
SOFTWARE REQUIREMENTS SPECIFICATION

for

Eye Surgeons Software

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1 Introduction

1.1 Purpose

The purpose of this document is to specify the software requirements for the Cloud-Based Eye Surgeons Software project. The software aims to provide a comprehensive solution for ophthalmologists, enabling them to efficiently manage patient data, generate glasses prescriptions, and handle medicine prescriptions for both in-patient (IPD) and out-patient (OPD) settings.

1.2 Document Conventions

This SRS follows standard document conventions, including the use of specific fonts and highlighting to emphasize significant information. The format specifications adhere to the IEEE standard for software requirements specifications. Higher-level requirements' priorities are assumed to be inherited by detailed requirements.

1.3 Intended Audience and Reading Suggestions

This document is intended for developers, project managers, marketing staff, users, testers, and documentation writers. Developers and testers may focus on technical details, while project managers and marketing staff may be interested in benefits and objectives. Users can find information related to the user interface and functionality. It is suggested to start with the overview sections and proceed through sections pertinent to each reader type.

1.4 Project Scope

The Cloud-Based Eye Surgeons Software aims to offer a comprehensive solution for ophthalmologists to manage patient data securely in the Cloud Database. It includes features for writing glasses prescriptions and generating medicine prescriptions for both in-patient (IPD) and out-patient (OPD) settings. The software provides a user-friendly interface for inputting and managing patient data, including medical history, previous prescriptions, and examination results. The primary goal is to streamline the workflow for ophthalmologists, ensuring efficient and accurate service delivery to patients.

1.5 References

This document refers to the vision and scope document for the Cloud-Based Eye Surgeons Software project. Additionally, other documents, including user interface style guides, contracts, standards, and system requirements specifications, may be referenced as needed. Please refer to the respective documents for more detailed information.

2 Overall Description

2.1 Product Perspective

The Cloud-Based Eye Surgeons Software is designed to address the current shortcomings in the market where most of the software used by hospitals for patient and disease management is outdated, lacking essential features, and often poses security threats. The existing solutions, which are approximately 10 years old, not only fall short of meeting the demands of the current healthcare landscape but also present potential risks to patient data security.

In contrast to these outdated systems, our software aims to provide a modern, comprehensive solution for managing patient data, writing glasses prescriptions, and generating medicine prescriptions in both in-patient (IPD) and out-patient (OPD) settings. The software is built with contemporary standards, ensuring not only enhanced functionality but also prioritizing the security of patient data in compliance with doctor-patient confidentiality.

This project is not a mere update to existing systems but a transformative approach to meet the evolving needs of hospitals, ophthalmologists, and patients. It seeks to introduce a secure, user-friendly interface with features that align with the requirements of the current healthcare environment.

2.2 Product Functions

The Cloud-Based Eye Surgeons Software is designed to provide comprehensive support to doctors for managing disease and patient data. The major functions of the software include:

- Capturing and storing basic patient data, including name, age, gender, address, mobile number, and MRD number.
- Two main tabs for distinct functionalities:
 - Out-Patient Department (OPD)
 - In-Patient Department (IPD)
- Glass Prescription Management
- Medicine Prescription Management
- Fundus Photo Upload to the Cloud for monitoring eye progression

- Complete Patient History Recording
 - Recording and storing every visit's details
 - Generation of a Word document for the complete diagnosis of any particular day of the patient's visit
- Storage of detailed patient information required by the doctor, including:
 - History
 - Diagnosis
 - Advised treatment
 - Examination results
- Generation of a complete Word file containing patient details
- Out-Patient Department (OPD) Record Management, including:
 - Clinical findings
 - Operation notes
 - Investigations
 - Post-operative medicines
 - Surgery advising
 - Advice on discharge
- Generation of a complete Word file containing OPD details

Details of these functions will be elaborated in Section 3.

2.3 User Classes and Characteristics

The Cloud-Based Eye Surgeons Software is exclusively designed for ophthalmologists, and the anticipated characteristics of this user class are as follows:

- **Ophthalmologists:**
 - **Frequency of Use:** Regular users with daily interaction.
 - **Technical Expertise:** High technical proficiency in using medical software.
 - **Security/Privilege Levels:** Full access to all features and patient data.
 - **Educational Level/Experience:** Advanced medical education with years of practical experience.

The entire software design and feature set are tailored to meet the specific needs and expertise of ophthalmologists. The focus is on providing a user-friendly interface that aligns with the workflow and requirements of ophthalmological practices.

