Health History Information System for Medical Machine Analyzer Users

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Abstract

In recent years, wearable technology has grown quickly in many areas, including health care, thanks to the Internet, more advanced hardware, and a lot of data. One example is the Quantum Analyzer. Patients won't be able to look at the results of medical tests done with the Medical Machine Analyzer tool, though. The goal of our study is to create a health records system for users of the quantum machine analyzer. You can only see these results by using the program, which is only available to the person who bought the tool. The system is built using the waterfall method of software development, which has steps for figuring out what needs to be done, designing it, writing the code, and testing it. The Health History Information System has many pages, such as the User homepage, the Patient page, the Consultant page, the Schedule page, the Contact page, the Form login page, the Homepage for the administrator, the Patient data page, the Registration data page, the History result data page, and the Form user page. Test two things to find out how well this method works: how well it works and how well it works. The Health History Information System was put together in a good way. This is clear from the results of testing for usefulness and efficiency by both users and administrators. Effective means that the Health History Information System is able to support the organization's business strategy, improve organizational structure and culture, and raise customer and business value in the health sector. While efficient means that this system has all the features it needs and has been built to its best potential.

Keywords: Medical Machine Analyzer, Information System, Health history.

1   Introduction

In recent years, with the development of the internet, sophisticated hardware, and large amounts of data, wearable technology has expanded rapidly in a variety of fields, including health care, education and culture, social networking, and military [1]–[4]. In the field of medicine, wearable technology in the form of portable medical devices or health electronics that can be directly worn on the body can be used to monitor, record, analyze, organize, and intervene to maintain health; it can even be used to treat diseases with the support of various technologies for identification, sensing, connection, cloud services, and storage [5]. Wearable devices come in the form of portable medical devices or health electronics. Wearables can be used to achieve immediate detection of patient signs and laboratory indicators and provide exercise guidance, drug administration reminders, and so on. The ultimate goal is to achieve online, accurate, and intelligent

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multiparameter real-time detection and analysis of human physiological and pathological information that can be used to conduct self-diagnosis and self-treatment [6], [7]. This can be accomplished by intelligently integrating mechanical functions with microelectronics and computing power. Wearables can be used to achieve immediate detection of patient signs and laboratory indicators [8] for example Quantum Analyzer.

The Medical Analyzer Machine is an innovative new device that can aid in the diagnosis and testing of diseases in a matter of minutes, thereby breaking down barriers associated with conventional diagnosis- no false positives or negatives. This device is a high-tech innovation that integrates the best of Bio-Informatics, Electrical Engineering, and other sciences with medicine. Medical Machine Analyzer is one of the medical devices that enables users to conduct health tests utilizing portable digital scanner techniques that can be utilized in a practical manner. This item has been made available to the general public and can be purchased from a number of stores in Indonesia, both online and offline [9]. Also variable is the cost of this Medical Machine Analyzer medical device. For those with a medium to upper-middle income, the Medical Machine Analyzer tool may be quite affordable, whereas for those with a middle to lower-middle income, it is still unaffordable.

The Medical Machine Analyzer is extremely user-friendly and does not require blood or urine samples for practice. Medical Machine Analyzer is highly portable, and only a laptop is required to analyze the results of the analysis and determine whether all organs are functioning normally, abnormally mild, abnormally moderate, or abnormally severe [10]. The results of the analysis demonstrate abnormal organ function and provide expert recommendations for restoring organ function to normal.

However, patients in general will not be able to view the results of medical tests that were performed with the Medical Machine Analyzer tool. These findings can only be viewed by utilizing the program, which is only accessible to the person who purchased the tool in the first place [11]. Because of this, we are going to develop a web information system that will allow patients who have used the medical tool known as the Medical Machine Analyzer to assess their health and get the findings of that assessment online and in a more convenient format. Our study aims to develop health history information system for Medical Machine Analyzer users.

2 Methodology

2.1 Waterfall

This system was developed utilizing the waterfall. The waterfall methodology is an approach to project management that emphasizes a linear progression from start to finish [12]. This methodology, which is frequently employed by engineers, is front-loaded and relies on meticulous planning, detailed documentation, and sequential execution [13]. The flow of system development is presented in Figure 1.

