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Design and Development of a Web Based Application Pharmacy Finder

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ABSTRACT

This research focuses on the design and development of a web-based application aimed at helping users efficiently locate nearby pharmacies. The application seeks to address challenges individuals face in identifying accessible and convenient pharmacy services, especially in situations where time and location are critical factors. These challenges may include lack of information about nearby pharmacies, inability to find specific services offered by pharmacies, or difficulty accessing such services during emergencies or in unfamiliar areas.

The project involves comprehensive data gathering and analysis on pharmacy locations, services provided, operating hours, and contact information. This data will be systematically integrated into a user-friendly web application that offers advanced search capabilities. Users will be able to locate pharmacies based on multiple criteria such as proximity, service type (e.g., medication availability, vaccination services), operational status, and distance. The application will also feature a streamlined interface to enhance user interaction and accessibility.

Leveraging modern web technologies, the application will ensure a seamless, responsive experience across various devices, including smartphones, tablets, and desktops. Key functionalities of the system will include real-time location tracking using GPS, interactive mapping through tools like Google Maps API, and comprehensive pharmacy profiles displaying critical details. Additionally, the platform will enable users to access emergency pharmacy services or find 24-hour pharmacies with minimal effort.

The expected impact of this application is multifaceted. First, it will significantly improve access to pharmacy services for the general public, particularly for individuals traveling in unfamiliar regions or during urgent medical situations. Second, it will support healthcare providers by offering an additional layer of convenience in guiding patients to the nearest pharmacy with the required services or medications. Finally, the application's aggregated data and usage analytics will provide policymakers and stakeholders in healthcare with actionable insights for optimizing resource allocation, improving pharmacy coverage, and addressing service gaps in underserved areas.

The proposed web-based application stands to bridge a critical gap in healthcare accessibility through the strategic integration of digital technology, user-centered design, and real-time geolocation features. By enhancing the way individuals connect with pharmacies, the system aspires to improve health outcomes, reduce stress in emergencies, and contribute to a more connected healthcare ecosystem.

Keywords: Pharmacy Access, Geo location Technology, Responsive Web Design, Healthcare Resource Optimization, Patient-Centered Technology, User-Friendly Interface, Web-Based Application.

I. INTRODUCTION

1.1 Background Overview

In today's fast-paced world, access to essential healthcare services, particularly pharmacies, is crucial for individuals' well-being. However, finding the nearest pharmacy, especially in unfamiliar locations or during emergencies, can be a daunting task. This challenge often leads to delays in accessing necessary medications and healthcare products.

To address this problem, this research aims to design and develop a web-based application that will help users locate nearby pharmacies. By gathering and analyzing data on pharmacy locations, services offered, and contact information, the application will provide a user-friendly interface to search for pharmacies based on various criteria, such as location, distance, and specific services.

The web application will be developed using modern web technologies, ensuring a seamless and responsive user experience across different devices. Key features will include real-time location tracking, interactive maps, and detailed pharmacy profiles.

In recent years, technological advancements have significantly impacted the healthcare industry. Mobile applications have emerged as powerful tools to improve access to healthcare services (Al-Zoubi & Al-Ayyoub, 2018). One such area where technology can be applied is in locating nearby pharmacies.

The ability to quickly locate a pharmacy can be crucial, especially during emergencies or when individuals are unfamiliar with a location. Traditional methods, such as relying on physical maps or asking for directions, can be time-consuming and inefficient. Additionally, finding a pharmacy that offers specific services or medications can be challenging without a reliable resource.

To address these challenges, a web-based application can be developed to provide users with a convenient and efficient way to locate nearby pharmacies. By leveraging geographic information systems (GIS) and real-time location data, the application can offer a range of features, including:

I. Real-time location tracking: Accurately determining the user's current location to provide relevant pharmacy recommendations.
II. Interactive maps: Visually displaying pharmacy locations and directions.
III. Detailed pharmacy information: Providing information about pharmacy hours, contact details, and services offered.
IV. Search functionality: Enabling users to search for pharmacies based on specific criteria, such as name, address, or services.