2.4 Operating Environment

The Cloud-Based Eye Surgeons Software operates in a desktop environment and is designed based on the following specifications:

- **Hardware Platform:** The software is compatible with standard desktop and laptop computers. It operates on various hardware configurations commonly found in healthcare institutions.
- **Operating System:** The software is designed to run on different operating systems, including but not limited to:
 - Microsoft Windows (Versions: Windows 10 and above)
 - macOS (Versions: Latest stable release)
 - Linux (Distributions: Ubuntu, Fedora, etc.)
- **Database:** The software interacts with a MongoDB database hosted on Amazon AWS, ensuring secure and scalable cloud-based data storage and retrieval.

Ensure that the hardware and operating system configurations meet the specified compatibility requirements for optimal performance and functionality in a desktop environment.

2.5 Design and Implementation Constraints

The development of the Cloud-Based Eye Surgeons Software is subject to the following design and implementation constraints:

- **Regulatory Compliance:** The software must adhere to relevant healthcare and data protection regulations, ensuring the security and confidentiality of patient information. Any applicable regulatory policies must be strictly followed throughout the development process.
- **Internet Connectivity:** While the software itself operates in a desktop environment, a reliable internet connection is required for the interaction with the cloud-based MongoDB database hosted on Amazon AWS.
- **Security Requirements:** The development must adhere to stringent security considerations, ensuring the protection of patient data both in transit and at rest in the cloud-based database.
- **Technology Stack:** Specific technologies, tools, and databases, including Amazon AWS and MongoDB, have been predetermined for use in the development process. Developers should adhere to the chosen technology stack for optimal integration.

- **Maintainability:** The delivered software should be designed with consideration for future maintenance and updates, including potential changes to the cloud-based infrastructure.

These constraints shape the development approach and guide decisions to ensure a compliant, reliable, and maintainable software solution.

2.6 User Documentation

The Cloud-Based Eye Surgeons Software will be accompanied by comprehensive user documentation to assist users in effectively utilizing the software. The user documentation components include:

- **User Manuals:** Detailed manuals providing step-by-step instructions for using various features of the software.
- **Online Help:** Context-sensitive help within the software interface to guide users during different operations.
- **Tutorials:** Interactive tutorials to facilitate a quick understanding of the software's functionality.

The user documentation will be delivered in electronic format, accessible online or downloadable for offline use. Standard documentation delivery formats and conventions, such as PDF and HTML, will be followed.

2.7 Assumptions and Dependencies

The successful development and deployment of the Cloud-Based Eye Surgeons Software are based on the following assumptions and dependencies:

- **Cloud Infrastructure:** Assumption that the cloud infrastructure provided by Amazon AWS will be stable and reliable for hosting the MongoDB database.
- **Internet Connectivity:** Assumption that users will have a reliable internet connection to access the cloud-based features of the software.
- **Third-Party Libraries:** Dependency on specific third-party libraries and frameworks for the development process. Changes to these dependencies may impact the project.
- **Regulatory Compliance:** Assumption that the regulatory environment relevant to healthcare software will remain consistent during the development and deployment phases.

- **Data Security:** Dependency on the implementation of secure data transmission and storage practices, including encryption and access controls, to ensure the confidentiality and integrity of patient data.

These assumptions and dependencies are crucial considerations, and any changes or discrepancies could affect the successful execution of the project.

3 External Interface Requirements

3.1 User Interfaces

The Cloud-Based Eye Surgeons Software presents a Tkinter-based graphical user interface (GUI), specifically tailored for ophthalmologists. Key features include:

- **Screen Layout:** Intuitive layouts with dedicated sections for OPD and IPD, offering efficient access to patient data, prescriptions, and medical history.
- **GUI Standards:** Adheres to Tkinter GUI standards, ensuring a cohesive and user-friendly experience for healthcare professionals.
- **Standard Buttons/Functions:** Standardized buttons for essential functions such as saving, retrieving patient records, and generating prescriptions. Integrated help functionality provides assistance as needed.
- **Error Message Display:** Consistent presentation of error messages, offering clear and actionable information for quick issue resolution.
- **Keyboard Shortcuts:** Incorporates keyboard shortcuts to enhance navigation efficiency and streamline operations.

Detailed design specifications for the user interface can be found in the separate User Interface Specification document.

3.2 Hardware Interfaces

The Cloud-Based Eye Surgeons Software seamlessly integrates with standard desktop and laptop hardware components. Supported devices encompass computers running on various operating systems, including Microsoft Windows (Versions: Windows 10 and above), macOS (Latest stable release), and Linux (Distributions: Ubuntu, Fedora, etc.). The software ensures compatibility with common computing devices through standard data and control interactions.

3.3 Software Interfaces

The software interfaces with essential software components, including:

- **Database:** Utilizes MongoDB (Version X.X) hosted on Amazon AWS, ensuring secure and scalable cloud-based data storage.

- **Operating Systems:** Compatible with Microsoft Windows (Versions: Windows 10 and above), macOS (Latest stable release), and Linux (Distributions: Ubuntu, Fedora, etc.).

Detailed documentation of communication protocols, data items, and message exchange between the software and these components is available in the Software Interface Specification.

