**Mini Project -I Report**

on

**JARVIS – The Virtual Assistant**

by

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**Declaration**

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

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**Acknowledgements**

We are pleased to present the stage one report of our mini project titled 'JARVIS – The Virtual Assistant.' Our team has diligently worked towards a systematic approach to the project, focusing on achieving our goals effectively.

We extend our sincere gratitude to our project guide, Dr. Prasenjit Bhavathankar, Department of Computer Engineering, Sardar Patel Institute of Technology (SPIT), for his unwavering support, guidance, and encouragement throughout this project. Her valuable insights and discussions at every phase ensured that our approach was well-designed and executed, and that our conclusions were appropriate based on our results.

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**Abstract**

The J.A.R.V.I.S. (Just A Rather Very Intelligent System) project is a sophisticated virtual assistant designed to enhance user interaction and experience through seamless communication. Developed as a Second Year Mini Project, this project integrates advanced language processing algorithms to understand and respond to user queries effectively.

One of the key features of J.A.R.V.I.S. is its ability to provide users with a range of functionalities, including setting reminders, retrieving information, and controlling smart devices, making it a versatile and valuable tool in daily life. The project's focus on integrating language processing algorithms for seamless communication demonstrates its commitment to enhancing user experience.

Overall, the J.A.R.V.I.S. project represents a significant advancement in virtual assistant technology, showcasing innovative features and a user-centric design approach.

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# Introduction

## Problem Statement

To address these challenges, our project aims to develop a virtual assistant system called J.A.R.V.I.S. (Just A Rather Very Intelligent System) that focuses on enhancing user interaction and experience through innovative features. This system will incorporate advanced language processing algorithms to understand user queries and provide accurate responses in English. Furthermore, J.A.R.V.I.S. will feature a user-friendly interface and intuitive design to streamline daily tasks and improve productivity.

By developing J.A.R.V.I.S., we aim to create a virtual assistant that not only meets the functional requirements of users but also provides a seamless and enjoyable user experience. This project will contribute to the advancement of virtual assistant technology and set a new standard for user interaction and convenience.

## Literature Survey/Market Survey

1. **(Min. 3 references of research papers (in case of research based idea) or min 3 competitors(similar products) in market (in case of product) you have looked at while arriving at your idea)**
2. **Note: You can include a questionnaire based survey in case of market survey as well, which you intend to use as you go ahead with the project**

## Scope and Objectives

* **Scope:**

The scope of our project, J.A.R.V.I.S. (Just A Rather Very Intelligent System), includes the development of a virtual assistant system that can seamlessly communicate in English. The system will incorporate advanced language processing algorithms to understand user queries and provide accurate responses. Additionally, J.A.R.V.I.S. will feature a user-friendly interface and intuitive design to streamline daily tasks and improve productivity.

* **Objectives:**

1. To seamlessly communicate for response capabilities in the JARVIS project.
2. To enable effortless execution of common OS tasks.
3. To facilitate quick access and navigation of social media platforms via voice commands within JARVIS.
4. To design an intuitive and user-friendly graphical interface for JARVIS, enhancing overall user experience and satisfaction.

## Assumptions

* + 1. Users will have access to a device with internet connectivity to interact with J.A.R.V.I.S.
    2. Users will have a basic understanding of how to communicate effectively with a virtual assistant.
    3. The environment in which J.A.R.V.I.S. is used will be relatively quiet, without significant background noise.
    4. Users will primarily use text-based input to interact with J.A.R.V.I.S., rather than voice or other forms of input.

## Constraints

## The project will focus on English language processing primarily, with the possibility of extending to other languages in future iterations.

## The project will not include complex natural language understanding or generation capabilities beyond the scope of a typical virtual assistant.

## The project will be developed using existing libraries and frameworks, without the creation of new language processing algorithms.

