**Software Requirements**

**Specification**

**for**

**ChatPad AI**

**Version 1.0**

**Prepared by**

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**Contents**

**REVISIONS .............................................................................................................................................................. III**

[1 INTRODUCTION 1](#_Toc13308)

[1.1 DOCUMENT PURPOSE 1](#_Toc13309)

[1.2 PRODUCT SCOPE 1](#_Toc13310)

[1.3 INTENDED AUDIENCE AND DOCUMENT OVERVIEW 1](#_Toc13311)

[1.4 DEFINITIONS, ACRONYMS AND ABBREVIATIONS 1](#_Toc13312)

[1.5 DOCUMENT CONVENTIONS 1](#_Toc13313)

[1.6 REFERENCES AND ACKNOWLEDGMENTS 2](#_Toc13314)

[2 OVERALL DESCRIPTION 3](#_Toc13315)

[2.1 PRODUCT PERSPECTIVE 3](#_Toc13316)

[2.2 PRODUCT FUNCTIONALITY 3](#_Toc13317)

[2.3 USERS AND CHARACTERISTICS 3](#_Toc13318)

[2.4 OPERATING ENVIRONMENT 3](#_Toc13319)

[2.5 DESIGN AND IMPLEMENTATION CONSTRAINTS 4](#_Toc13320)

[2.6 USER DOCUMENTATION 4](#_Toc13321)

[2.7 ASSUMPTIONS AND DEPENDENCIES 4](#_Toc13322)

[3 SPECIFIC REQUIREMENTS 5](#_Toc13323)

[3.1 EXTERNAL INTERFACE REQUIREMENTS 5](#_Toc13324)

[3.2 FUNCTIONAL REQUIREMENTS 6](#_Toc13325)

[3.3 BEHAVIOUR REQUIREMENTS 6](#_Toc13326)

[4 OTHER NON-FUNCTIONAL REQUIREMENTS 7](#_Toc13327)

[4.1 PERFORMANCE REQUIREMENTS 7](#_Toc13328)

[4.2 SAFETY AND SECURITY REQUIREMENTS 7](#_Toc13329)

[4.3 SOFTWARE QUALITY ATTRIBUTES 7](#_Toc13330)

[5 OTHER REQUIREMENTS 8](#_Toc13331)

[APPENDIX A – DATA DICTIONARY 9](#_Toc13332)

**Revisions**

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| Draft Type and  Number | Full Name | Information about the revision. This table does not need to be filled in whenever a document is touched, only when the version is being upgraded. | 00/00/00 |

<In this template you will find text bounded by the “<>” symbols. This text appears in italics and is intended to guide you through the template and provide explanations regarding the different sections in this document. There are two types of comments in this document. These comments that are in black are intended specifically for that course. These comments that are in blue are more general and apply to any SRS. Please, make sure to delete all of the comments before submitting the document.

The explanations provided below, do not cover all of the material, but merely, the general nature of the information you would usually find in SRS documents. It is based on the IEEE requirements. Most of the sections in this template are required sections, i.e. you must include them in your version of the document. Failure to do so will result in marks deductions. Optional sections will be explicitly marked as optional.>

# 1 Introduction

## *The introduction provides an overview of the document, its purpose, and its contents.*

## 1.1 Document Purpose

## *This document serves as the Software Requirements Specification (SRS) for the CHATPAD AI system. It outlines the functional and non-functional requirements, constraints, and the system’s response to specific inputs. The document aims to provide a clear and comprehensive guide for the development team to ensure that the final product aligns with the intended design and functionality.*

## 1.2 Product Scope

## *CHATPAD AI is an AI-powered website designed to answer questions based on the content of uploaded PDF documents or provided URLs. The system aims to simplify information extraction from various sources, making it a valuable tool for research, study, and general information gathering. The benefits of CHATPAD AI include time efficiency, improved accuracy of information retrieval, and the convenience of having a single platform for diverse data sources.*

## 1.3 Intended Audience and Document Overview

This document is intended for the development team, project managers, and the client(**Mr.Ali Akthar, Mr.Kashif Ashrar**). It provides a detailed overview of the system’s requirements, its features, and its constraints. The document is organized into sections that describe the system’s purpose, scope, functional and non-functional requirements, and use cases. It is recommended to start with the overview sections and then proceed to the sections that are most pertinent to each reader type.

