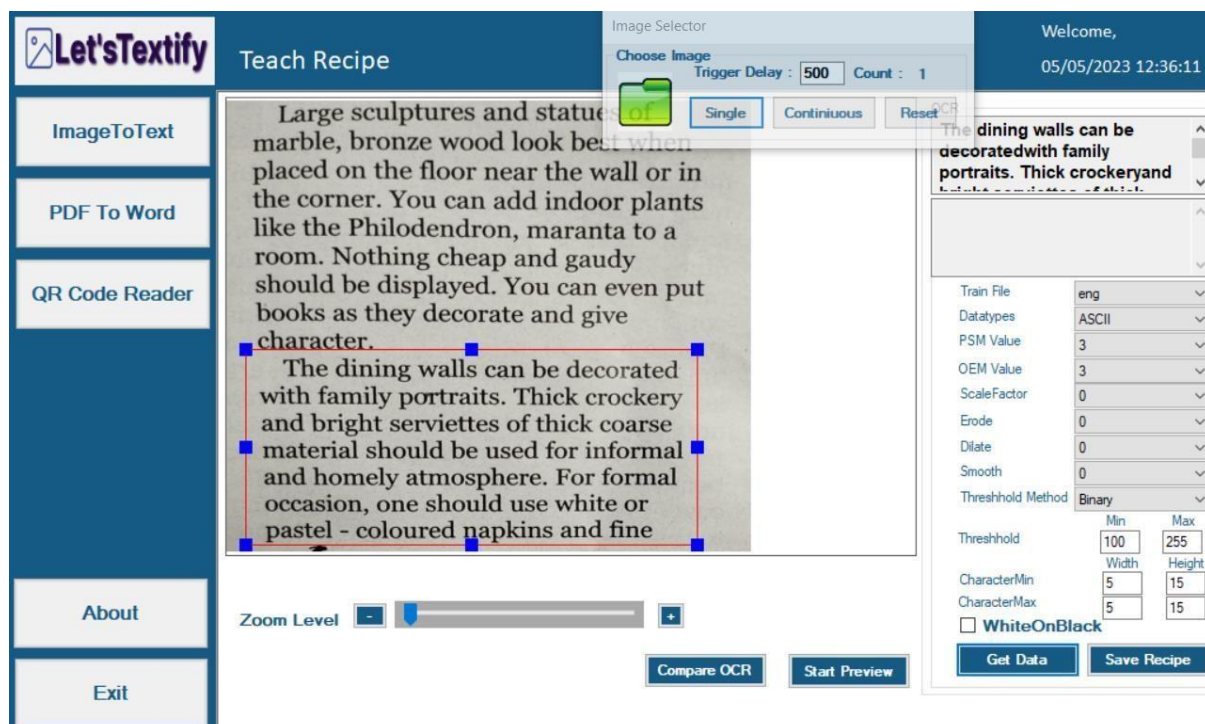**FIGURE 8.2: RECIPE MANAGEMENT**

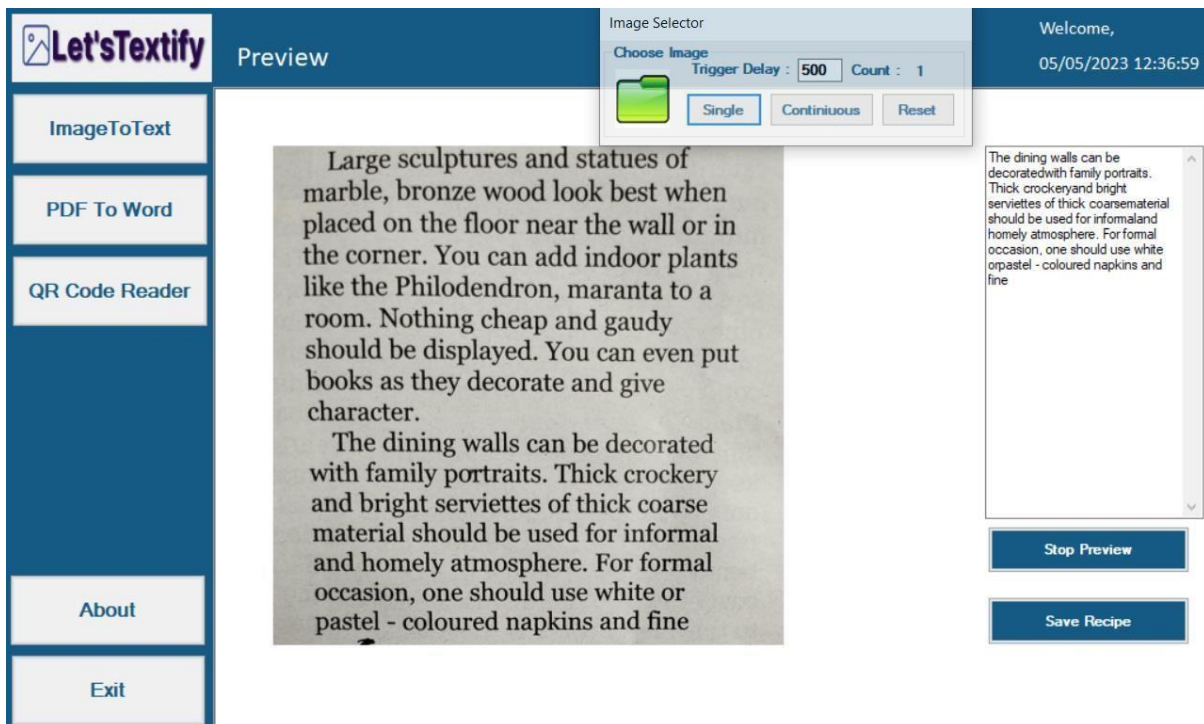**FIGURE 8.3: RECIPE CREATE**

FIGURE 8.4: TEACH RECIPE

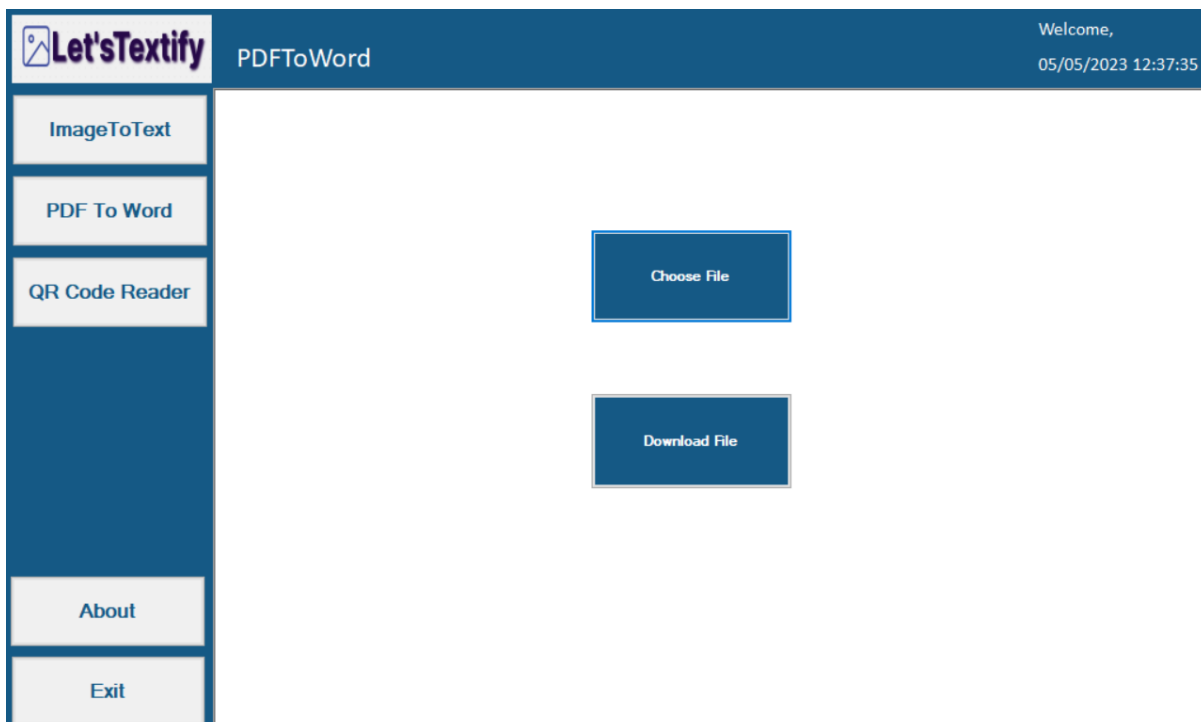**FIGURE 8.5: PREVIEW**

FIGURE 8.6: PDFToWord
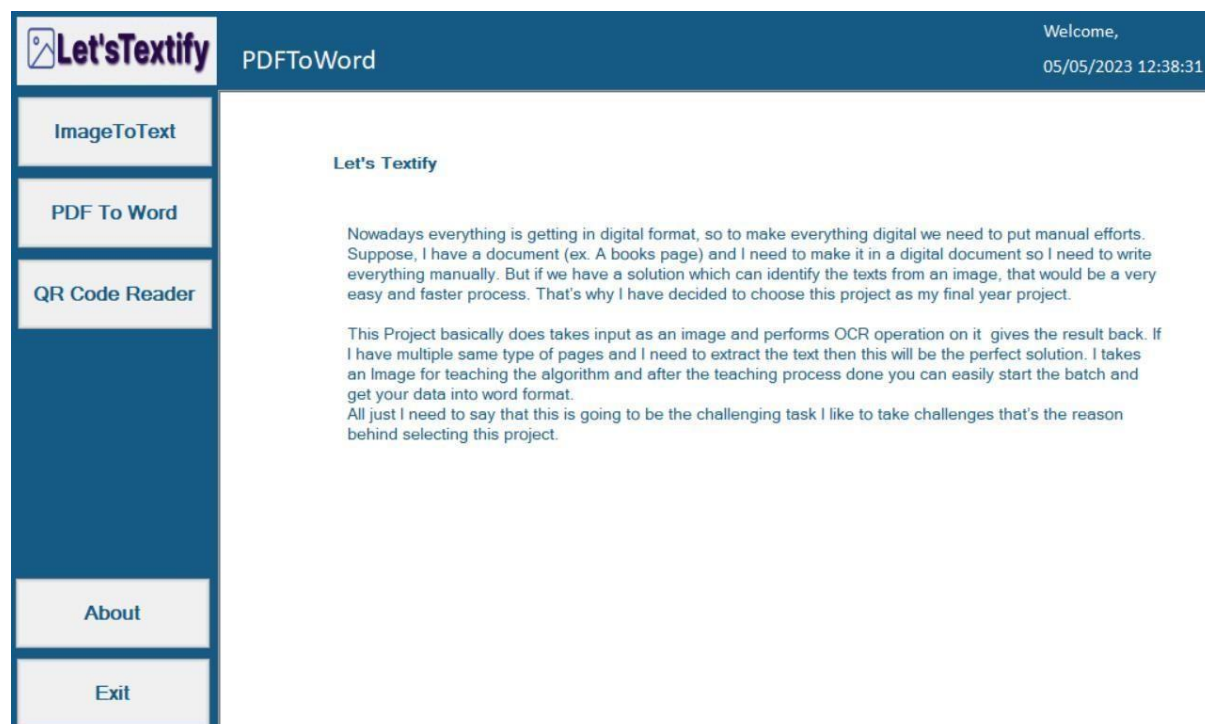
FIGURE 8.7: QR code Reading

FIGURE 8.8: ABOUT

CHAPTER-9 TESTING

9.1 TESTING PLAN AND STRATEGY

This state a number of rules that can serve well as testing objectives:

- Testing is a process execution of a program with the intent of finding an error.

- A good test case is one that has a high probability of finding an as-yet undiscovered error.

- A successful test is one that uncovers an as-yet undiscovered error. These objectives imply a dramatic change in viewpoint for some hardware developers. They move counter to the commonly held view that a successful test is one in which no errors are found. Our objective is to design tests that systematically uncover different classes of errors and to do so with minimum amount of time & effort.

