**Software Requirements**

**Specification for Mobile Doctor**

**Version 2.0 approved**

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**06/01/2023**

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# Revision History

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| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| Kareem Qaraien | 2023-07-19 | To reflect changes and updates in the project's requirements and specifications | 2.0 |
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# Introduction

## Purpose

Mobile Doctor, our innovative web-based application, is designed to serve as a digital health assistant. It uses advanced machine learning algorithms to analyze user-inputted symptoms and predict potential diseases. The application not only identifies possible health conditions but also provides comprehensive information about the predicted disease, its severity, and necessary precautions. Additionally, Mobile Doctor features a robust user authentication system and a disease prediction history feature, offering a personalized and user-centric experience.

## Intended Audience and Reading Suggestions

This document is intended for a broad audience, including users of Mobile Doctor, developers, stakeholders, and anyone interested in understanding the application's functionality and scope. Mobile Doctor is designed with user-friendliness at its core, requiring no medical expertise from its users.

## Product Scope

Mobile Doctor is a pioneering step in digital healthcare, providing users with an initial health assessment based on their symptoms. It offers a wealth of information about the predicted disease and suggests precautions. While it does not replace professional medical advice, it serves as a valuable preliminary health assessment tool.

# Overall Description

## Product Perspective

Mobile Doctor stands as a self-contained product, developed with the aim to assist users in predicting potential diseases based on their symptoms. The application harnesses the power of artificial intelligence and machine learning algorithms to analyze user-inputted symptoms and generate potential disease predictions.

## Product Functions

• User Authentication: Mobile Doctor features a secure login system, allowing users to create an account and access personalized features.

• Disease Prediction: Users can input their symptoms, and the application employs machine learning to predict potential diseases.

• Disease Information: The application provides comprehensive information about the predicted disease, its severity, and precautions.

• Prediction History: Users can access their disease prediction history, providing a detailed overview of previously predicted diseases..

A screenshot of a computer

Description automatically generated

*Figure 1 Context Data Flow Diagram*

## User Classes and Characteristics

Mobile Doctor is designed for the general public, particularly individuals seeking a preliminary health assessment. It can also serve as a valuable tool for healthcare professionals for initial diagnosis. The application requires basic digital literacy to operate.

## Operating Environment

Mobile Doctor is a web-based application, offering the flexibility to be accessed via any device with a web browser, including desktops, laptops, and mobile devices.

## Design and Implementation Constraints

The accuracy of disease prediction is contingent on the quality and comprehensiveness of the training data used for the machine learning model. The application requires regular updates with new medical data to ensure its relevance and effectiveness.

## User Documentation

Mobile Doctor is designed with user-friendliness in mind. To assist users in navigating and operating the application, a comprehensive user manual will be provided. This manual will include detailed instructions on how to use each feature of the application, from user registration and login to symptom input and disease prediction. The user manual will serve as a valuable resource for users to understand and utilize the application to its full potential.

## Assumptions and Dependencies

The application assumes that users will provide accurate symptoms for disease prediction. It also depends on a reliable internet connection for optimal performance. The user authentication and disease prediction history features rely on a MySQL database hosted on AWS for secure and efficient data storage and retrieval.

# External Interface Requirements

## User Interfaces

Upon launching the application, users will be welcomed by a visually appealing landing page. Here, they are presented with two options - to log in using their existing credentials or to register for a new account. In the event of invalid login attempts, a user-friendly error message will be displayed. Once the authentication process is successfully completed, users will be directed to the homepage. From the homepage, users can easily navigate through the application using the navigation bar. The navigation bar provides access to the disease prediction tool, the user's personal disease prediction history, and the user's profile. All features of the application are easily accessible from this central hub, ensuring a user-friendly experience.

## Hardware Interfaces

Mobile Doctor is a software-based solution that is compatible with a wide range of electronic devices. Whether users prefer to access the application on their PC, tablet, or smartphone, Mobile Doctor ensures a seamless user experience across all platforms.

## Software Interfaces

The application's backend is powered by Flask and MySQL, which manages user profiles and prediction histories. The frontend, designed with HTML, CSS, and JavaScript, provides an intuitive and engaging user interface. Flask, a Python-based micro web framework, facilitates the backend operations, ensuring smooth communication between the database and the frontend.

## Communications Interfaces

For account creation and authentication, the application uses email. However, for other functionalities such as accessing disease results, the system utilizes unique identifiers like userId and predictionId, which are generated by the database. This ensures secure and personalized access to the user's specific data and history.