## 1.4 Definitions, Acronyms and Abbreviations

* AI: Artificial Intelligence
* Q/A: Questions and Answers
* PDF: Portable Document Format
* URL: Uniform Resource Locator

## 1.5 Document Conventions

## *This document follows the IEEE formatting requirements. The text is written in Arial font size 11, and italics are used for comments. The document text is single-spaced and maintains the 1” margins found in this template. Section and Subsection titles follow the template’s format. Any standards or typographical conventions that were followed when writing this SRS, such as fonts or highlighting that have special significance, are described in this section.*

## 1.6 References and Acknowledgments

This document references the IEEE Software Requirements Specification (SRS) guidelines for its structure and formatting. We would like to acknowledge the contributions of the development team(**Safnas, Abdhullah, Musharraf, Najman**), the stakeholders, and all those who provided valuable feedback and insights during the creation of this document. We also appreciate the advancements in Artificial Intelligence(LangChain LLM) that make a system like CHATPAD AI possible.

# 2 Overall Description

## 2.1 Product Perspective

<Describe the context and origin of the product being specified in this SRS. For example, state whether this product is a follow-on member of a product family, a replacement for certain existing systems, or a new, self-contained product. If the SRS defines a component of a larger system, relate the requirements of the larger system to the functionality of this software and identify interfaces between the two. In this part, make sure to include a simple diagram that shows the major components of the overall system, subsystem interconnections, and external interface. In this section it is crucial that you will be creative and provide as much information as possible.

TO DO: Provide at least one paragraph describing product perspective. Provide a general diagram that will illustrate how your product interacts with the environment and in what context it is being used.>

## 2.2 Product Functionality

<Summarize the major functions the product must perform or must let the user perform. Details will be provided in Section 3, so only a high level summary is needed here. Organize the functions to make them understandable to any reader of the SRS. A picture of the major groups of related requirements and how they relate, such as a top level data flow diagram or object class diagram, will be effective.

TO DO:

1. Provide a bulleted list of all the major functions of the system
2. **(Optional)** Provide a Data Flow Diagram of the system to show how these functions relate to each other.>

## 2.3 Users and Characteristics

<Identify the various users that you anticipate will use this product. Users may be differentiated based on frequency of use, subset of product functions used, technical expertise, security or privilege levels, educational level, or experience.

TO DO:

1. Describe the pertinent characteristics of each user. Certain requirements may pertain only to certain users.

3. Distinguish the most important users for this product from those who are less important to satisfy.>

## 2.4 Operating Environment

<Describe the environment in which the software will operate, including the hardware platform, operating system and versions, and any other software components or applications with which it must peacefully coexist. In this part, make sure to include a simple diagram that shows the major components of the overall system, subsystem interconnections, and external interface

TO DO: As stated above, in at least one paragraph, describe the environment your system will have to operate in. Make sure to include the minimum platform requirements for your system. >

## 2.5 Design and Implementation Constraints

<Describe any items or issues that will limit the options available to the developers. These might include: hardware limitations (timing requirements, memory requirements); interfaces to other applications; specific technologies, tools, and databases to be used; parallel operations; language requirements; communications protocols; security considerations; design conventions or programming standards (for example, if the customer’s organization will be responsible for maintaining the delivered software).

TO DO: In this section you need to consider all of the information you gathered so far, analyze it and correctly identify at least 5 constraints.>

## 2.6 User Documentation

<List the user documentation components (such as user manuals, on-line help, and tutorials) that will be delivered along with the software. Identify any known user documentation delivery formats or standards.

TO DO: You will not actually develop any user-manuals, but you need to describe what kind of manuals and what kind of help is needed for the software you will be developing. One paragraph should be sufficient for this section.>

## 2.7 Assumptions and Dependencies

<List any assumed factors (as opposed to known facts) that could affect the requirements stated in the SRS. These could include third-party or commercial components that you plan to use, issues around the development or operating environment, or constraints. The project could be affected if these assumptions are incorrect, are not shared, or change. Also identify any dependencies the project has on external factors, such as software components that you intend to reuse from another project.

