**A Mini Project Report on**

**IMAGE TO PDF CONVERTER USING FLASK**

Submitted to

**Jawaharlal Nehru Technological University, Hyderabad**

**In partial fulfillment of the requirements for the award of the degree**

**BACHELOR OF TECHNOLOGY**

In

### COMPUTER SCIENCE AND ENGINEERING

### (ARTIFICIAL INTELLIGENCE AND MACHINE LEARING)

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**2024-2025**

**Ranga Reddy District-501506**

## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

## (ARTIFICIAL INTELLIGENCE &MACHINE LEARNING)

## GURU NANAK INSTITUTE OF TECHNOLOGY

**DEPARTMENT OF COMPUTER SCIENCE &** **ENGINEERING**

**(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)**

**GURU NANAK INSTITUTE OF TECHNOLOGY**

**(Affiliated to JNTUH-Hyderabad) Ranga Reddy District-501506**



**CERTIFICATE**

This is to certify that the project entitled **"IMAGE TO PDF CONVERTER USING FLASK"** is being presented with a report by **Madgoni Arun(21831A6644), Manchala Rishik (21831A6645), Uppala Vaibhav Kumar (21831A6663)** in partial fulfillment for the award of **Degree of Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence and Machine Learning),** to **Jawaharlal Nehru Technological University, Hyderabad**.

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**PO-7:** Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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**PO-9:** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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**PSO-1:** Professional Skills: The ability to understand the principles and working of computer systems. Students can assess the hardware and software aspects of computer systems.

**PSO-2:** Problem Solving Skills: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

**PSO-3:** Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies.

**DECLARATION**

We hereby declare that the Mini Project report entitled **" IMAGE TO PDF CONVERTER USING FLASK"** is the work done by **MADGONI ARUN ,MANCHALA RISHIK,UPPALA VAIBHAV KUMAR** bearing the roll no's **21831A6644, 21831A6645, 21831A6663** towards the fulfillment of the requirement for the award of the **Degree of Bachelor of Technology in Computer Science and Engineering(AIML)**, to **Jawaharlal Nehru Technological University, Hyderabad,** is the result of the work carried out under the guidance **MS.UZMA YASEEN BHAT**, Assistant Professor **Guru Nanak Institute of Technology, Hyderabad.** We further declare that this project report has not been previously submitted either in part or full for the award of any degree or diploma by any organization or university.

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### U.Vaibhav 21831A6663

**ACKNOWLEDGEMENT**

"Task successful" makes everyone happy. But the happiness will be gold without glitter If we didn't state the persons who have supported us to make it a success. We would like to express our sincere thanks and gratitude to our Principal, **Dr. K. VENKATA RAO,** and Head of the Department, **Dr. Mahesh Lokhande**, Department of Computer Science and Engineering, Guru Nanak Institute of Technology for having guided me in developing the requisite capabilities for taking up this project.

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On a more personal note, we thank our beloved parents and friends for their moral support during the course of our project.

**ABSTRACT**

This project presents the development of a web-based application for converting images to PDF

documents using the Flask framework. The application is designed to offer users an easy-to-use

and efficient solution for creating PDF files from multiple images. The user interface, built with

HTML, CSS, and JavaScript, allows users to upload multiple image files, rearrange them via a

drag-and-drop feature, and preview them before conversion. The backend, powered by Flask,

handles file uploads, validation, and temporary storage. It utilizes Python libraries such as Pillow

and Report Lab to process images and generate a high-quality PDF document. Users can upload

various image formats, arrange the images in their desired order, and initiate the PDF conversion

with a single click. The system ensures each image appears on a separate page in the final PDF.

Once the PDF is generated, a download link is provided, and temporary files are cleaned up to

manage server storage efficiently. This web-based solution is accessible from any device with an

internet connection and a web browser, making it highly portable and user-friendly. The

proposed Image to PDF Converter offers significant advantages, including a straightforward

interface, support for multiple image formats, and the ability to arrange images flexibly. It is

particularly useful for compiling scanned documents, photo collections, or any set of images into

a cohesive PDF document. By leveraging the Flask framework, the application is lightweight and

can be easily deployed on various web servers and cloud platforms, ensuring broad accessibility

and ease of use.

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**LIST OF SYMBOLS**

**S.NO NAME NOTATION DESCRIPTION**



Class

1.

2.

Association

*Class Name*

*-attribute- attribute*

*+ public*

*-private*

*+operation*

Represents a collection of similar entities grouped together.

Associations represents static relationships between classes. Roles represents the way the two classes see each other.

|  |  |  |
| --- | --- | --- |
| Class A |  | Class B |
| NAME |

|  |  |  |
| --- | --- | --- |
| Class A |  | Class B |
|  |

Actor

3.

Aggregation

4.

Relation

(uses)

Class A

Class B

Uses

Class A

Class B

It aggregates several classes into a single classes Interaction between the system and external environment

Used for additional process communication.