# System Features

Mobile Doctor offers a range of features, including disease prediction, user authentication, and a symptom-based historical search.

## Disease Prediction and Information Provision

### Description and Priority

This feature predicts the possible disease based on the symptoms provided by the user and provides additional resources about the predicted diseases. This feature was a key component of the final product.

### Stimulus/Response Sequences

* User inputs symptoms to the system.
* The system analyses and processes the symptoms.
* The system provides a list of possible diseases, descriptions of those diseases, and

preventive measures.

### Functional Requirements

REQ-1: The system should accept a list of symptoms as input from the user.

REQ-2: The system should be able to analyze the provided symptoms and predict potential diseases.

REQ-3: The system should provide a list of potential diseases based on the analysis.

REQ-4: The system should provide a brief description of each disease listed.

REQ-5: The system should provide precautionary measures for each disease listed.

REQ-6: The system should generate the probability of having each disease based on the number of inputs and the degree to which they match the disease symptoms.

REQ-7: The system should handle invalid or unrecognized symptoms with appropriate error messages.

## User Authentication

### Description and Priority

This feature validates a user’s credentials to provide personalized services and maintain user history. This feature was integral to the final product.

### Stimulus/Response Sequences

* User enters credentials on the website.
* The system verifies the credentials.
* The system grants access to the user upon successful verification.

### Functional Requirements

REQ-8: The system should provide an interface for the user to input credentials.

REQ-9: The system should verify the user’s credentials against the stored user database.

REQ-10: The system should allow the user to access their personalized dashboard upon successful

verification.

REQ-11: The system should handle invalid credentials with an appropriate error message.

## Symptom-based Historical Search

### Description and Priority

This feature enables the user to retrieve their historical records of symptoms and predicted diseases. This feature was included in the final product.

### Stimulus/Response Sequences

* User requests to view history.
* The system retrieves and presents user history based on provided symptoms.

### Functional Requirements

REQ-12: The system should provide an interface for the user to request their history.

REQ-13: The system should retrieve the user’s history from the database based on the symptoms provided.

REQ-14: The system should present the user’s history in an easily digestible format.

# Other Nonfunctional Requirements

## Performance Requirements

The main functionality of the application should allow for each individually inputted symptom to filter the possible diseases or illnesses down. It should also order the results from most to least likely and present the results in an easily digestible format. It should evaluate and clearly display the likelihood of the user contracting the listed diseases to prevent or at least mitigate any undue alarm that could be caused when learning that the user is presenting similar symptoms as listed in the disease’s description.

## Safety Requirements

Disclaimers:

This application, a medical diagnosis aid, does not substitute professional medical advice. Users should be aware that the diagnostic feature's results may not be as accurate or extensive as those provided by a trained medical professional. If symptoms worsen, persist, or new symptoms appear, users are advised to seek medical attention. Self-medication or self-treatment should be avoided. Proper references to informative websites, clinics, hospitals, and pharmacies will be provided.

## Security Requirements

SAFETY REQ-1: Users must register and verify their accounts using a password, unique username and an email address to access the various functions of this application.

SAFETY REQ-2: The system should prevent the creation of duplicate accounts and verify the uniqueness of usernames.

SAFETY REQ-3: Users must have a unique userId assigned to their account, which is required to access the user history function. This ensures that only legitimate accounts with valid userIds can access the user history feature, preventing unauthorized access and protecting user privacy.

## Software Quality Attributes

* **Accessibility**: The application should be easily accessible via a downloadable app or website login. The medical history functionality should require only one additional layer of authentication and should not hinder the user from using other features.
* **Correctness**: The user must be able to consistently achieve the same results when inputting

the same symptoms, no matter what order they are inputted in.

* **Portability**: The app should have an adaptable layout designed using HTML, CSS and JavaScript, which would make it easy to be adjusted to any screen and compatible with

multiple browsers.

* **Security**: The application must be able to validate the credentials of the user accessing the features and data on the application and prevent any unauthorized access, account theft and other potential breaches of privacy.
* **Usability**: The application should have a simple, intuitive and easy-to-learn interface, layout and navigation with an obvious use for each feature and straightforward instructions. It has simple but effective register and sign in processes. The application should be designed with ease of use in mind and both understandable and usable with only basic technological

knowledge and education.

## Business Rules

Users must have an account and provide additional authentication beyond the username and password to access the medical history functionality, ensuring privacy protection.