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# **1. Introduction**

## **1.1 Purpose**

The purpose of a patient monitoring system website project is to develop a digital platform that enables healthcare providers to remotely monitor the health status of their patients in real-time. The website serves as a central hub for collecting and storing data from various medical devices and sensors connected to the patient, such as blood pressure monitors, heart rate monitors, and oxygen saturation monitors.

The primary purpose of a patient monitoring system website is to improve the quality of care provided to patients. By providing healthcare providers with timely and accurate information about their patients' health status, the website can help to identify potential health problems early and intervene before they become serious. This can lead to better health outcomes for patients and reduced healthcare costs over time.

Another key purpose of a patient monitoring system website is to improve the efficiency of healthcare delivery. By allowing healthcare providers to remotely monitor patients, the website can reduce the need for in-person visits and follow-up appointments. This can help to free up healthcare resources and reduce wait times for patients.

In addition, a patient monitoring system website can help to improve patient engagement and satisfaction. By providing patients with access to their own health data, the website can help to empower them to take an active role in managing their health and wellbeing.

Overall, the purpose of a patient monitoring system website project is to leverage the power of digital technology to improve the quality, efficiency, and effectiveness of healthcare delivery, while also improving patient outcomes and satisfaction.

## **1.2 Scope**

## **1.3 Definitions, Acronyms and Abbreviations**

### **1.3.1 Admin login**

An admin login feature enables authorized personnel to access and manage the system. The admin login provides access to the administrative dashboard, which is the main control panel for managing the patient monitoring system.

### **1.3.2 Patient login**

A patient login is another essential feature of a patient monitoring system that enables patients to access their own medical data and information. With a patient login, patients can view their vital signs, test results, and other health information in real-time.

### **1.3.3 Dashboard**

A dashboard is the main user interface of a patient monitoring system, providing an overview of patient data and system performance in real-time. The dashboard is typically designed to be easy to navigate, with interactive graphs and charts that display data in a clear and concise manner.

### **1.3.4 Registration**

Registration is an process in a patient monitoring system that enables healthcare providers to create patient profiles and collect key information about each patient. The registration process typically involves collecting patient demographic information, medical history, and other relevant data.

## **1.4 References**

## **1.5 Overview**

This is a working document and, as such, is subject to change. In its initial form, it is incomplete by definition, and will require continuing refinement. Requirements may be modified and additional requirements may be added as development progresses and the system description becomes more refined. This information will serve as a framework for the current definition and future evolution of the patient monitoring system.

## **2. Overall Description**

### **2.1 Product Perspective**

A patient monitoring system website is an online platform that provides a comprehensive and real-time view of a patient's health status. The website is designed to collect and store data from various medical devices and sensors that are connected to the patient, such as blood pressure monitors, heart rate monitors, and oxygen saturation monitors.

The purpose of a patient monitoring system website is to improve the quality of care provided to patients by allowing healthcare professionals to track and analyze patient data remotely. This helps to identify potential health problems early and intervene before they become serious.

#### **2.1.1 System Interface**

Thinks peak will be used as a webserver. The user input data will be stored in google firebase using PHP.

### **2.1.2 patient user interface**

The system will provide a new registration form for the new user. After the registration process the user will be given a username and password so that they can login and check their reports and more. The patient health details will be displayed on the main dashboard in the website.

### **2.1.3 Doctor user interface**

Doctor will be given a username and password doctor login credentials will be given by admin. so they can login and see the all-patient data on the dashboard and they can recommend the medicines.

### **2.1.4 Hardware Interface**

- a) Sensors: These are devices that are placed on or inside the patient's body to measure various physiological parameters such as heart rate, blood pressure, oxygen saturation, and temperature. Sensors can be invasive, such as a catheter, or non-invasive, such as a blood pressure cuff.
- b) Data transmission devices (ESP8266): These are devices that transmit the data collected by the sensors to the monitors or other data collection systems. Data transmission devices can include cables, wireless sensors, or telemetry systems.
- c) Power supplies: Patient monitoring systems require a reliable power source to operate. Power supplies can include battery packs, AC adapters, or backup generators in case of power outages.
- d) Computer systems: patient monitoring systems are integrated with computer systems for data storage, analysis, and communication. These systems can include desktop computers, laptops, or even mobile devices such as tablets or smartphones.

### **2.1.5 Software Interface**

- a) Monitoring software: This is the software that runs on the monitors and is used to display the data collected by the sensors. Monitoring software can include features such as alarms and alerts to notify healthcare providers of abnormal readings.
- b) Data management software (THINKSPEAK & GOOGLE FIREBASE): This software is used to collect, store, and analyze the data collected by the patient monitoring system. Data

management software can include features such as data visualization, trend analysis, and report generation.