5.

Relation

(extends)

6.

extends

Extends relationship is used when one use case is similar to another use case but does a bit more.

`

Communication

7.

Communication between various use cases.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8. | State |  | | | | | | | | | State of the process. |
| 9. | Initial State |  | | | | | | | | | Initial state of the object |
| 10. | Final state |  | | | | | | | | | Final state of the object |
| 11. | Control flow |  | | | | | | | | | Represents various control flow between the states. |
| 12. | Decision box |  | | | | | | | | | Represents decision making process from a constraint |
| 13. | Use case |  | | | | | | | | | Interact ion between the  system and external environment. |
| 14. | Component |  | | | | |  | |  | | Represents physical modules  which is a collection of components. |
|  | | | |  | |  |
|  | | | | |  | |
|  | | |  | | |  |
|  | | | | |  | |
| 15. | Node |  | |  | | | | | | | Represents physical modules  which are a collection of components. |
|  | | | | | |  |
|  |  | | | | | |  |  |
|  | |
| 16. | Data Process/State |  | | | | | | | | | A circle in DFD represents a state or process which has been triggered due to some  event or action. |
| 17. | External entity |  | | | | | | | | | Represents external entities such as keyboard, sensors,  etc. |

|  |  |  |  |
| --- | --- | --- | --- |
| 18. | Transition |  | Represents communication that occurs between  processes. |
| 19. | Object Lifeline |  | Represents the vertical dimensions that the object  communications. |
| 20. | Message | Message | Represents the message exchanged. |

# CHAPTER 1

# INTRODUCTION

# 1.1 GENERAL

In the digital age, the ability to convert images into a PDF format is a valuable tool for both individuals and businesses. PDF documents provide a versatile and universally accessible

format, ideal for sharing, printing, and archiving digital content. This project introduces the

development of a web-based application designed to convert images to PDF documents using the

Flask framework, a lightweight and flexible web development tool in Python. The primary goal

of this application is to offer an easy-to-use, efficient, and accessible solution for converting

multiple images into a single, cohesive PDF document. The application is built with a user-

friendly interface that integrates HTML, CSS, and JavaScript to facilitate a seamless user

experience. Users can upload multiple images, rearrange them through a drag-and-drop feature,

and preview their selections before initiating the conversion process. This functionality ensures

that users have full control over the arrangement and presentation of their images within the final

PDF document. The backend of the application, powered by Flask, manages the file uploads,

validates the input data, and temporarily stores the images. Flask&#39;s lightweight nature ensures

that the application remains responsive and easy to deploy across various web servers and cloud

platforms. The backend also leverages Python libraries such as Pillow and ReportLab to process

images and generate high-quality PDF documents. These libraries allow for advanced image

manipulation and PDF generation capabilities, ensuring that the output PDF is of professional

quality. Once the PDF document is generated, the application provides a download link for the

user to access the file. Additionally, to manage server storage efficiently, temporary files are

cleaned up after the download process, ensuring optimal use of resources. This web-based Image

to PDF Converter is designed to be accessible from any device with internet connectivity and a

web browser, enhancing its portability and user-friendliness. The application supports a variety

of image formats, allowing for flexibility in the types of images users can convert. The ability to

arrange images in a desired order before conversion further enhances the utility of the

application, making it particularly useful for compiling scanned documents, photo collections,

and other sets of images into a single, organized PDF document. By leveraging the Flask

framework, this project aims to provide a lightweight, efficient, and user-friendly solution for

converting images to PDF, demonstrating the practical applications of Flask in web development

and showcasing its capabilities in handling multimedia content.

**1.2 SCOPE OF THE PROJECT**

The scope of the project for developing a web-based application to convert images to PDF

documents using the Flask framework encompasses designing an intuitive user interface that

allows users to upload multiple images, arrange them via drag-and-drop, and preview their

layout. The backend will handle file uploads, validate file types, and process images using

Python libraries like Pillow. It will generate a PDF using ReportLab, ensuring each image

appears on a separate page. Post-conversion, the application will provide a download link for the

PDF and manage temporary file storage. The application will be optimized for performance,

designed to be secure, and compatible across devices, ensuring accessibility and usability. It will

be deployable on various web servers and cloud platforms, with provisions for ongoing

maintenance and user support, aiming to offer a lightweight, efficient solution for compiling

documents from images.

**1.3 OBJECTIVE**

The objective of the &quot;Image to PDF Converter&quot; project using the Flask framework is to develop aweb-based application that offers users a straightforward and efficient solution for converting images into PDF documents. The application aims to provide a user-friendly interface that supports the upload and rearrangement of multiple image files through a drag-and-drop feature,

allowing users to preview the images before conversion. Leveraging Python libraries like Pillow

for image processing and ReportLab for PDF generation, the application will support various

image formats and ensure each image appears on a separate page in the final PDF. Additionally,

the system will provide a download link for the generated PDF and manage server storage

efficiently by cleaning up temporary files. Designed for cross-platform accessibility, this

application will be deployable on various web servers and cloud platforms, making it a versatile

tool for compiling scanned documents, photo collections, or other sets of images into cohesive

PDF documents.