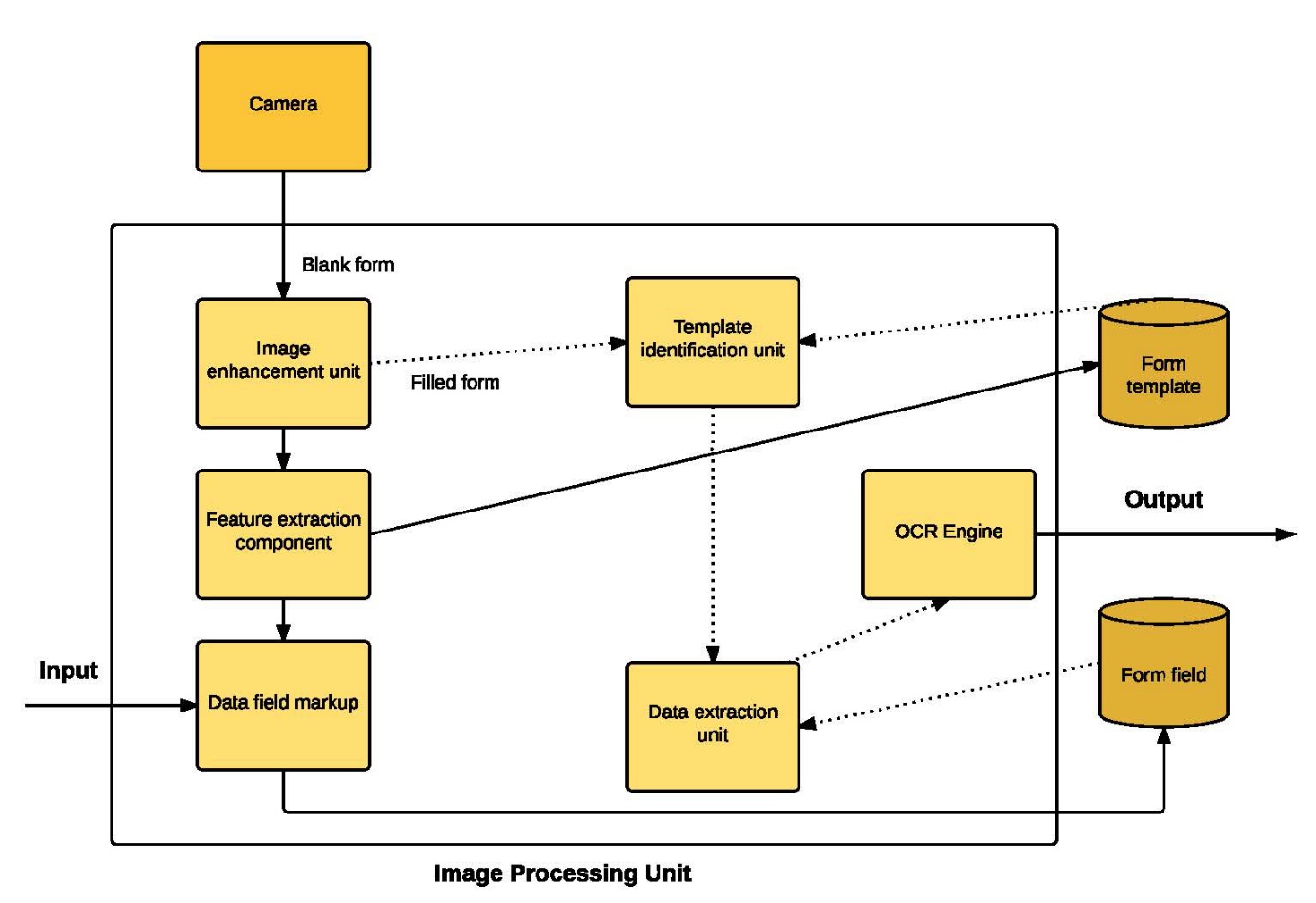
# Proposed System

## Architecture Diagram

**Block Diagram-draw the detailed block diagram to highlight the major modules in your system, Sample:**

The system consists of three major components namely:

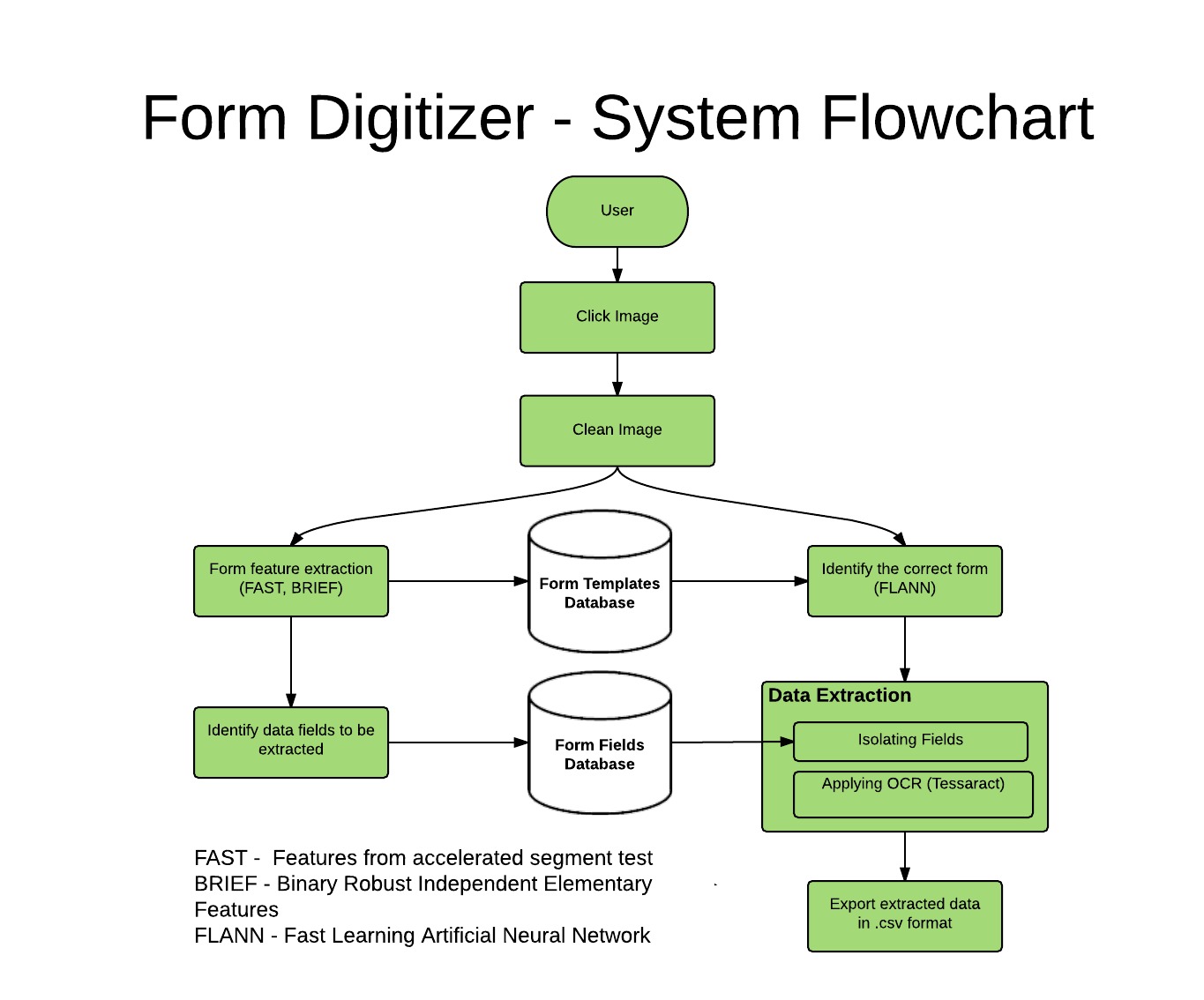
1. Camera to capture the input images.
2. Image Processing component to do the actual processing.
3. Data storage component to maintain template data.



* + 1. **Image Enhancement unit:** Enhances the image according to the requirements of the system.
    2. **Feature Extraction Component:** Extracts important features that describe the image.
    3. **Data Field Mark-up:** Assists the user in marking the fields to be extracted.
    4. **Template identification unit:** Makes a comparison between the input image and he templates stored in the database.
    5. **Data extraction unit:** Extracts the data in the image sections according to the matched template and sends them to the OCR engine.
    6. OCR Engine: It recognises the characters form the sliced image.

## Algorithms used

**Detail the algorithms/techniques(cite the algorithms/ models adopted from research papers/other resources here) you have used for the implementation, sample:**



The user takes the image of an empty form and then cleans the image using the system. For cleaning the image the system uses a low pass filter – median filter.

Subsequently, the form features are extracted, and stored in the database. To select the form feature that needs to be extracted, first the system selects the feature point that it needs to extract. The system uses feature detector algorithm – Fast, which is a standalone feature detector and is very efficient and suitable for real time applications. The feature detector algorithm is used to find interesting points in an image that helps to define whole image and generate a template out of it. Once the interesting points are identified they need to be represented in a format that helps to store them in the form Template database and use them while comparing. A feature extractor algorithm - Brief (Binary Robust Independent Elementary Features) descriptor algorithm is used by the system. In this way template of an empty form is generated and stored in database. The user then marks the fields from where data needs to be extracted and this data is also stored in a database in the form of relative region coordinates.

When the user wishes to extract data from a target form, he takes an image of the filled form and sends it to the system. System cleans the image and extracts its feature using the algorithm mentioned above. The features of it are compared with the templates available in the database and system identifies the matching template. Once the template is identified, the data previously marked by the user is loaded and corresponding regions are mapped. These sections are cropped and then OCR is applied on these cropped regions to get the output. The output is then exported in CSV format.

# Project Plan

1. **Make use of Timeline charts to clearly explain your project plan**
2. **Detail the tasks completed module wise for the entire project**

# Implementation

1. **Details of 100% of implementation completed**
2. **Tech Stack Used**
3. **APIs used**
4. **Results & Observations- Graphs/comparative tables/ observations from results**
5. **Module-wise Implementation Screenshots**

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# Conclusion and Future Work

1. **Write the conclusions you can make out of your project**
2. **Write about any further enhancements that can be done as future work**

# References

**Write all referred material ( research papers/links/tutorials/blogs/APIs used) in IEEE standard reference style.**