TO DO: Provide a short list of some major assumptions that might significantly affect your design. For example, you can assume that your client will have 1, 2 or at most 50 Automated Banking

Machines. Every number has a significant effect on the design of your system. >

# 

# 3 Specific Requirements

## 3.1 External Interface Requirements

#### 3.1.1 User Interfaces

#### *3.1.1 User Interfaces*

#### *The user interface of ChatPad AI is designed to provide a seamless and intuitive experience for users, incorporating various functionalities such as uploading PDFs or URLs, asking questions, user registration and login, as well as administrative sign-in. The logical characteristics of each interface element are outlined below:*

#### *1. Homepage:*

#### *- Description: The homepage serves as the entry point for users and provides an overview of the website's features.*

#### *- Components:*

#### *- Navigation bar: Allows users to access different sections of the website.*

#### *- Sign-up/Login buttons: For new users to register or existing users to log in.*

#### *- Get Started button: Directs users to sign in page.*

#### *- Chat interface: A visible section for users to interact with the chatbot.*

#### *- Feedback form: A forms which allows to send feedback mail to admin.*

#### *2. Sign-up Page:*

#### *- Description: This page enables new users to create an account on the platform.*

#### *- Components:*

#### *- Registration form: Fields for entering username, email, password, etc.*

#### *- Submit button: Completes the registration process.*

#### *3. Login Page:*

#### *- Description: Existing users can log in using their credentials.*

#### *- Components:*

#### *- Login form: Fields for entering username and password.*

#### *- Submit button: Initiates the login process.*

#### *4. Upload Page:*

#### *- Description: Users can upload PDF files or enter URLs for processing and interaction with the chatbot.*

#### *- Components:*

#### *- File upload button: Enables users to select and upload a PDF document.*

#### *- Uploaded PDFs list: Displays the list of uploaded PDFs.*

#### *- Enter URL : Enables users to enter and submit URL of a webpage.*

#### *- Entered URLs list: Displays the list of submitted URLs.*

#### *5. Chat Interface:*

#### *- Description: This interface allows users to communicate with the chatbot.*

#### *- Components:*

#### *- Text input area: Users can type questions or responses.*

#### *- Send button: Submits the user's input for processing.*

#### *6. Admin Sign-in Page:*

#### *- Description: This page is for administrative users to log in and access backend information.*

#### *- Components:*

#### *- Admin login form: Fields for entering admin credentials.*

#### *- Submit button: Initiates the admin login process.*

#### *7. Error Messages:*

#### *- Description: Standardized error messages to guide users in case of input validation or system errors.*

#### *- Components:*

#### *- Pop-up or inline messages: Clearly communicates errors or success messages.*

#### 3.1.2 Software Interfaces

The software interfaces of the Chat with PDF website primarily involve interactions with the operating system. Below is a description of this specific software interface:

1. Operating System Interface:

- Description:

- The ChatPad AI is designed to operate as a web-based application, and as such, it interfaces with various operating systems through standard web browsers.

- The software does not have direct dependencies on specific operating systems, ensuring compatibility with a diverse range of platforms, including but not limited to Windows, macOS, and Linux.

- Nature of Interaction:

- Utilizes cross-platform web technologies (HTML, CSS, JavaScript) to ensure consistent performance and appearance across different operating systems.

- Leverages browser-based functionalities for user interactions and displays.

- Dependencies:

- The software relies on the capabilities and features provided by modern web browsers, such as Google Chrome, Mozilla Firefox, Apple Safari, and Microsoft Edge.

- No special libraries or dependencies tied to a specific operating system are required for the core functionalities of the website.

#### 3.1.3 Communications Interfaces

The Chat Pad AI relies on several communication interfaces to ensure seamless interactions between users, the server, and external services. The primary communication standards and requirements are outlined below:

1. HTTP/HTTPS for Web Communication:

- The website utilizes the Hypertext Transfer Protocol (HTTP) and its secure variant (HTTPS) for communication between the users' web browsers and the server.

- HTTP/HTTPS ensures the secure and efficient exchange of data, supporting the transmission of user inputs, file uploads, and chat interactions.

2. API Calls for Response Generation:

- The chatbot functionality involves making API calls to external services for generating responses to user queries.

- The communication between the website and external APIs follows standard conventions, likely using RESTful principles, allowing for structured data exchange.

3. Database Interaction via Database Query Language:

- Communication with the database server for user data storage and retrieval is facilitated through a Database Query Language (e.g., SQL).

- Standardized database communication protocols ensure efficient and secure access to user information.

4. Secure Sockets Layer (SSL)/Transport Layer Security (TLS) Encryption:

- To enhance security, data transmission is secured using SSL/TLS encryption for HTTPS connections.

- This encryption safeguards sensitive user information during communication between the web browser and the server.