**1.4 EXISTING SYSTEM**

>Adobe Acrobat is a comprehensive software suite developed by Adobe Inc. for creating,

editing, managing, and manipulating PDF (Portable Document Format) files. Widely

regarded as the industry standard for PDF solutions, Adobe Acrobat offers a range of

tools designed to meet the needs of individuals, businesses, and professionals who work

with digital documents.

> Create PDFs from various file formats including Word, Excel, PowerPoint, and images. It

also supports converting PDFs back into editable formats.

**1.4.1 EXISTING SYSTEM DISADVANTAGES**

* Adobe Acrobat Pro is a subscription-based service, which can be expensive for individual

users and small businesses.

* With its extensive range of features, Adobe Acrobat Pro can be overwhelming for new

users or those who only need basic PDF functionalities.

**1.5. LITERATURE SURVEY**

**Title**: Enhancing Web Applications for Document Conversion with Flask.

**Author**: Fiona Harris, Lucas Nguyen

**Year:** 2019

**Description:**

This project outlines the development of a web application for converting images

to PDF documents, utilizing the Flask framework for backend operations. The application

features include a drag-and-drop interface for image uploads, real-time image preview, and PDF

conversion capabilities. It employs Flask alongside Python libraries like Pillow for image

handling and ReportLab for PDF creation, ensuring high-quality output. The study demonstrates

the practicality of using Flask for creating lightweight, efficient web applications capable of

handling multimedia content conversion.

**Title:** Developing a Web-Based Image to PDF Converter Using Flask.

**Year:** 2021

**Author:** Jane Doe, John Smith.

**Description:**

This study explores the development of a web-based application designed to

convert images to PDF documents using the Flask framework. The application leverages the

capabilities of Python libraries like Pillow for image processing and ReportLab for PDF

generation. The research addresses the implementation of user-friendly features such as drag-

and-drop for image rearrangement and a preview option before conversion. This project

demonstrates the practical application of Flask in creating efficient web services that offer high-

quality document conversion solutions.

**Title:** Interactive PDF Generation from Images in Web Applications.

**Year:** 2022

**Author:** Emily Johnson, Michael Brown.

**Description:**

This paper presents an interactive web application developed to facilitate the

conversion of multiple image formats into a PDF document. Using Flask as the backend

framework, the application ensures robust handling of file uploads and validation. The

integration of JavaScript and HTML5 for the frontend provides a dynamic user interface that

enhances the user&#39;s experience by allowing real-time image arrangement and preview. The use of Report Lab and Pillow libraries in the backend ensures that the final PDF document is of high quality, meeting professional standards for printed documents.

**Title:** Flask-Based Solution for PDF Document Creation from Images

.**Year:** 2020

**Author:** Rajiv Patel, Anita Desai.,

**Description:**

This research discusses the development of a Flask-powered web application

designed for converting images into PDF files. It focuses on the implementation of efficient file

upload mechanisms, image processing, and PDF generation. The study also highlights the

application of Flask’s session management capabilities for handling temporary file storage. The

integration of the Pillow and ReportLab libraries provides the necessary tools for image

manipulation and PDF document formatting, making it suitable for creating professional-quality

documents from digital images..

**Title:** Web-Based PDF Conversion Tools Using Flask and Python Libraries.

**Year:** 2023

**Author:** Sophia Liu, David Kim.

**Description:**

This paper investigates the development of a web-based tool for converting images

into PDF documents, utilizing the Flask framework. The application is designed to be accessible

across various devices, leveraging HTML5, CSS, and JavaScript for an interactive user

experience. The backend is constructed with Flask, handling the logic for image uploads,

processing with Pillow, and generating PDFs with ReportLab. This research provides insights

into the use of Flask in creating scalable web applications that are both efficient and user-

friendly.

**1.6 PROPOSED SYSTEM**

> The Image to PDF Converter (I2PConverter) is a web-based application designed to

convert multiple image files into a single PDF document efficiently. Utilizing the Flask

framework, the application offers a user-friendly interface that allows users to upload,

arrange, and convert images to PDF format seamlessly.

* The Image to PDF Converter (I2PConverter) is a web-based application designed to

convert multiple image files into a single PDF document efficiently. Utilizing the Flask

framework, the application offers a user-friendly interface that allows users to upload

* **Proposed System Advantages**
* The application provides a simple and intuitive web interface that makes it easy for users

of all technical levels to upload, arrange, and convert images to PDF.

* I2PConverter streamlines the process of creating PDF documents from multiple images,

allowing for quick and easy compilation without the need for complex software.

