MINI PROJECT REPORT
MediPort

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CERTIFICATE

This is to certify that the project report entitled **MediPort,** submitted by **Ajeeb Kunhuty, Akash V V, Akhil K K, Ashwin Nambiar** in the partial fulfilment for the award of the Degree of Bachelor of Technology in Computer Science and Engineering to **A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY, KERALA,** is a record of bonafied work carried out under my guidance and supervision.

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1.Introduction

For decades, pharmacies have relied on manual processes to manage their inventory, a system fraught with inefficiencies. Time-consuming stock checks, inaccurate data due to human error, and difficulties in tracking medicine availability and expiry dates are just some of the challenges plaguing traditional methods. These inefficiencies not only disrupt pharmacy operations but can also impact patient care. Delays in order placement due to inaccurate stock levels can lead to critical medicine shortages, jeopardizing timely treatment.

MediPort emerges as a transformative solution, designed to empower pharmacies with a state-of-the-art, web-based inventory management system. This innovative platform tackles the limitations of the past by harnessing the power of modern technologies. By transitioning from manual processes to a streamlined digital system, MediPort promises to revolutionize the way pharmacies operate, optimizing efficiency, enhancing data visibility, and ultimately, ensuring seamless patient care.

At the core of MediPort lies a user-centric approach. The system caters to various user roles within a pharmacy, each with functionalities tailored to their needs. Pharmacists can leverage MediPort for real-time inventory tracking, ensuring readily available medicine stock to fulfil patient prescriptions promptly. The system also automates low-stock notifications, eliminating the risk of critical medicine shortages. Order management becomes effortless with online ordering functionalities, streamlining communication with suppliers and ensuring timely restocking.

Beyond user experience, MediPort prioritizes data-driven decision-making. By providing comprehensive reports on medicine usage patterns and order history, the system empowers pharmacy managers to gain valuable insights into their inventory. This data can be used to optimize stock levels, minimize waste, and make informed purchasing decisions. The improved data visibility also allows for proactive inventory management, ensuring pharmacies are well-equipped to handle fluctuating demands and unforeseen circumstances.

The benefits of MediPort extend beyond the walls of the pharmacy. Streamlined operations translate to reduced wait times for patients, leading to a more positive and efficient healthcare experience. Additionally, accurate inventory management ensures the availability of essential medicines, contributing to improved patient outcomes.

MediPort represents a paradigm shift in pharmacy inventory management. This intelligent system promises to transform the way pharmacies operate, fostering efficiency, accuracy, and ultimately, prioritizing patient care. By harnessing the power of technology, MediPort paves the way for a future where pharmacies can operate at their full potential, ensuring a seamless and reliable supply of medicines for the communities they serve.

2.Literature Survey

Among the essential eight roles of the pharmacist that are described by the World Health Organization and the International Pharmaceutical Federation, managing resources (money, material, manpower, time, and information) is a key factor to professional success on individual level, as well as organizational level [1]. In pharmacy operations, inventory is referred to the stock of pharmaceutical products retained to meet future demand. Inventory represents the largest current asset, as well as liquid asset in pharmacy practice and its value continues to rise because of the growth in variety and cost of pharmaceutical products [2].

The paper by E J Berger [3] proposes a web-based stock management system that uses Electronic Stock Card technology to implement stock cards as web pages. The proposed system uses an electronic stock card which tracks incoming and outgoing flow, as well as lot number, expiration date and current available balance. This system eliminates the need for manual record-keeping, and it provides real-time data that can be used for decision-making. However, the system is costly to implement and maintain.

The paper by N C Sarker [4] proposes a web-based pharmacy inventory management system that uses data collection from the pharmacists. The proposed system uses the regularly updated information from pharmacists which tracks lot number, expiration date, reorder level and current available balance. This system eliminates the need for manual record-keeping, and it provides real-time data that can be used for decision-making. However, the system is costly to implement.