By developing and implementing such a web-based application, we aim to improve access to healthcare services, enhance user experience, and contribute to better health outcomes.

The successful implementation of this web-based application is expected to significantly improve access to pharmacy services, especially for individuals in unfamiliar locations or during emergencies. It will also provide valuable information to healthcare providers and policymakers to enhance pharmacy services planning and resource allocation.

1.2 Technology as Tool

S. Hasan (2016) asserts that ‘In today's tech era, IOT (Internet of things) has become much popular around the world. Almost all the devices, which are known as smart device, can connect to the internet and access data from any corner of the world. There was a time when people used to waste their valuable times just to get a piece of information. Now the technology is more advance then compare to any previous times. One of the blessings of technology is web application. It allows users to interact with the system from anywhere as long as they are connected to the internet’.

Consumers’ or the public population, in current age, can purchase their transport ticket through mobile phone and pay on-line to book, validate and retrieve tickets using simple mobile applications (Ceipidor et al., 2013). People start to spend more time on mobile devices than desktop and laptops (Meeker, 2015). Indeed, mobile devices (e.g., smartphone and tablet PC) are increasingly becoming an essential part of Ghanaians' as the most effective and convenient communication tools not bounded by time and place (Jarad, 2014) any people in Ghana do not carry their PC outside the office, but mobile phones are with them at all time. Nowadays, mobile phones and smartphones has become very popular for a large number of users (Smith, M. J. 2016). Using a mobile phone for making reservation systems is the easiest and convenient way to perform this task. The online pharmacies locater, in general, gives the customer extra information regarding the pharmacies, availability of the services, locating structure,

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Nowadays, mobile phones and smartphones has become very popular for a large number of users (Smith, M. J. 2016) Using a mobile phone for making reservation systems is the easiest and convenient way to perform this task.

C. General Objection

To design, develop, and evaluate a web-based application that enables users to efficiently locate nearby pharmacies, thereby improving access to healthcare services and enhancing the overall well-being of individuals.

a) Specific Objections

I. To gather and analyze data on pharmacy locations, services offered, and contact information.
II. To design a user-friendly and intuitive web application interface.
III. To develop the web application using appropriate technologies and frameworks.
IV. To test the application's functionality, usability, and performance.

2. WORKS RELATED

2.1 Existing Systems

Collaboration with industry stakeholders further amplifies the potential of these applications. Partnerships with pharmaceutical companies, for instance, can facilitate exclusive offers or discounts for app users, encouraging greater adoption. Similarly, collaborations with healthcare providers enable the seamless integration of electronic prescriptions and patient health records, creating a unified digital experience. These partnerships not only enhance the app's value proposition but also foster innovation by aligning the interests of various stakeholders in the healthcare system (Nguyen et al., 2021).

2.2 Drawbacks

Current systems for locating pharmacies face several critical limitations, reducing their effectiveness and accessibility. A significant drawback is the lack of real-time updates, which can lead users to pharmacies that are closed, out of stock, or otherwise unavailable. Many platforms also lack advanced search functionality, making it difficult for users to find pharmacies based on specific criteria such as distance, services offered, or medication availability. This limitation is particularly problematic during emergencies when quick access is vital.

C. Proposed System

The proposed system is a comprehensive, web-based application designed to address the limitations of existing pharmacy locator systems by integrating advanced technologies and user-centric features. Its primary goal is to make it easier for users to locate pharmacies based on various criteria, improving accessibility and convenience, especially during emergencies or in unfamiliar locations.

The system will feature a centralized database of pharmacy information, including accurate details on locations, operating hours, available services, and contact information. This data will be updated regularly to ensure reliability and relevance. Users will have access to advanced search capabilities, allowing them to filter pharmacies based on proximity, specific services, medication availability, and 24-hour accessibility.