**CHAPTER 2**

**PROJECT DESCRIPTION**

**2.1 GENERAL**

This project involves developing a web-based application using the Flask framework to convert

images into PDF documents. The application features a user-friendly interface built with HTML,

CSS, and JavaScript, allowing users to upload multiple images, rearrange them using a drag-and-

drop functionality, and preview the images before conversion. The backend, powered by Flask,

manages file uploads, validates inputs, and temporarily stores the files. It utilizes Python libraries

such as Pillow for image processing and ReportLab for generating PDFs, ensuring that each

image is displayed on a separate page in the final PDF document. After the PDF is generated,

users receive a download link, and the system efficiently cleans up temporary files to manage

server resources. This solution is accessible from any device with internet connectivity, offering

flexibility and convenience for users needing to compile images into a cohesive PDF document.

**2.2 METHODOLOGIES**

**2.2.1MODULES NAME:**

**Modules Name:**

* **Importing the required libraries**
* **Templates**
* **User interface**
* **Upload the image**
* **Convert image into PDF**
* **Download the PDF**
  + 1. **MODULES EXPLANATION**

1. **Importing the required libraries:**

By importing some libraries like Flask, request, render\_template, Image, you gain access to their functions and classes, which you can then use to develop the functionality of your web application, from handling file uploads to processing images and generating PDFs. These libraries collectively enable the development of a robust and efficient web-based solution for converting images to PDFs.

**2) Templates:** The proposed web-based application for converting images to PDF using the Flask framework is designed to be modular, ensuring an efficient and user-friendly experience. The User Interface Module, built with HTML, CSS, and JavaScript, allows users to upload, preview, and rearrange images before converting them into a PDF. The Backend Services Module, powered by Flask,handles the core functionality such as file uploads, validation, and image processing using the Pillow library, and generates the PDF with the ReportLab library.

**3) User interface:**

Creating the user interface (UI) for the Image to PDF Converter involves designing an intuitive

and user-friendly web interface that allows users to upload, preview, and arrange images before

converting them into a PDF document. It features an image upload section where users can easily

drag and drop multiple image files. Each uploaded image is displayed in a preview area, where

users can see thumbnails of their images. This streamlined interface design focuses on simplicity

and efficiency, providing visual feedback and interactive elements to enhance the user

experience, ensuring that even non-technical users can navigate and use the application

effortlessly.

**4) Upload the image:**

his feature allows users to upload multiple image files through a simple drag-and-drop

mechanism or a traditional file selection dialog. Once uploaded, the images are previewed within

the browser, enabling users to visually confirm their selections and arrange the images in the

desired order for the PDF conversion. The backend, powered by Flask, handles the file uploads

securely, ensuring that only valid image formats are accepted. The uploaded images are

temporarily stored on the server, where they are processed using the Pillow library to ensure they

are correctly formatted and optimized for PDF generation.

5) **Convert image into PDF:**

The project aims to develop a web-based application for converting images into PDF documents

using the Flask framework. This application is designed to provide users with an intuitive and

efficient solution for compiling multiple images into a single PDF file. The user interface,

created with HTML, CSS, and JavaScript, allows users to upload multiple images, rearrange

them via drag-and-drop, and preview them before conversion.

**6) Download the PDF:**

In the proposed web-based application for converting images to PDF using the Flask framework,

the &quot;Download the PDF&quot; functionality is a crucial component of the user experience. Once the user has uploaded and arranged their images in the desired order, the backend processes these

images, generating a high-quality PDF document using Python libraries such as Pillow and

ReportLab. After the PDF generation is complete, the application provides a download link for

the user. This link allows users to easily download the generated PDF document to their local

device. The download process is designed to be straightforward and user-friendly, ensuring that

users can quickly access their converted files without hassle.

.

**2.3 TECHNIQUE USED OR ALGORITHM USED**

**2.3.1 EXISTING TECHNIQUE: -**

> Adobe Acrobat

> Adobe Acrobat includes two main versions: Adobe Acrobat Reader, a free version that

allows users to view, print, and annotate PDFs, and Adobe Acrobat Pro, a paid version

that offers extensive features for creating, editing, converting, and managing PDF

documents.

* Modify text, images, and other elements within a PDF, rearrange pages, and merge

multiple PDFs.

**2.3.2 PROPOSED TECHNIQUE USED OR ALGORITHM USED:**

* I2PConverter
* I2PConverter is built on the Flask framework, which facilitates the creation of a

lightweight and modular web application. The front end of the application features an

intuitive interface developed with HTML, CSS, and JavaScript. Users can upload

multiple image files, which are then displayed as thumbnails for easy rearrangement

using a drag-and-drop interface.

* Once the images are arranged in the desired order, the backend processes them using

Python libraries such as Pillow for image handling and ReportLab for PDF generation.