### 2.1.6 Communication Interfaces

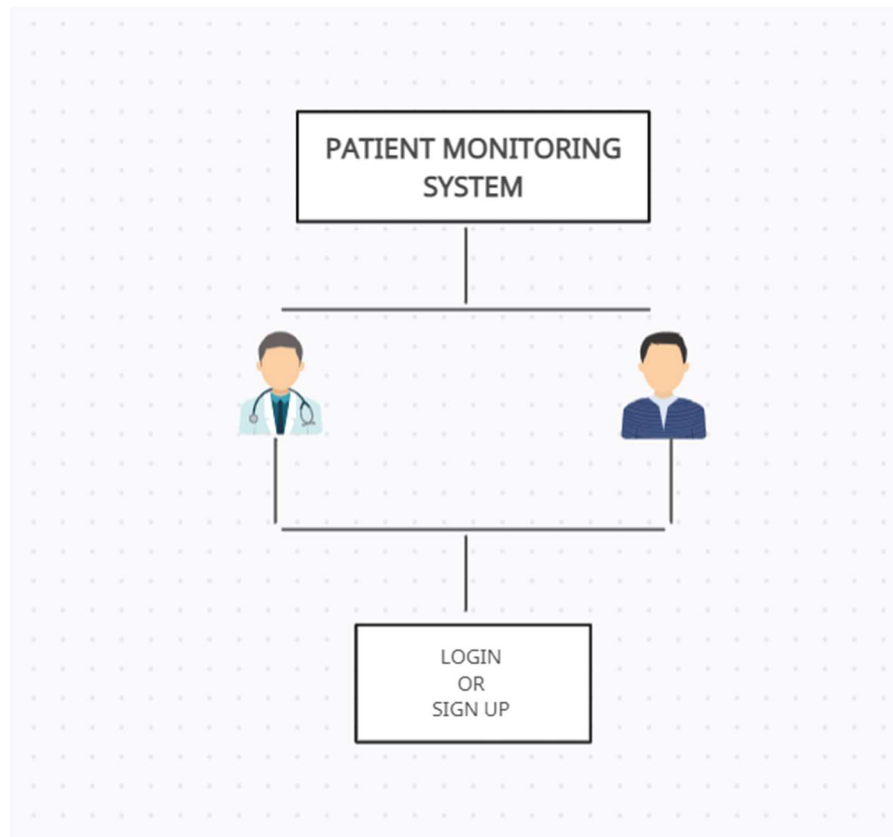
The HTTP or HTTPS protocol(s) will be used to facilitate communication between the client and server.

### 2.1.7 Operations

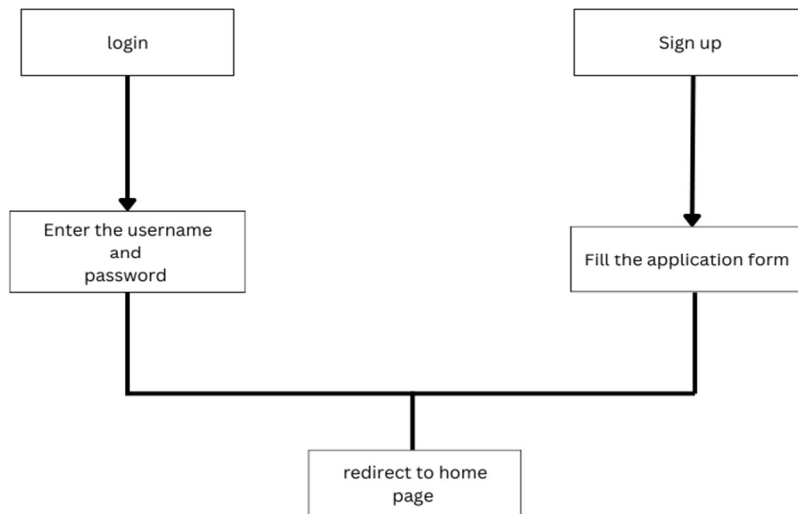
The product shall have operations to protect the database from being corrupted or accidentally altered during a system failure.