The paper by I H M K Chathuranga [5] proposes to automate the routine manual process paper-based inventory management to maximize the profit. The proposed system will have inventory management system to manage their stocks and keep track of the inventory and make suggestion to order stocks automatically. This system reduced workload of the pharmacy staff. However, the system is costly to implement.

The paper by Russell Findlay [6] proposes to improve automatic dispensing cabinets inventory management by leveraging dynamic inventory standards and a low inventory alert

platform. The proposed system's outcome measures included number and duration of daily stockouts, ADC inventory turns, and number of phone calls related to stockouts received by pharmacy staff. This system reduced both the number and duration of stockouts. However, the system is costly to implement.

3.Problem Statement

Traditional pharmacy inventory management, reliant on manual processes, suffers from critical inefficiencies. Prone to human error, manual stock checks lead to inaccurate data, potentially causing stockouts of essential medicines and impacting patient care. Time-consuming tasks like physical inventory counts and paper-based record-keeping divert valuable resources from patient interaction. The lack of real-time data and insights hinders proactive inventory management, making it difficult to anticipate demand and optimize stock levels. These inefficiencies culminate in longer wait times for patients, potential medication errors, and wasted resources due to expired medicines. A modern, web-based solution is necessary to address these limitations and ensure efficient pharmacy operations with a focus on patient care.

4.Existing System

Use of ICT in a pharmacy store is not up to date in our country, till now we are in the age of traditional manual system. In our survey, we found three methods have been used to manage inventory and purchase orders in most of the pharmacies. Most of the pharmacies are doing a lot of paper works to track availability of stocks as well as reorder level of medicines which are very erroneous and also a very tedious task. Tracking expire date of each medicine is not possible using manual paper works. Besides, maintenance of these papers is also very important and crucial. A very few pharmacies use a basic inventory management system which is also a desktop version. The rest do not use any system that means they have no tracking system; they just buy and sale.

In our survey, we found there are a very few pharmacies which use a basic inventory management software which is a desktop-based application. It provides only basic functionalities.

We have found some application for only searching medicine and dosage details. In our findings, our system has some unique features which are not integrated with the similar systems.

With the existing desktop version system, a pharmacy has to invest a lot to use that system which is a big challenge for all type of pharmacies in our country. In our survey, we have explored that the previous systems have many desirable and undesirable attributes. We have gained valuable experience with the previous systems.

5.Proposed System

MediPort, a comprehensive web-based solution, revolutionizes pharmacy inventory management. It automates all aspects, streamlining workflows and achieving optimal efficiency.

The user-centric design boasts a dynamic and responsive web interface. Pharmacists can effortlessly create new pharmacy profiles, manage their medicine inventory, and place reorder requests – all with a few clicks. The intuitive design eliminates any learning curve, allowing users of all technical backgrounds to navigate MediPort with ease.

MediPort eliminates the need for tedious manual processes. Automated inventory management ensures real-time stock level visibility, replacing error-prone manual checks. Reordering becomes effortless with automated alerts and functionalities for placing purchase orders directly through the platform. This translates to significant time savings for pharmacy staff, allowing them to focus on core patient care activities.

MediPort fosters seamless communication with suppliers. Suppliers can access the platform to process purchase orders submitted by pharmacies, ensuring timely delivery of essential medicines. This centralized platform creates a transparent and efficient communication channel, benefiting both pharmacies and suppliers. Streamlined communication and efficient order fulfilment contribute to a more reliable and responsive supply chain.

MediPort operates on a Software as a Service (SaaS) model, eliminating the need for pharmacies to invest in expensive hardware or software installations. This cost-effective approach allows pharmacies of all sizes to access the benefits of a sophisticated inventory management system without significant upfront investment. MediPort's web-based accessibility fosters flexibility and scalability, allowing pharmacies to adapt to their growing needs.

MediPort extends beyond automation by providing valuable insights into pharmacy operations. Robust reporting functionalities empower pharmacies to analyse inventory usage patterns, identify trends, and make data-driven decisions regarding stock levels and ordering strategies. This proactive approach minimizes the risk of stockouts and ensures pharmacies

are well-equipped to meet patient needs. By leveraging data-driven insights, MediPort empowers pharmacies to optimize inventory management and ultimately prioritize exceptional patient care.