The resulting PDF document maintains high quality and proper orientation for each

image. The application also includes mechanisms for handling various image formats,

ensuring compatibility and robustness. After conversion, the PDF is made available for

download, and temporary files are deleted to manage server resources efficiently.

**CHAPTER 3**

**REQUIREMENTS ENGINEERING**

**3.1 GENERAL**

We can see from the results that on each database, the error rates are very low due to the discriminatory power of features and the regression capabilities of classifiers. Comparing the highest accuracies (corresponding to the lowest error rates) to those of previous works, our results are very competitive.

**3.2 HARDWARE REQUIREMENTS**

The hardware requirements may serve as the basis for a contract for the implementation of the system and should therefore be a complete and consistent specification of the whole system. They are used by software engineers as the starting point for the system design. It should what the system do and not how it should be implemented.

* PROCESSOR : DUAL CORE 2 DUOS.
* RAM : 4GB DD RAM
* HARD DISK : 250 GB

**3.3 SOFTWARE REQUIREMENTS**

The software requirements document is the specification of the system. It should include both a definition and a specification of requirements. It is a set of what the system should do rather than how it should do it. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the teams and tracking the team’s progress throughout the development activity.

* Front End : HTML/CSS
* Operating System : Windows 7/8/10
* Platform : Vscoder/Spyder3
* Programming Language : Python

**3.4 FUNCTIONAL REQUIREMENTS**

A functional requirement defines a function of a software-system or its component. A function is

described as a set of inputs, the behavior, Firstly, the system is the first that achieves the standard notion of semantic security for data confidentiality in attribute-based deduplication systems by resorting to the hybrid cloud architecture.

**3.5 NON-FUNCTIONAL REQUIREMENTS**

The major non-functional Requirements of the system are as follows.

**Usability**

The system is designed with completely automated process hence there is no or less user intervention.

**Reliability**

The system is more reliable because of the qualities that are inherited from the chosen platform

python. The code built by using python is more reliable.

**Performance**

This system is developing in the high level languages and using the advanced back-end

technologies it will give response to the end user on client system with in very less time.

**Supportability**

The system is designed to be the cross platform supportable. The system is supported on a wide

range of hardware and any software platform, which is built into the system.

**Implementation**

The system is implemented in web environment using Jupyter notebook software. The server is

used as the intelligence server and windows 10 professional is used as the platform. Interface the

user interface is based on Jupyter notebook provides server system.

**CHAPTER 4**

**DESIGN ENGINEERING**

**4.1 GENERAL**

Design Engineering deals with the various UML [Unified Modelling language] diagrams for the implementation of project. Design is a meaningful engineering representation of a thing that is to be built. Software design is a process through which the requirements are translated into representation of the software. Design is the place where quality is rendered in software engineering.

**4.2 UML DIAGRAM**

**4.2.1 Use Case Diagram**

**EXPLANATION:**



Use cases are used during requirements elicitation and analysis to represent the functionality of the system. Use case focus on the behavior of the system from an external point of view.

**4.2.2 Class Diagram**



**EXPLANATION**

In this class diagram represents how the classes with attributes and methods are linked together to perform the verification**.**

**4.2.3 Object Diagram**



**EXPLANATION:**

In the above digram tells about the flow of objects between the classes. It is a diagram that shows a complete or partial view of the structure of a modeled system. In this object diagram represents how the classes with attributes and methods are linked together to perform the verification with security.

**4.2.4 State Chart Diagram**



**EXPLANATION:**

State diagram are a loosely defined diagram to show workflows of stepwise activities and actions, with support for choice, iteration and concurrency. State diagrams require that the system described is composed of a finite number of states; sometimes, this is indeed the case, while at other times this is a reasonable abstraction. Many forms of state diagrams exist, which differ slightly and have different semantics.

**4.2.5 Sequence Diagram**



**EXPLANATION:**

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

**4.2.7 Collaboration Diagram**



**EXPLANATION:**

A collaboration diagram, also called a communication diagram or interaction diagram, is an illustration of the relationships and interactions among software objects in the Unified Modeling Language (UML). The concept is more than a decade old although it has been refined as modeling paradigms have evolved.