3.4 Communications Interfaces

The Cloud-Based Eye Surgeons Software relies on internet connectivity for interactions with the cloud-based MongoDB database hosted on Amazon AWS. Communication utilizes standard protocols such as HTTPS, ensuring secure data transmission. Optimal data transfer rates are maintained for efficient performance, with robust encryption standards implemented to guarantee the confidentiality of patient data during communication.

4 System Features

This section outlines the major system features of the Cloud-Based Eye Surgeons Software, categorizing them based on the primary services provided by the product. Each feature contributes to the comprehensive solution offered to ophthalmologists.

4.1 Out-Patient Department (OPD) Features

4.1.1 Patient Data Management

- Capture and manage basic patient information, including name, age, gender, address, and mobile number.
- Priority: High

4.1.2 Complaints Recording

- Allow ophthalmologists to record specific complaints or symptoms reported by out-patients.
- Priority: High

4.1.3 Examinations

- Provide functionalities for conducting and documenting various eye examinations during OPD visits.
- Priority: High

4.1.4 Prescription Generation

- Enable ophthalmologists to generate accurate glasses prescriptions based on examination results.
- Priority: High

4.1.5 Medical History

- Maintain a comprehensive medical history of out-patients, including previous prescriptions and examinations.
- Priority: High

4.1.6 Diagram Upload

- Allow uploading or creation of diagrams related to eye conditions for visual representation.
- Priority: Medium

4.1.7 Advised Recommendations

- Facilitate the recording of recommendations and advice given to out-patients for better eye health.
- Priority: High

4.1.8 Complete History Retrieval

- Provide a feature to retrieve and view the complete medical history of out-patients for reference.
- Priority: High

4.1.9 Patient Information Input

- The system shall allow the entry of patient information, including name, age, sex, mobile number, and date of visit.
- The system shall validate the format of the mobile number and the date to ensure they adhere to predefined formats.
- Priority: High

4.1.10 Prescription Data Input

- The system shall provide input fields for glass prescription details for both the right eye and the left eye.
- The system shall include fields for spherical (Spl.), cylindrical (Cyl.), axis, and vision values for distance, computer, and near measurements.
- The system shall allow entry of IPD (interpupillary distance) values.
- The system shall permit the selection of glasses purpose (e.g., for near vision only, photo grey) from a predefined list.
- The system shall enable remarks to be added, such as 'progressive glass' or 'change left glass only.'
- Priority: High

4.1.11 Prescription Generation and Printing

- The system shall generate a prescription based on the entered data, formatted according to professional ophthalmic standards.
- The system shall provide a preview of the prescription before printing.
- The system shall send the prescription to the printer and ensure it is printed in a clear,

legible format.

- Priority: High

4.2 In-Patient Department (IPD) Features

4.2.1 Clinical Findings Documentation

- Document detailed clinical findings during the in-patient stay.
- Priority: High

4.2.2 Investigations

- Record results of additional investigations or tests conducted for in-patients.
- Priority: High

4.2.3 Surgery Advising

- Provide advice and recommendations for surgical interventions if necessary.
- Priority: High

4.2.4 Operation Notes

- Document detailed notes regarding surgical procedures performed.
- Priority: High

4.2.5 Post-Operative Medications

- Prescribe medications for post-operative care and recovery.
- Priority: High

4.2.6 Advice on Discharge

- Offer guidance and instructions for patients upon discharge from the hospital.
- Priority: High

4.2.7 Admission and Discharge Dates

- Record and track the dates of admission and discharge for in-patients.
- Priority: High

4.3 Common Features

4.3.1 Data Security and Access Control

- Implement robust data security measures to protect patient information.
- Define access controls to ensure authorized personnel have appropriate levels of access.

- Priority: High

4.3.2 Cloud Database Integration

- Integrate with a cloud-based MongoDB database hosted on Amazon AWS for secure and scalable data storage.
- Priority: Medium

4.3.3 Cross-Platform Compatibility

- Ensure compatibility with various operating systems, including Microsoft Windows, macOS, and Linux.
- Priority: High

4.3.4 Encryption Standards

- Implement encryption standards, such as HTTPS, for secure data transmission.
- Priority: High

4.3.5 User Assistance

- Provide user assistance through integrated help functionality.
- Priority: Medium

4.3.6 Error Handling

- Implement consistent standards for error message display, aiding users in issue resolution.
- Priority: Medium

These system features collectively contribute to the efficiency, functionality, and security of the Cloud-Based Eye Surgeons Software.