6.Software and Hardware Requirements

For MediPort, a web-based pharmacy inventory management system, efficient and secure operation relies on specific software and hardware components. Here's a breakdown of the necessary requirements:

6.1 Software Requirements:

Development tools: The fundamental web development languages, HTML & CSS will form the foundation of MediPort's user interface, ensuring a visually appealing and user-friendly experience for pharmacists. The JavaScript runtime environment, Node.js enables server-side scripting, allowing MediPort to handle functionalities beyond static web pages. Node.js is known for its speed and scalability, making it well-suited for web applications like MediPort. EJS (Embedded JavaScript) simplifies the process of generating dynamic web content. EJS allows developers to seamlessly integrate server-side logic with HTML code, resulting in a more robust and adaptable user interface.

Database Management System: MySQL is a widely used open-source relational database management system. MediPort will leverage MySQL to store critical pharmacy data securely and efficiently. phpMyAdmin provides a user-friendly interface for managing the MySQL database, allowing for data manipulation and analysis.

Code Editor: A code editor like Visual Studio Code offers developers a platform to write, edit, and debug code efficiently.

6.2 Hardware Requirements:

Server: MediPort requires a reliable server to host the web application and database. The server's processing power, storage capacity, and memory should be sufficient to handle the expected user load and data volume. Cloud-based server solutions offer scalability and flexibility, allowing MediPort to adapt to changing needs.

Client Devices: MediPort is a web-based system accessible from any device with a web browser. However, for development and testing purposes, developers may require access to various devices like desktops, laptops, and tablets to ensure optimal user experience across different screen sizes and resolutions.

Security Software: Implementing robust security measures is crucial for protecting sensitive pharmacy data. Firewalls, intrusion detection systems, and data encryption techniques are essential to safeguard MediPort from cybersecurity threats.

By ensuring compatibility, reliability, and security of the software and hardware components, MediPort can achieve optimal performance and data integrity. During development, the team should prioritize the use of up-to-date and well-maintained software, while also establishing secure coding practices and utilizing reliable database management tools. In the deployment phase, a robust server infrastructure with appropriate security measures will be essential for ensuring MediPort's continued success.

7. Development Tools

7.1 HTML & CSS:

HTML (HyperText Markup Language): The cornerstone of web development, HTML structures the content of web pages. It defines elements like headings, paragraphs, lists, and images, providing a basic framework for the content.

CSS (Cascading Style Sheets): CSS breathes life into HTML by defining the visual presentation of web pages. It controls styles like fonts, colours, layouts, and positioning, allowing you to create a visually appealing and user-friendly interface.

Together, HTML and CSS form the inseparable duo for building the frontend (user-facing side) of web applications.

7.2 Node.js:

This JavaScript runtime environment transcends the limitations of traditional web development. It allows you to execute JavaScript code outside of a web browser, on the server-side. This opens doors to functionalities beyond static web pages, enabling features like dynamic content generation, real-time data processing, and server-side scripting. Node.js offers numerous benefits for the development team, including:

Event-Driven Architecture: Unlike traditional web servers that rely on a request-response cycle, Node.js utilizes an event-driven architecture. This means it can handle multiple requests concurrently without needing a separate thread for each request.

Asynchronous Programming: Node.js embraces asynchronous programming, which allows it to handle multiple tasks simultaneously without waiting for one to finish before starting another. This is particularly beneficial for I/O-bound operations (like database interactions) that can be slow. While the database retrieves data, Node.js can handle other tasks, maximizing efficiency.

JavaScript Unification: Node.js allows developers to use JavaScript for both frontend and backend development. This eliminates the need to learn and switch between different languages, reducing development time and complexity.

Package Ecosystem (npm): Node.js boasts a vast and ever-growing ecosystem of open-source packages available through the npm (Node Package Manager) registry. These pre-built modules offer functionalities for various tasks, from database interactions to authentication and file handling.