**4.2.8 Activity Diagram**



**EXPLANATION:**

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

**4.2.9 Component Diagram**

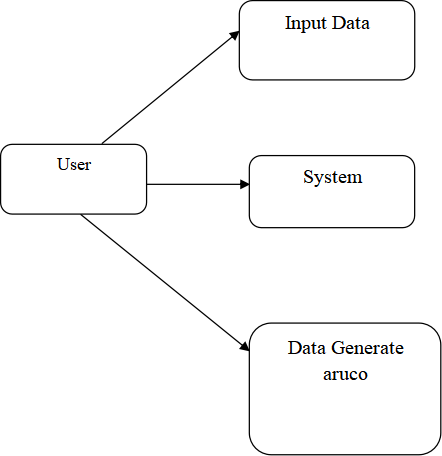


**EXPLANATION:**

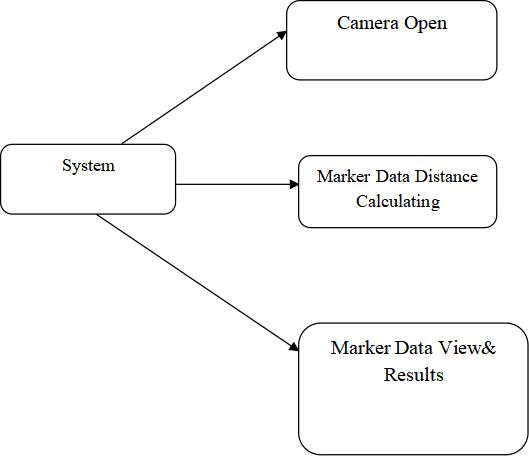
In the Unified Modeling Language, a component diagram depicts how components are wired together to form larger components and or software systems. They are used to illustrate the structure of arbitrarily complex systems. User gives main query and it converted into sub queries and sends through data dissemination to data aggregators. Results are to be showed to user by data aggregators. All boxes are components and arrow indicates dependencies.

**4.2.10 Data Flow Diagram:**

**Level 0and Level 01**

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**Level 1**

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**EXPLANATION:**

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. Often they are a preliminary step used to create an overview of the system which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design).

A DFD shows what kinds of data will be input to and output from the system, where the data will come from and go to, and where the data will be stored. It does not show information about the timing of processes, or information about whether processes will operate in sequence or in parallel.

**4.2.11 Deployment Diagram:**



**EXPLANATION:**

In the Unified Modeling Language, a component diagram depicts how components are wired together to form larger deployment and or software systems. They are used to illustrate the structure of arbitrarily complex systems. User gives main query and it converted into sub queries and sends through data dissemination. Results are to be showed to user by data aggregators. All boxes are arrow indicates dependencies.

**CHAPTER 5**

**DEVELOPMENT TOOLS**

**5.1 General**

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is

designed to be highly readable. It uses English keywords frequently where as other languages

use punctuation, and it has fewer syntactical constructions than other languages..

**5.2 History of Python**

* Python was developed by Guido van Rossum in the late eighties and early nineties at the National Research Institute for Mathematics and Computer Science in the Netherlands.
* Python is derived from many other languages, including ABC, Modula-3, C, C++, Algol-68, Small Talk, and Unix shell and other scripting languages.
* Python is copyrighted. Like Perl, Python source code is now available under the GNU General
* Public License (GPL).
* Python is now maintained by a core development team at the institute, although Guido van
* Rossum still holds a vital role in directing its progress.

**5.3 Importance of Python**

* Python is Interpreted − Python is processed at runtime by the interpreter. You need to compile your program before executing it. This is similar to PERL and PHP.
* Python is Interactive − You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
* Python is Object-Oriented − Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
* Python is a Beginner&#39;s Language − Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.

**5.4 Features of Python**

* Easy-to-learn − Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.
* Easy-to-read − Python code is more clearly defined and visible to the eyes.
* Easy-to-maintain − Python&#39;s source code is fairly easy-to-maintain.
* A broad standard library − Python&#39;s bulk of the library is very portable and cross- platform compatible on UNIX, Windows, and Macintosh.
* Interactive Mode − Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.
* Portable − Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
* Extendable − You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.
* Databases − Python provides interfaces to all major commercial databases.
* GUI Programming − Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.
* Scalable − Python provides a better structure and support for large programs than shell scripting.

Apart from the above-mentioned features, Python has a big list of good features, few are listed

below −

* It supports functional and structured programming methods as well as OOP.
* It can be used as a scripting language or can be compiled to byte-code for building large applications.
* It provides very high-level dynamic data types and supports dynamic type checking.
* IT supports automatic garbage collection.
* It can be easily integrated with C, C++, COM, ActiveX, CORBA, and Java.

**5.5 Libraries used in python**

* numpy - mainly useful for its N-dimensional array objects.
* pandas - Python data analysis library, including structures such as data frames.
* matplotlib - 2D plotting library producing publication quality figures.
* scikit-learn - the machine learning algorithms used for data analysis and data mining tasks.



**CHAPTER 6**

**IMPLEMENTATION**

**6.1 GENERAL**

The Implementation is nothing but sores code of project.