## 2.2 Product functions

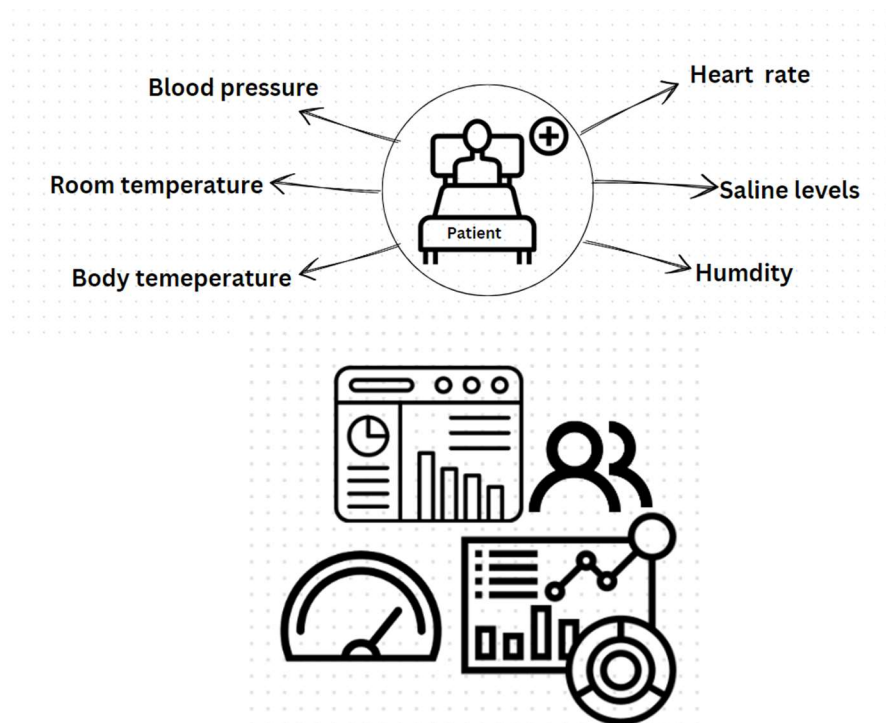
### 2.2.1 Start up page



### 2.2.2 login page



### 2.2.3 patient website interface



## 2.2.4 Doctor website interface



## 2.2.3 Use case descriptions /Introductions

### 2.2.3.1 doctor interface

Our interface is designed to be intuitive and easy to navigate, allowing you to quickly access the information you need. You can view patient profiles, track medical history, and update treatment plans with just a few clicks. You can also send messages to your patients securely through our messaging system, allowing for convenient and efficient communication.

We understand the importance of maintaining patient privacy and confidentiality, which is why we have implemented robust security measures to protect patient information. Our website interface is compliant with HIPAA regulations to ensure that all patient data is kept safe and secure.



Doctor can see the every patient data in dashboard

### **2.2.3.2 patient interface**

Our goal is to provide you with a user-friendly platform to manage your healthcare needs, communicate with your healthcare provider, and access your medical records.

Through our patient interface, you can view your medical history, track your appointments, and receive important health reminders. You can also securely message your healthcare provider with any questions or concerns you may have, allowing for convenient and efficient communication.

Patient can see their data after login into their account

## **2.3 Benefits**

### **2.3.1 Patient Benefits**

- I. Early detection of changes in a patient's condition: With a patient monitoring system, healthcare providers can detect changes in a patient's vital signs, such as blood pressure, heart rate, and oxygen saturation, as well as other physiological parameters. Early detection of such changes can help healthcare providers intervene quickly and prevent adverse outcomes.
- II. Improved patient outcomes: Continuous monitoring of a patient's vital signs can help prevent complications and improve patient outcomes. For example, monitoring a patient's blood sugar levels can help prevent hypoglycemia or hyperglycemia, which can cause serious complications in patients with diabetes.
- III. Reduced healthcare costs: By monitoring patients remotely, healthcare providers can reduce the need for hospitalizations and emergency room visits. This can result in significant cost savings for both patients and healthcare providers.
- IV. Increased patient comfort and satisfaction: Patient monitoring systems can help patients feel more comfortable and secure, knowing that they are being closely

monitored by healthcare professionals. This can lead to increased patient satisfaction and improved patient outcomes.

- V. Enhanced communication between healthcare providers: Patient monitoring systems can help healthcare providers communicate more effectively and efficiently with each other. For example, a physician can receive real-time updates on a patient's condition from a nurse or other healthcare provider, allowing for prompt intervention if necessary.