Scalability: Node.js excels at handling increasing user loads and data volumes. Its event-driven architecture and asynchronous nature make it well-suited for applications that need to scale efficiently.

7.3 EJS:

This templating engine simplifies the process of creating dynamic web content. It allows you to seamlessly integrate server-side logic written in Node.js with HTML code. This means you can use JavaScript to manipulate data, generate dynamic content, and personalize the user experience within the HTML structure.

EJS (Embedded JavaScript) might seem like a simple templating engine, but it offers significant advantages for building dynamic web applications like MediPort. Here's a deeper dive into its functionalities and how it contributes to MediPort's development:

Template Inheritance: EJS allows developers to create base templates that define the overall layout of a web page. Sub-templates can then inherit from the base template, allowing for code reuse and consistency in the user interface.

Conditional Logic: EJS integrates seamlessly with JavaScript, allowing developers to incorporate conditional statements within the templates. This enables dynamic content generation based on specific conditions.

Loops and Iterations: EJS supports loops and iterations, making it easy to display lists of data dynamically.

Partials: EJS allows developers to create reusable code snippets called partials. These partials can be included across multiple templates, further promoting code reusability and reducing redundancy. Common elements like headers, footers, or navigation bars can be defined as partials, ensuring consistency throughout the application.

Separation of Concerns: EJS promotes a clear separation of concerns between presentation logic (HTML) and business logic (JavaScript). Developers can focus on writing clean HTML for the user interface, while using JavaScript and Node.js to handle data manipulation and server-side functionalities. This separation improves code maintainability and readability.
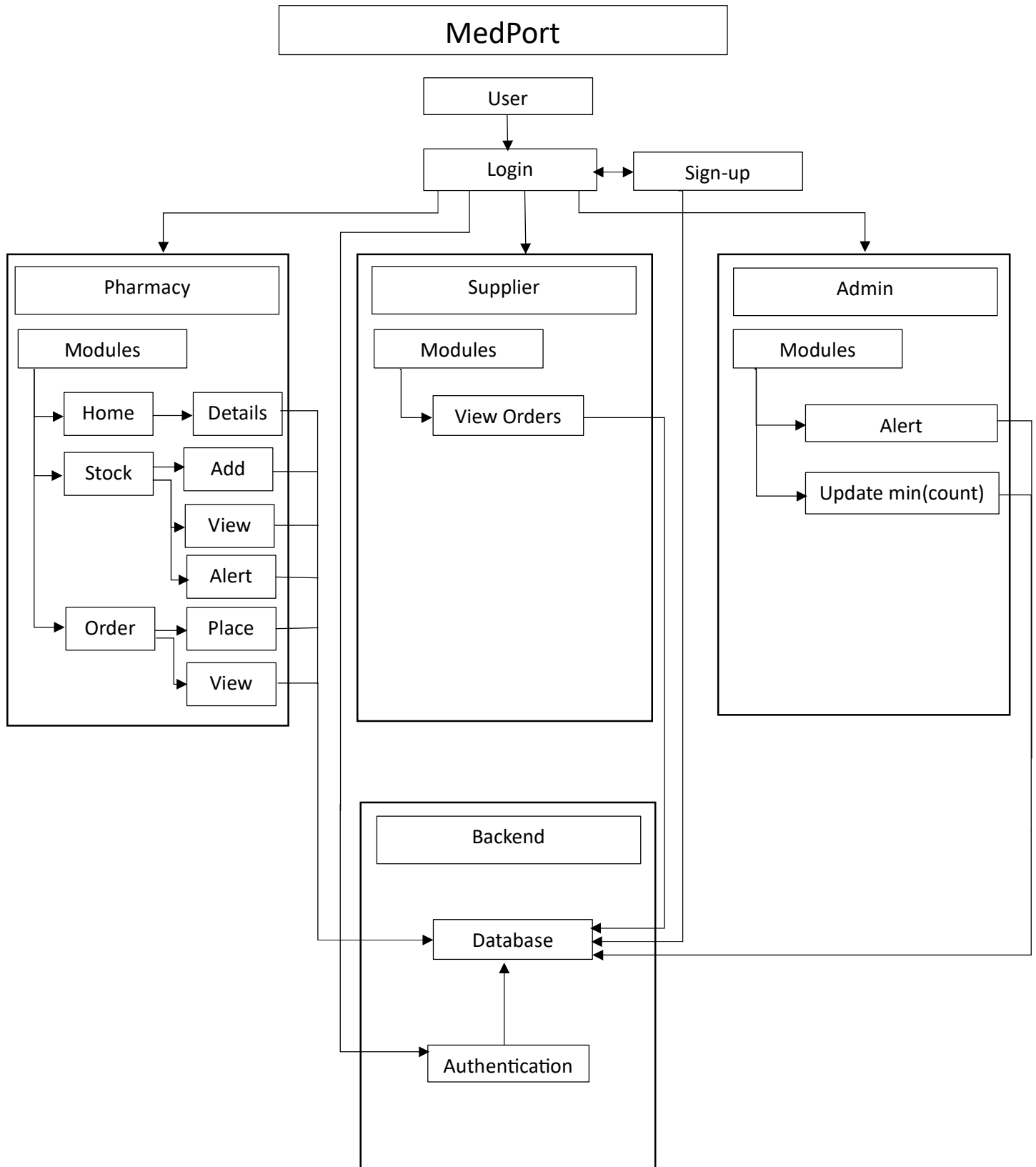
7.4 phpMyAdmin:

phpMyAdmin provides a user-friendly web interface for managing MySQL databases. This graphical user interface (GUI) allows users to create, modify, and interact with MySQL databases. It simplifies tasks like data manipulation (inserting, editing, deleting), running queries, and managing user privileges.
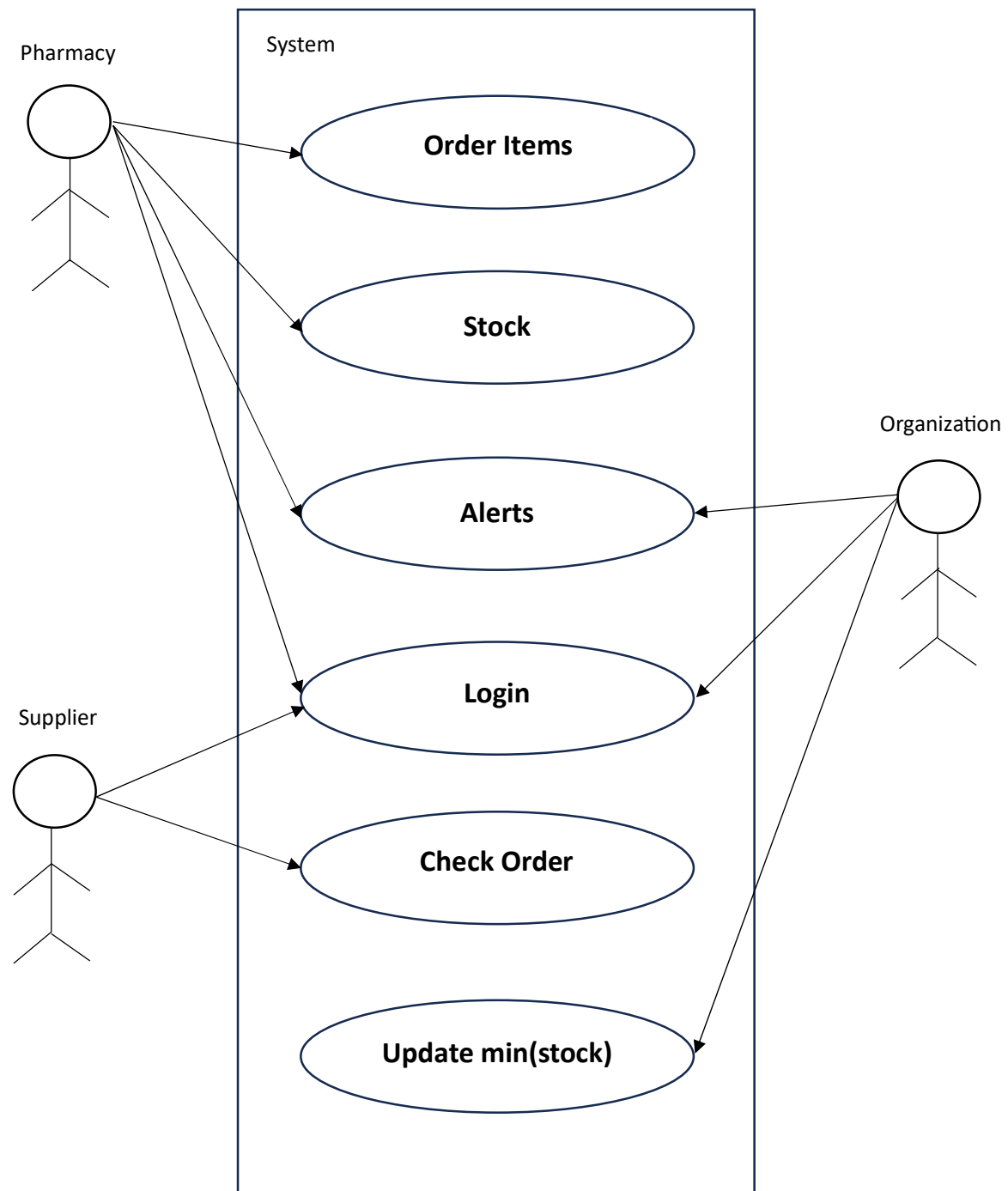
7.5 Integrated Development Environment (IDE):