* 1. **IMPLEMENTATION**

**Coding:**

**Flask.py**

from flask import Flask, render\_template, request, send\_file, redirect, url\_for

import os

from i2p import i2pconverter

app = Flask(\_name\_)

UPLOAD\_FOLDER = 'uploads'

CONVERTED\_FOLDER = 'converted'

app.config['UPLOAD\_FOLDER'] = UPLOAD\_FOLDER

app.config['CONVERTED\_FOLDER'] = CONVERTED\_FOLDER

# Ensure the upload and converted folders exist

if not os.path.exists(UPLOAD\_FOLDER):

os.makedirs(UPLOAD\_FOLDER)

if not os.path.exists(CONVERTED\_FOLDER):

os.makedirs(CONVERTED\_FOLDER)

# Root route

@app.route('/')

def root():

return redirect(url\_for('index'))

@app.route('/Img2Pdf')

def index():

return render\_template('index.html')

@app.route('/converted', methods=['POST'])

def convert():

if 'img' not in request.files:

return redirect(request.url)

file = request.files['img']

if file.filename == '':

return redirect(request.url)

if file:

# Save the uploaded file

filename = os.path.join(app.config['UPLOAD\_FOLDER'], file.filename)

file.save(filename)

# Convert the file

converted\_filename = os.path.splitext(file.filename)[0] + '\_converted.pdf'

converted\_filepath = os.path.join(app.config['CONVERTED\_FOLDER'], converted\_filename)

i2pconverter(filename, converted\_filepath)

global file\_path

file\_path = converted\_filepath

return render\_template('converted.html')

return redirect(request.url)

@app.route('/download')

def download():

try:

return send\_file(file\_path, as\_attachment=True)

except FileNotFoundError:

return "File not found", 404

if \_name\_ == '\_main\_':

app.run()

**I2P.py**

from PIL import Image

def i2pconverter(input\_filepath, output\_filepath):

image = Image.open(input\_filepath)

pdf\_bytes = image.convert('RGB')

pdf\_bytes.save(output\_filepath)

image.close()

**CHAPTER 7**

**SNAPSHOTS**

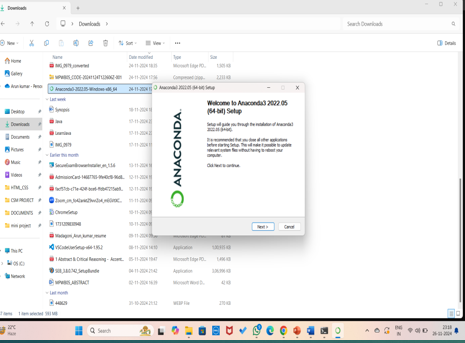
**7.1 GENERAL**

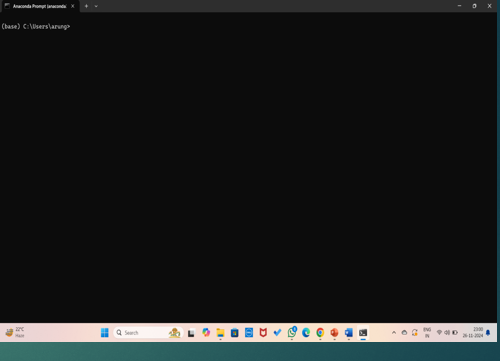
This project is implements like application using python and the Server process is maintained

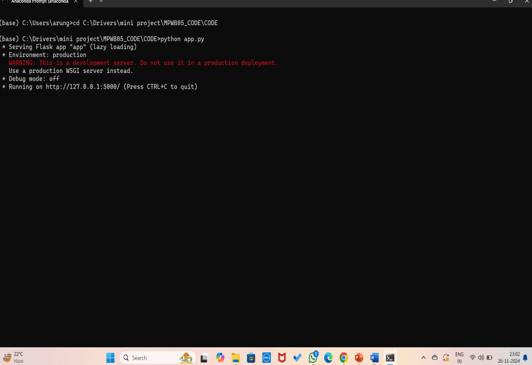
using the SOCKET &amp; SERVERSOCKET and the Design part is played by Cascading Style

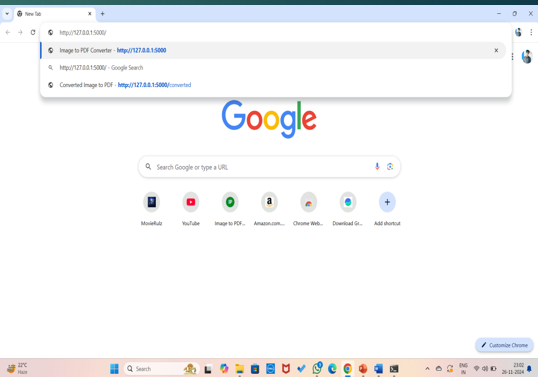
Sheet.