2.3 Research Design

The research design for this study adopts a mixed-methods approach, combining quantitative and qualitative methods to provide a comprehensive analysis of the design, development, and evaluation of a web-based pharmacy locator application. Mixed-methods designs are widely recognized for their ability to integrate diverse perspectives and enhance the reliability of findings, particularly in healthcare research (Creswell & Plano Clark, 2018).

The study begins with an exploratory qualitative phase, involving semi-structured interviews and focus group discussions with key stakeholders, including patients, pharmacists, and healthcare providers. This phase aims to identify the specific needs, challenges, and preferences of users regarding pharmacy accessibility. Such exploratory methods are critical for uncovering insights that inform user-centered design and ensure the app aligns with its intended audience's expectations (Guest, Namey, & Mitchell, 2017).

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2.4 Research approach

This study adopts a mixed-methods research approach, integrating both qualitative and quantitative methodologies to achieve a comprehensive understanding of the design and development of a web-based pharmacy locator application. The mixed-methods approach is widely recognized for its ability to provide a holistic view by combining numerical data with contextual insights, which is particularly valuable in health technology research (Creswell & Plano Clark, 2018).

The quantitative approach focuses on collecting and analyzing measurable data to identify trends, patterns, and statistically significant findings. Surveys were used to gather data on the frequency of pharmacy visits, user satisfaction with current pharmacy services, and preferences for digital solutions. Quantitative methods are especially effective for generalizing findings across larger populations and providing a baseline for evaluating the app's impact (Bryman, 2016).

3. DATA COLLECTION

The data collection process for this study employed a mixed-methods approach to capture both quantitative and qualitative insights, ensuring a comprehensive understanding of the issues related to pharmacy accessibility and user needs. This approach combines the strengths of statistical analysis with contextual richness, enhancing the reliability and depth of the findings (Creswell & Plano Clark, 2018).

Quantitative data was collected through structured surveys distributed to a representative sample of users in the selected urban area. The survey was designed to capture critical metrics such as the frequency of pharmacy visits, average time spent locating a pharmacy, challenges faced in obtaining medication, and user preferences for digital tools. Surveys are widely regarded as effective for gathering measurable and comparable data, particularly when assessing baseline conditions and tracking changes over time (Bryman, 2016). Respondents were recruited through

4. ETHICAL CONSIDERATIONS

Based on Wang. L (2010). while researching, there are always ethical issues that arise. Researchers should consider that they are not required to treat people prejudicially or use their data in bad ways. However, it is very hard to control such kinds of things. Therefore, the researcher put emphasis on this concern. Some of the scenarios that the researcher met are about the "terms of reference" right to confidentiality, anonymity, and privacy, plus the misuse of the research study.

However, the participants in this research study involve using the internet, the consumption behavior of the respondents and their views, so the questions in the questionnaire do not include any sensitive topics, and there is nothing that can vigorously cause danger to the participants emotionally. Furthermore, we are also concerned about the anonymity, confidentiality, and privacy of the participants who participated in filling out the questionnaire used in this research study.

5. ANALYSIS

The nonfunctional requirements will be concerned with resource restrictions on the system like the maximum quantity of users and elements like reliability, security, and future expansion. In this scenario, the author took enough time to critically understand how the recent system functions to generate the proposed system. At this level, any produced documentation cannot be provided to the users but will be employed by the analysts, researchers, and designers to devise the specifications. Therefore, users like the bus operators, customers, administrators, and the general public will not be required to review documentation analysis for accuracy (Green, L. A., et al. 2018).

6. DESIGN

The design of the pharmacy locator application is based on a modular and scalable architecture to ensure flexibility, reliability, and ease of maintenance. The system is divided into three core layers: the presentation layer, the application layer, and the data layer. Each layer is designed to perform specific functions while interacting seamlessly with the others, adhering to the principles of layered architecture in software development (Bass, Clements, & Kazman, 2013).