An IDE provides a comprehensive environment for software development, including tools for writing and editing source code, debugging, and testing. PyCharm, Eclipse, and Visual Studio are popular IDEs that support multiple programming languages and can be used for developing the inventory management system. The use of an IDE is necessary for the development of the project report as it ensures efficient coding and debugging.

8.Software Design

8.1 System Architecture

MedPort

User

Login ↔ Sign-up

Pharmacy

Modules

Home → Details

Stock → Add

View

Alert

Order → Place

View

Supplier

Modules

View Orders

Admin

Modules

Alert

Update min(count)

Backend

Database

Authentication

8.2 Use Case Diagram

9.Modular Divisions

To ensure then smooth functioning and convenience in managing the medicine resource management system, it is beneficial to divide the project into several well-defined modules. These modules allow for a structured and organized approach to handling different aspects of the system. By breaking down the project into modules, it becomes easier to manage and maintain specific functionalities independently, enhancing the overall efficiency and effectiveness of the system. Each module focuses on a specific set of tasks or features, enabling developers to work on them separately and ensuring better collaboration among the development team. These modules are as follows:

9.1 User Management

9.1.1   User Authentication:

This module verifies user credentials (pharmacist username and password) during login attempts. It ensures only authorized pharmacists can access MediPort's functionalities and safeguards sensitive pharmacy data.

9.1.2   User Profile Management:

This module allows pharmacists to create and manage their profiles within MediPort. Pharmacists can update their information like contact details and preferences, ensuring accuracy and personalization.

9.2 Medicine Inventory Management

9.2.1   Medicine Entry:

This module empowers pharmacists to add new medicines to the inventory. It provides a user-friendly interface for entering details like medicine name, dosage form, strength, manufacturer, and unit price.

9.2.2 Stock Management:

This module provides functionalities to track medicine stock levels. It might include features for setting reorder points, receiving automatic alerts for low stock, and managing medicine expiry dates.

9.3 Order Management

9.3.1 Order Entry:

This module allows pharmacists to place orders for medicine supplies from vendors. It provides a platform for selecting medicines, specifying quantities, and submitting purchase orders.