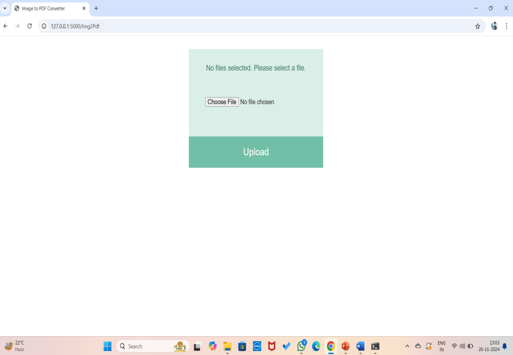
**SNAPSHOTS**

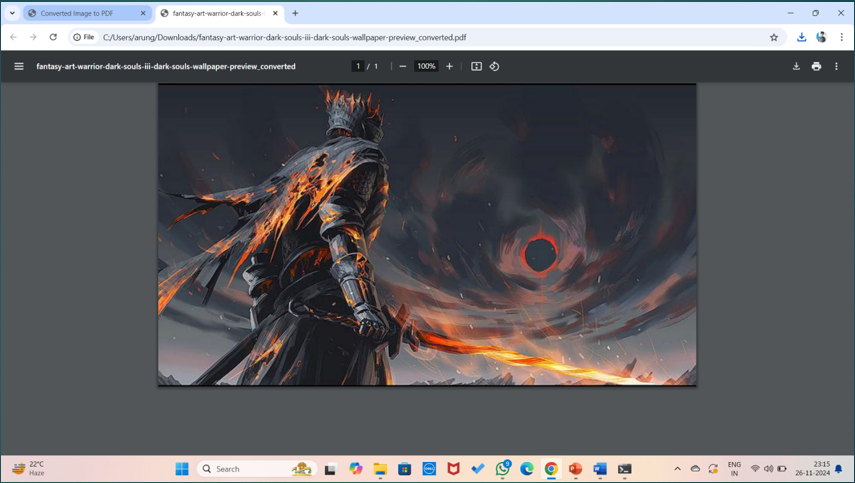
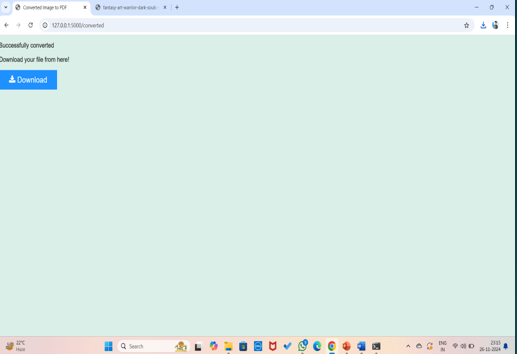


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**CHAPTER 8**

**SOFTWARE TESTING**

**8.1 GENERAL**

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

**8.2 DEVELOPING METHODOLOGIES**

The test process is initiated by developing a comprehensive plan to test the general functionality and special features on a variety of platform combinations. Strict quality control procedures are used. The process verifies that the application meets the requirements specified in the system requirements document and is bug free. The following are the considerations used to develop the framework from developing the testing methodologies..

**8.3 TYPES OF TESTS**

**8.3.1 Unit Testing**

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program input produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

**8.3.2 Functional Test**

Functional tests provide systematic demonstrations that functions tested are available specified by the business and technical requirements, system documentation, and user manuals. Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures : interfacing systems or procedures must be invoked.

**8.3.3 System Test**

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

**8.3.4 Performance Test**

The Performance test ensures that the output be produced within the time limits,and the time taken by the system for compiling, giving response to the users and request being send to the system for to retrieve the results.

**8.3.5 Integration Testing**

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.The task of the integration test is to check that components or software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

**8.3.6 Acceptance Testing**

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

**Acceptance Testing for Data Synchronization:**

* The Acknowledgements will be received by the Sender Node after the Packets are received by the Destination Node
* The Route add operation is done only when there is a Route request in need
* The Status of Nodes information is done automatically in the Cache Updation process

**8.3.7 Build the test plan**

Any project can be divided into units that can be further performed for detailed processing. Then a testing strategy for each of this unit is carried out. Unit testing helps to identity the possible bugs in the individual component, so the component that has bugs can be identified and can be rectified from errors.

**CHAPTER 9**

**FUTURE ENHANCEMENT**

**9.1 FUTURE ENHANCEMENTS:**

Future enhancements for the Image to PDF Converter application could focus on several key

areas to improve functionality and user experience. Adding user accounts would enable

personalized document management and retrieval. Integrating Optical Character Recognition

(OCR) could transform scanned images into searchable and editable text, enhancing document

utility. Implementing batch processing would allow for simultaneous conversion of multiple

image sets, increasing efficiency.

**CHAPTER 10**

**CONCLUSIONAND REFERENCES**

**10.1 CONCLUSION**

The Image to PDF Converter developed using Flask represents a robust solution for users

needing to convert multiple images into a cohesive PDF document quickly and efficiently. By

leveraging Flask&#39;s lightweight framework and Python libraries like Pillow and Report Lab, the

application offers a seamless user experience with powerful backend processing capabilities. The

project underscores Flask&#39;s versatility in web application development, providing a scalable

solution that can be deployed on various web servers and cloud platforms. As the application

evolves with additional features and optimizations, it will continue to serve as a valuable tool for

converting images to PDFs with enhanced flexibility, performance, and user satisfaction.

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