There are mainly **five** testing principles which are described below:

Principle #1: All tests should be traceable to customer requirements.

The objective of software testing is to uncover errors. It follows that the most server defects are those that cause the program to fail to meet its requirements.

Principle #2: Test should be planned long before the actual testing begins.

Planning can begin as soon as the analysis model is complete. Detailed definition of test cases can begin as soon as the design model has been solidified.

Therefore, all tests can be planned and designed before any code has been generated.

Principle # 3: The Pareto principle applies to hardware testing.
Stated simply, the Pareto principle implies that 80 percent of all errors uncovered during testing will likely be traceable to 20 percent of all programcomponents. The problem of course, is to isolate these suspect components and to thoroughly test them.

Principle # 4: Testing should begin "in the small" and progress toward testing "in the large."

The first test planned and executed generally focuses on individual components. As testing progresses, focus shifts in an attempt to find errors in integrated clusters of components and ultimately in the entire system.

Principle # 5: Exhaustive testing is not possible.

The number of path permutations for even a moderately sized program is exceptionally large. For this reason, it is impossible to execute every combination of paths during testing. It is possible, however, to adequately cover program logic and to ensure that all conditions in the component-level design have been exercised.

Top down testing:

In top-down testing, testing starts with the most abstract components and works downwards.

Back-to-Back testing:

It is used when different versions of a system are available. They are tested together and their outputs are compared.
Testing can be done to check the performance of the product.