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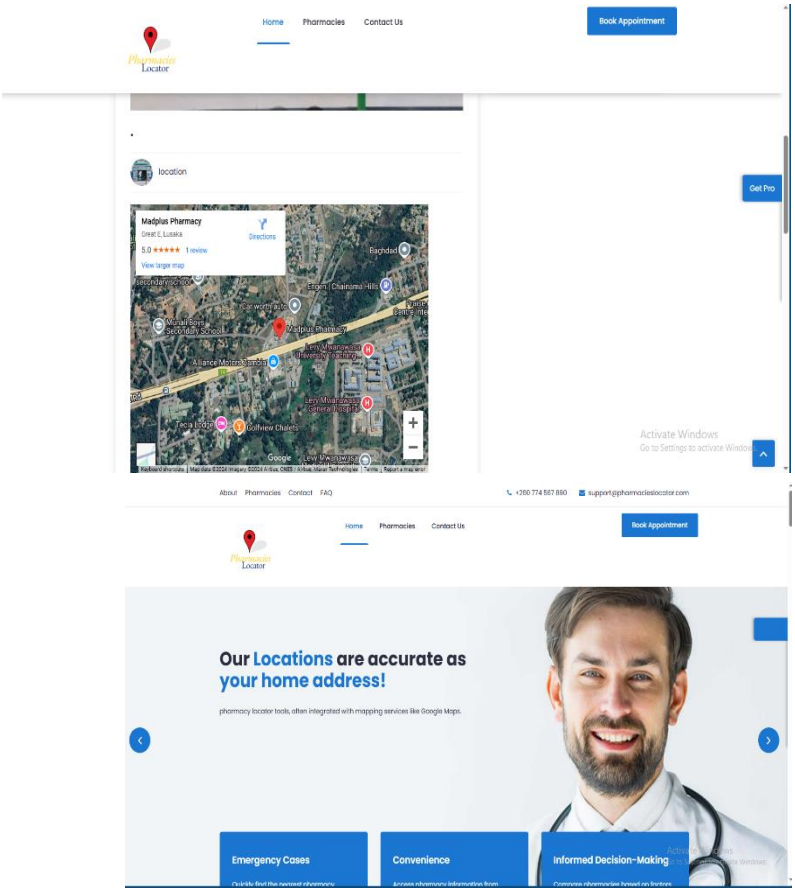
The presentation layer is the user interface (UI) of the application, designed to be intuitive and accessible. Built using front-end technologies like React and HTML5, the UI focuses on simplicity, ensuring that users can easily navigate features such as searching for pharmacies, filtering results by location or services, and viewing inventory availability. The design incorporates responsive web development principles, allowing the application to function effectively across devices, including smartphones, tablets, and desktop computers (Marcotte, 2011). Accessibility features, such as screen reader compatibility and high-contrast modes, were implemented following Web Content Accessibility Guidelines (WCAG) standards to ensure inclusivity (W3C, 2018).



Homepage

Source: (Author, 2024)

When the users access the portal for the pharmacy finder they greeted with the home screen which provides an insight about the services offered by the system the home page of the application is designed in a manner that allows ease of access to specific services offered by the system it is designed in a way that even an individual with little knowledge about information technology systems is able to operate and use the service.