5 Other Nonfunctional Requirements

5.1 Performance Requirements

The Cloud-Based Eye Surgeons Software must meet the following performance requirements to ensure efficient and responsive operation:

- **Response Time:** The system should provide a response time of less than 2 seconds for common operations, such as retrieving patient records and generating prescriptions.
- **Scalability:** The software should scale gracefully to handle an increasing number of simultaneous users, ensuring performance is not significantly affected.
- **Data Retrieval Time:** The time taken to retrieve patient data from the cloud database should be optimized for quick access, aiming for retrieval within 3 seconds.
- **Compatibility:** Ensure compatibility with a range of devices and network conditions to maintain performance consistency.

These performance requirements are crucial for providing a seamless and responsive experience for ophthalmologists using the software.

5.2 Safety Requirements

To ensure the safety of patient data and the reliability of the Cloud-Based Eye Surgeons Software, the following safety requirements must be adhered to:

- **Data Encryption:** All patient data transmitted over the internet must be encrypted using industry-standard protocols to prevent unauthorized access.
- **Access Controls:** Implement stringent access controls to restrict user access based on roles and responsibilities, preventing unauthorized modifications or deletions of critical information.
- **Backup and Recovery:** Regularly perform automated backups of patient data stored in the cloud, ensuring quick recovery in case of data loss or system failures.
- **User Authentication:** Enforce strong user authentication mechanisms to verify the identity of users accessing the system, preventing unauthorized logins.

These safety requirements contribute to the overall reliability and integrity of the Cloud-Based Eye Surgeons Software.

5.3 Security Requirements

The Cloud-Based Eye Surgeons Software must meet stringent security requirements to safeguard patient information and maintain privacy:

- **HIPAA Compliance:** Adhere to the Health Insurance Portability and Accountability Act (HIPAA) standards to ensure the confidentiality and security of patient health information.
- **User Authorization:** Implement role-based access control, specifying different levels of access for ophthalmologists, administrative staff, and other users.
- **Audit Trails:** Maintain comprehensive audit trails to track user activities within the system, enabling accountability and traceability of changes.
- **Regular Security Audits:** Conduct regular security audits and vulnerability assessments to identify and address potential security threats.

Meeting these security requirements is essential for ensuring the trustworthiness and compliance of the Cloud-Based Eye Surgeons Software.

5.4 Software Quality Attributes

The Cloud-Based Eye Surgeons Software must exhibit the following quality attributes to meet the expectations of both customers and developers:

- **Usability:** The software should have an intuitive and user-friendly interface, ensuring ease of use for ophthalmologists and medical staff.
- **Reliability:** The system must consistently perform its functions accurately, providing reliable access to patient data and generating precise prescriptions.
- **Maintainability:** The software should be designed for ease of maintenance, allowing for updates, bug fixes, and improvements without significant downtime.
- **Scalability:** Ensure the software can scale to accommodate the growing volume of patient data and increasing user demand over time.
- **Interoperability:** The system should seamlessly integrate with external components, ensuring interoperability with other healthcare systems and tools.
- **Security:** Implement robust security measures to safeguard patient information, adhering to industry standards such as HIPAA compliance.

These software quality attributes are crucial for delivering a reliable and effective Cloud-Based Eye Surgeons Software.

5.5 Business Rules

The Cloud-Based Eye Surgeons Software operates based on the following business rules:

- **User Roles:** Different user roles, such as ophthalmologists, administrative staff, and support personnel, will have specific functions and access levels within the system.
- **Data Confidentiality:** Adherence to doctor-patient confidentiality is paramount, and all users must comply with policies to ensure the security and privacy of patient data.
- **Compliance:** The software must comply with relevant healthcare regulations, including HIPAA standards, to maintain legal and ethical standards.

These business rules guide the operation of the Cloud-Based Eye Surgeons Software.

6 Other Requirements

Additional requirements not covered elsewhere in the SRS include:

- **Database Backup:** Implement a regular automated backup process for the cloud-based MongoDB database to prevent data loss.
- **Documentation:** Provide comprehensive documentation for users, administrators, and developers, including user manuals and technical documentation.
- **Training:** Offer training sessions for ophthalmologists and medical staff to ensure effective utilization of the software.

These additional requirements contribute to the overall functionality and success of the Cloud-Based Eye Surgeons Software.

6.1 Appendix A: Glossary

SRS: Software Requirements Specification

GUI: Graphical User Interface

IPD: In-Patient Department

OPD: Out-Patient Department

MRI: Magnetic Resonance Imaging

HIPAA: Health Insurance Portability and Accountability Act

6.2 Appendix B: Analysis Models

6.2.1 Data Flow Diagram (DFD)

Figure 6.1: Data Flow Diagram for Cloud-Based Eye Surgeons Software

Figure 6.2: Class Diagram for Cloud-Based Eye Surgeons Software

6.2.2 Class Diagram

6.3 Appendix C: To Be Determined List

1. TBD: Detailed hardware specifications for system requirements.
2. TBD: Specific encryption standards for secure data transmission.
3. TBD: Integration details with external healthcare systems.