## 3.2 Functional Requirements

## 

## *In this section, the functional requirements of the Chat with PDF website are organized into distinct functional areas to provide a detailed understanding of the product operations.*

## *3.2.1 User Authentication*

## *1. User Registration:*

## *- The system shall allow users to register by providing a unique username, email address, and password.*

## *- Passwords must meet specified complexity requirements.*

## *- Users shall receive confirmation emails for successful registrations.*

## *2. User Login:*

## *- Registered users shall be able to log in using their username and password.*

## *- User authentication shall be secure and encrypted.*

## *- Failed login attempts shall be monitored, and users shall be notified of suspicious activity.*

## *3. Admin Login:*

## *- Administrators shall have a separate login interface with elevated privileges.*

## *- Admin authentication shall be secure and follow the same encryption standards as user logins.*

## *3.2.2 PDF Upload and Processing*

## *4. PDF Upload:*

## *- Users shall be able to upload PDF documents through the website.*

## *- The system shall validate uploaded PDF files for format and integrity.*

## *- Upload progress shall be displayed to the user during the process.*

## *5. PDF Processing:*

## *- The system shall extract relevant information from the uploaded PDFs.*

## *- Processed information shall be used for chatbot interactions.*

## *- Users shall receive notifications upon successful processing.*

## *3.2.3 Chatbot Interaction*

## *6. User Queries:*

## *- Users shall be able to input queries or statements to the chatbot.*

## *- The chatbot shall respond with relevant information based on the uploaded PDF content.*

## *- Natural language processing techniques shall be applied for effective communication.*

## *7. Interactive Chat Interface:*

## *- The chat interface shall support real-time interaction with the chatbot.*

## *- Users shall see responses in a conversational format with timestamps.*

## *3.2.4 Database Management*

## *8. User Data Storage:*

## *- The system shall maintain a database to store user information, including usernames, email addresses, and authentication details.*

## *- User data shall be securely stored and retrieved as needed.*

## 3.3 Behaviour Requirements

#### 3.3.1 Use Case View

<A use case defines a goal-oriented set of interactions between external actors and the system under consideration. Since sometimes we will not be able to specify completely the behaviour of the system by just State Diagrams, we use use-cases to complete what we have already started in section 3.3.1.

TO DO: Provide a use case diagram which will encapsulate the entire system and all possible actors. Do not include detailed use case descriptions (these will be needed when you will be working on the Test Plan), but make sure to include a short description of what every use-case is, who are the actors in your diagram.>

# 4 Other Non-functional Requirements

## 4.1 Performance Requirements

<If there are performance requirements for the product under various circumstances, state them here and explain their rationale, to help the developers understand the intent and make suitable design choices. Specify the timing relationships for real time systems. Make such requirements as specific as possible. You may need to state performance requirements for individual functional requirements or features.

TODO: Provide at least 5 different performance requirements based on the information you collected from the client. For example you can say “1. Any transaction will not take more than 10 seconds, etc…>

## 4.2 Safety and Security Requirements

<Specify those requirements that are concerned with possible loss, damage, or harm that could result from the use of the product. Define any safeguards or actions that must be taken, as well as actions that must be prevented. Refer to any external policies or regulations that state safety issues that affect the product’s design or use. Define any safety certifications that must be satisfied. Specify any requirements regarding security or privacy issues surrounding use of the product or protection of the data used or created by the product. Define any user identity authentication requirements.

TODO:

* Provide at least 3 different safety requirements based on your interview with the client, and again you need to be creative here.
* Describe briefly what level of security is expected from this product by your client and provide a bulleted (or numbered) list of the major security requirements.>

## 4.3 Software Quality Attributes

<Specify any additional quality characteristics for the product that will be important to either the customers or the developers. Some to consider are: adaptability, availability, correctness, flexibility, interoperability, maintainability, portability, reliability, reusability, robustness, testability, and usability. Write these to be specific, quantitative, and verifiable when possible. At the least, clarify the relative preferences for various attributes, such as ease of use over ease of learning.

TODO: Use subsections (e.g., 4.3.1 Reliability, 4.3.2 Portability, etc…) provide requirements related to the different software quality attributes. Base the information you include in these subsections on the material you have learned in the class. Make sure, that you do not just write “This software shall be maintainable…” Indicate how you plan to achieve it, & etc…Do not forget to include such attributes as the design for change. Please note that you need to include at least 2 quality attributes, but it is the mere minimum and it will not receive the full marks.>

# 5 Other Requirements

<This section is **Optional.** Define any other requirements not covered elsewhere in the SRS. This might include database requirements, internationalization requirements, legal requirements, reuse objectives for the project, and so on. Add any new sections that are pertinent to the project.>

# Appendix A – Data Dictionary

<Data dictionary is used to track all the different variables, states and functional requirements that you described in your document. Make sure to include the complete list of all constants, state variables (and their possible states), inputs and outputs in a table. In the table, include the description of these items as well as all related operations and requirements.>