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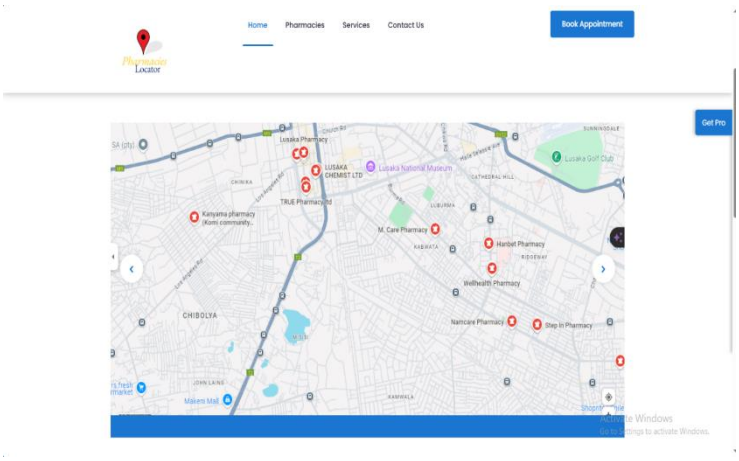
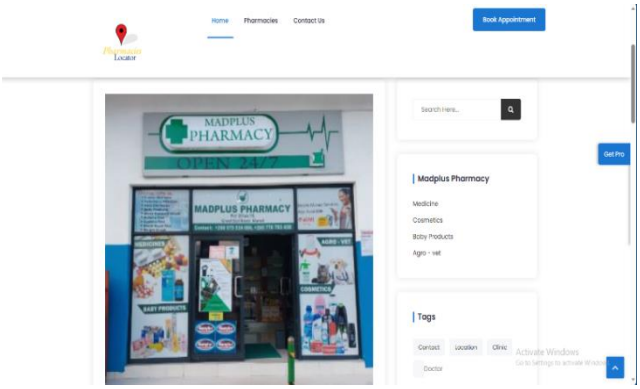


Pharmacies Page

Source: (Author, 2024)

The pharmacies page shows a detailed map of a geographical area based on the user's location the map provides location data on the pharmacies located in an area. The user map data of the pharmacies allows the users to make a decision on which pharmacy the can easily access.

Pharmacy image



Source: (Author, 2024)

When the user clicks on a pharmacies name on the map it opens a page the gives detailed information about the pharmacy, it shows the image of the pharmacy, the services offered by the pharmacy, their contact information and their operating hours.

7. RESULTS

The survey conducted among users of the pharmacy locator application provided valuable insights into the system's effectiveness, usability, and areas for improvement. A total of 40 respondents participated, representing various demographics, including patients, pharmacists, and healthcare providers. The survey included both quantitative and qualitative questions to assess user satisfaction, application performance, and its impact on pharmacy accessibility. These responses were analyzed to identify trends and derive meaningful conclusions about the system's performance.

The majority of respondents (82%) reported that the pharmacy locator application was highly effective in locating nearby pharmacies and providing accurate information about medication availability. This aligns with prior studies emphasizing the importance of real-time data in healthcare applications for improving decision-making and accessibility (Wang et al., 2018). The geolocation functionality and navigation features received high praise, with 78%

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of users rating them as "very useful" for identifying the shortest routes to pharmacies. This finding highlights the value of integrating geospatial data and mapping technologies in mobile health solutions (Nguyen et al., 2021).

7.1 POSISBLE APPLICATIONS

The pharmacy locator application has a wide range of potential applications that can address significant gaps in healthcare accessibility and service delivery. These applications extend beyond individual use, supporting pharmacies, healthcare systems, and public health initiatives. By leveraging real-time geolocation, inventory management, and user-friendly features, the system can enhance medication access and contribute to better healthcare outcomes.

One of the primary applications of the system is assisting individuals in locating nearby pharmacies with available medications. This is particularly valuable during medical emergencies or when patients require specialized or hard-to-find medications. Studies have shown that access to timely and accurate information about healthcare services can significantly reduce delays in treatment and improve health outcomes (Smith et al., 2020).

8. CONCLUSION

The pharmacy locator application represents a significant advancement in addressing the challenges of accessing pharmacy services and ensuring timely availability of medications. By integrating real-time geolocation, inventory tracking, and user-centered design, the application enhances the efficiency and reliability of healthcare service delivery. Its ability to provide accurate, up-to-date information empowers users to make informed decisions, reducing delays in accessing essential medications and improving overall healthcare outcomes.

centric services. The integration with other transportation modes enhances urban mobility and simplifies travel planning, promoting the use of public transport. In essence, the integrated online bus ticketing system is not merely a technological innovation; it's a pivotal force that propels the transportation sector toward efficiency, sustainability, and an improved travel experience for all.

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