10. User Interface

10.1 Pharmacy App:

10.2 Supplier App:

10.3 Admin App:

11.Coding Procedure

The coding procedure for the web-based medical resource management system involves requirement analysis, system design, technology selection, database design, webpage development using HTML and CSS, backend development with Node.js, integration and testing, deployment and hosting, user training and documentation, and ongoing maintenance and updates. These steps ensure the successful implementation of the system. Let's explore each step in detail.

11.1 Requirement Analysis

During the requirement analysis phase, the specific needs and functionalities of the admin and user apps will be identified and documented. This includes determining the features required for the admin app, such as medicine shortage management. Similarly, the user app will require functionalities such as stock browsing and order placement. By thoroughly understanding these requirements, the development team can proceed with a clear vision for the project.

11.2 System Design

The system design phase involves creating a high-level architecture for the MediPort. This includes defining the structure of the admin and user apps, selecting Node.js as the backend service, and designing the database structure. Additionally, careful consideration is given to the user interface design for the apps, ensuring usability and intuitive navigation.

11.3 Technology Selection

Choosing the right technologies is crucial for the success of the project. Node.js is known for its real-time capabilities, scalability, and potential for future API development. EJS integrates with Node.js to simplify dynamic content creation and streamline development. This powerful duo ensures an efficient and user-friendly backend.

11.4 Database Design

The database design phase involves structuring the database schema to efficiently store and retrieve information related to medicines, orders and user profiles. MySQL with phpMyAdmin is utilized for this purpose. The team focuses on defining the appropriate data structure and relationships to ensure smooth data management and retrieval.

11.5 UI Development

The development of the webpages begins by setting up the HTML development environment. The team proceeds to implement the user interface screens and components, specifically tailored to the user's functionalities such as stock management, order management, and user management. HTML structures the content, while CSS breathes life into it with styles and layouts (fonts, colours), creating a visually appealing and user-friendly experience for pharmacists and suppliers.

11.6 Backend Development

Acting as the engine, Node.js facilitates real-time functionalities like inventory updates and order processing. It efficiently handles data requests and interactions between the user interface and the database. Simplifying development, EJS empowers dynamic content generation. This allows for features like personalized dashboards or dynamically displaying medicine information based on user queries. MySQL securely stores and organizes critical pharmacy data like medicine inventory, order history, and user information.

11.6 Integration and Testing

Integration and testing are crucial stages in the development process. The admin and user apps are integrated with the Node.js backend, ensuring proper functionality and data flow. Unit testing is performed to validate the individual components, while system testing is conducted to validate the overall flow and interactions between the apps and the backend. This ensures a stable and robust system

11.7 Deployment and Hosting

Once development and testing are completed, the admin and user apps are prepared for deployment on their respective platforms, such as the Google Play Store and Apple App Store.

Simultaneously, the Node.js backend is deployed, and necessary configurations are set up to ensure proper hosting and scalability of the system.

11.8 User Training and Documentation

User training and documentation play a vital role in ensuring a smooth transition to the new medicine resource management system. The team provides comprehensive documentation and training materials for both the admin and user apps. Training sessions are conducted to familiarize the pharmacy staff and users with the system's functionalities and usage, ensuring a seamless user experience.

11.9 Ongoing Maintenance and Updates

To ensure the system's continued success, regular maintenance and updates are essential. The development team monitors the system for any issues or bugs and addresses them promptly. Additionally, the system is regularly updated with new features, security patches, and performance improvements to meet evolving needs and provide an enhanced user experience.

12.Conclusion

Inventory management is a challenging problem for a pharmacy. In our survey, we have explored that most of the existing methods do not solve all the requirements. The aim of this work is to provide the basic tool for tracking as well as monitoring sales and inventory to individuals and small businesses who cannot afford the investment of a complete dedicated Inventory Management System. We have a plan that MediPort will be free or a minimal license fee will be charged which will help a pharmacy to use our system without requiring an initial investment. We hope that MediPort will be the replacement of existing systems as well as efficient web application with its user-friendly UI and effectiveness which will gear up their organizational performances.

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