System Testing:

System Testing typically involves running through every possible input to verify that it results in the right outputs using the software as an end-user would. It is needed to improve the performance of the system so user can have fast processing of all work.

9.2 TESTING METHODS Black-Box Testing

The technique of testing without having any knowledge of the interior workings of the application is called black-box testing. The tester is oblivious to the system architecture and does not have access to the source code. Typically, while performing a black-box test, a tester will interact with the system's user interface by providing inputs and examining outputs without knowing how and where the inputs are worked upon.

White-Box Testing

White-box testing is the detailed investigation of internal logic and structure of the code. White-box testing is also called glass testing or open-box testing. In order to perform white- box testing on an application, a tester needs to know the internal workings of the code.

The tester needs to have a look inside the source code and find out which unit/chunk of the code is behaving inappropriately.

Grey-Box Testing

Grey-box testing is a technique to test the application with having a limited knowledge of the internal workings of an application. In software testing, the phrase the more you know, the better carries a lot of weight while testing an application.

Mastering the domain of a system always gives the tester an edge over someone with limited domain knowledge. Unlike black-box testing, where the tester only tests the application's user interface; in grey-box testing, the tester has access to design documents and the database. Having this knowledge, a tester can prepare better test data and test scenarios while making a test plan

9.3 TEST CASES

Test for Dashboard

1. Image To Text button

    a. Folder select floating dialogue box should appear.

    b. Recipe management tab must appear.

2. PDF to word button

    a. PDF File should be chosen.

    b. Word file must be created when we save the word file.

3. QR Code reader

    a. Image file of QR code should be chosen.

    b. If the QR code is correct then the result should be shown on the screen

    c. If Improper QR code or any image then the message should be shown as "QR code not found".

4. About button:

    a. A detailed description of the project will appear on the screen.

5. Exit button:

    a. Should close the application.

Test for offline simulator

1. Image selector should appear.

2. Folder selection should allow us to select multiple images.

3. Single button should load one picture at a time over a single click.

4. Continuous button should load multiple picture one after other over a particular time interval.

5. Reset button should load the first loaded image.

6. Trigger delay textbox should delay the images loaded by continuous button after entered time interval.

Test for Recipe Management

1. Should load the entire saved recipe.

2. Create button should make a pop for recipe name and then load teach UI.

3. Edit recipe must open the teach UI.

4. Delete recipe must delete the recipe that is selected.

Test for teach

1. Image should load properly.

2. Zoom level should zoom image properly.

3. All the dropdown must work fine.

4. Get data button should get data from the ROI region text.

5. Preview button should load the preview UI and should load the images continuously and also the text from the image.

6. Compare OCR button should load the UI and should load the both the preprocessed and post processed images and their respective test results.

7. Save recipe should save the values of the dropdowns and other parameters from recipe-to-recipe UI.

CHAPTER-10 LIMITATIONS & FUTURE ENHANCEMENT

10.1 LIMITATIONS

- It's going to be work on decent quality Image.
- Need to do some configuration for performing OCR operations.
- Only one tag at a time.
-

10.2 FUTURE ENHANCEMENT

- Will work on improving the algorithm for working in less quality image.
- Minimize configuration as much as possible.
- Will provide multiple tags together.

CHAPTER-11: CONCLUSION & REFERENCES

11.1 CONCLUSION

Nowadays everything is getting in digital format, so to make everything digital we need to put manual efforts.

Suppose, I have a document (ex. A books page) and I need to make it in a digital document so I need to write everything manually. But if we have a solution which can identify the texts from an image, that would be a very easy and faster process. That's why I have decided to choose this project as my final year project.

This Project basically does takes input as an image and performs OCR operation on it & gives the result back.

All just I need to say that implementing this project gave me vast knowledge of OCR, Pre-Processing techniques. Also I have learnt many new things as well. Learnt about C# one of the popular languages as well as I have learnt about database.

During an internship and implementation I also got to know how an organization works and how they built an application. It's kind of out of the world experience for me.

11.2 REFERENCES

- www.youtube.com
- www.StackOverflow.com
- www.c-sharpcorner.com
- https://chat.openai.com/
- https://www.academia.edu/search?page=4&q=Text%20Extraction%20from%20image%20using%20OCR
- https://en.wikipedia.org/wiki/Digital_image_processing
- https://www.geeksforgeeks.org/digital-image-processing-basics/
- https://www.ibm.com/topics/machine-learning
- https://www.geeksforgeeks.org/machine-learning/
- https://www.javatpoint.com/digital-image-processing-tutorial
- https://www.javatpoint.com/java-ocr
- https://www.geeksforgeeks.org/tag/ocr-optical-character-recognition/