### **2.3.2 Doctor Benefits**

- I. Access to real-time patient data: A patient monitoring system can provide doctors with real-time data on their patients' vital signs, allowing them to make more informed clinical decisions. This can be especially useful in emergency situations, where quick decisions can be critical.
- II. Improved efficiency: With a patient monitoring system, doctors can monitor multiple patients simultaneously, reducing the need for constant physical check-ups. This can free up time for doctors to focus on other important tasks, such as analyzing patient data and developing treatment plans.
- III. Remote monitoring capabilities: A patient monitoring system can allow doctors to monitor their patients remotely, which can be especially useful for patients who live in remote or rural areas. Remote monitoring can also reduce the need for in-person visits, which can be more convenient for both doctors and patients.
- IV. Improved accuracy and consistency: Patient monitoring systems can provide consistent and accurate measurements of a patient's vital signs, reducing the potential for human error. This can help doctors make more accurate diagnoses and develop more effective treatment plans.
- V. Better communication with patients: Patient monitoring systems can provide doctors with a way to communicate more effectively with their patients. For example, doctors can use the system to send patients reminders about medication, check-ups, or other important health-related tasks. This can help improve patient compliance and overall health outcomes.

### 3. Specific Requirements

#### 3.1 External interface

##### 3.1.1 Web Server

- ☐ ThinkSpeak and MySQL will be used as web server:
- ☐ The user inputs data via the web server using HTML forms
- ☐ The web server executes the PHP as a module and PHP script retrieves the post data if available.
- ☐ The web server receives information back from the PHP script.
- ☐ The web server displays a HTML page as result to the end-user

##### 3.1.2 PHP Application

The actual program that will perform the operations is written in PHP. All data will be stored in a database.

##### 3.1.3 MySQL Database

It's an open source SQL database to store all data which communicates with the application on the server.

### 3.2 Functional Requirements

#### 3.2.1 Use Case Scenario

##### 3.2.1.1 Use Case Scenario 1 – User Login

###### User Login

<b>Purpose</b>	User logs in to system using existing profile.
<b>User</b>	A user with an existing profile.
<b>Input Data</b>	Profile username and password.
<b>Output Data</b>	Corresponding page data.
<b>Invariants</b>	Profile table data and user information
<b>Pre-conditions</b>	User is not logged in to a profile, input profile exists in data base, user password matches profile
<b>Post-conditions</b>	User's computer has been supplied with appropriate cookie, page data is appropriate for selected profile

### 3.2.1.2 Use Case Scenario 2- New Registration

#### New Registration

<b>Purpose</b>	For login the new users can do registration Giving some inputs
<b>User</b>	A user without an existing profile.
<b>Input Data</b>	Profile username and password, Email
<b>Output Data</b>	Corresponding page data.
<b>Invariants</b>	Profile table data and user Information
<b>Pre-conditions</b>	Already registered email account can't be registered.
<b>Post-conditions</b>	User's computer has been supplied with appropriate cookie, page data is appropriate for selected profile

### 3.2.1.3 Use Case Scenario 3 – Content Sharing

A user wants to download a particular report.

#### Content Sharing (Download Files)

<b>Purpose</b>	A user wants download a particular file.
<b>User</b>	A user with an existing profile.
<b>Input Data</b>	Request to download a particular file.
<b>Output Data</b>	File is downloaded on user's computer.
<b>Invariants</b>	The user and the file.
<b>Pre-conditions</b>	User is logged in and the file must be shared with him and concern doctor
<b>Post-conditions</b>	The user has downloaded the file successfully.

### **3.3 Performance Requirements**

The system should support at least 2000 concurrent users.

This statement provides a general sense of reliability when the system is under load. It is important that a substantial number of users be able to access the system at the same time, when the system will be under the most stress are likely during busy hours. Therefore, it must be able to handle at least 2000 concurrent users.

### **3.4 Logical database requirements**

All data will be saved in the database: user accounts and profiles, reports, messages etc. (except files which are stored on the disk.) The database allows concurrent access and will be kept consistent at all times, requiring a good database design.

### **3.5 Design Constraints**

1. The communication between the portal software and the database will be in SQL.
2. The portal layout will be produced with HTML/CSS.
3. The product will be written in PHP.
4. The output must be compatible with W3C XHTML 1.0
5. The source code must follow the coding conventions of PHP.
6. System administrators must have access to comprehensive documentation.

### **3.6 Software System Attributes**

The software consists of the following elements:

1. The Thinkspak web server
2. The PHP application
3. The MySQL database
4. The database should remain consistent at all times in case of an error.

#### **3.6.1 Reliability**

The reliability of the overall program depends on the reliability of the separate components.

#### **3.6.2 Availability**

The system should be available at all times, meaning the user can access it using a web browser, only restricted by the down time of the server on which the system runs. In case of a of a hardware failure or database corruption, a replacement page will be shown. Also in case of a hardware failure or database corruption, backups of the

database should be retrieved with the MySQL server and saved by the administrator.

### **3.6.3 Security**

1. Passwords will be saved encrypted in the database in order to ensure the user's privacy.
2. The user's IP will be logged.
3. The system will be protected against vulnerabilities such as SQL injection attacks.