Figure 1: Phase of System Developing

Requirement. In this phase, every conceivable requirement for the system to be developed is gathered and documented in a requirement specification document. Based on interviews with health consultants who select these devices, it was discovered that the problem encountered by health consultants today is the lack of a website that provides patients with information about health checks using the Medical Machine Analyzer tool. As a result of these issues, it is necessary to design a specialized website to provide information about it, as well as to facilitate the exchange of questions and answers between patients and health consultants using confirmation facilities.

Design. In this phase, the need specifications from the previous phase are analyzed, and the system design is prepared. This system design contributes to the process of specifying hardware and system requirements, as well as contributing to the process of establishing the overall architecture of the system.

Coding. The system is initially developed in tiny programs known as units, which are then integrated in the subsequent phase. The process of developing and testing each unit's functionality is known as Testing.

Testing. After being individually tested, each of the modules that were produced during the implementation phase are combined into a single system. After the integration, the whole system is tested to make sure there aren't any bugs or errors. At this point, we put the system through its paces to see how effective and efficient it is.

2.2 Testing Design

Table 1 and 2 present a plan for conducting system testing (for user and admin) based on two criteria: namely, effectiveness and efficiency.

Table 1: Testing Design for User

User Task	Task scenario	Time (seconds)
Task I	Users are prompted to access the homepage	30
Task II	User prompted to access patient page	30
Task III	User prompted to access consultant page	30
Task IV	Users are prompted to access the schedule page	30
Task V	User prompted to access contact page	30

There are 5 tasks that must be done by the user to test the system with a given time of 30 seconds.

Table 2: Testing Design for Admins

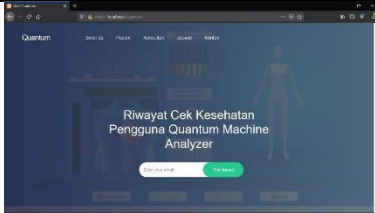| User Task	Task scenario	Time (seconds)
Task I	Admins are prompted to access the login page	30
Task II	Admin is asked to login using admin account (input username and password)	30
Task III	Admins are prompted to access the home page	30
Task IV	Admins are prompted to access the patient data page	30
Task V	Admins are required to manage patient data (add, edit, view, delete)	240
Task VI	Admins are prompted to access the registration data page	30

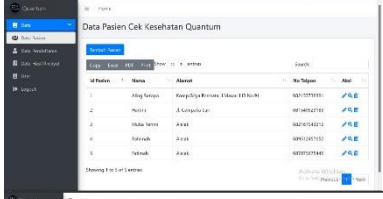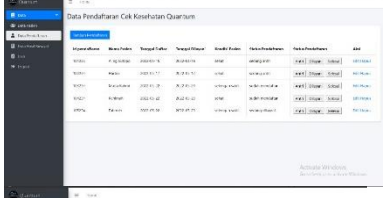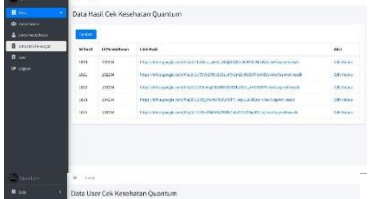| User Task	Task scenario	Time (seconds)
Task VII	Admins are required to manage registration data (add, edit, view, delete)	240
Task VIII	Admins are prompted to access the History result data page	30
Task IX	Admins are required to manage history result data (add, edit, view, delete)	240
Task X	Admin prompted to access user data page	30
Task XI	Admins are required to manage user data (add, edit, view, delete)	240

There are 11 tasks that must be done by the user to test the system with a given time of 30 seconds and 240 seconds.

3   Result and Discussion

3.1   Health History Information System

Table 3: System Overview

Page	View	Description
User hompage		This Home page displays the Medical Machine Analyzer User Health Check History Home menu, and is composed of a single language, Indonesian.
Patient page		Patient page shows patient data
Consultant page		Consultant page shows brief profiles of health consultants and admins
Schedule page		Schedule page shows the consultation schedule
Contact page		Contact Page's address and phone number

Page	View	Description
Form login		The login form is the page that is first displayed when the admin accesses the website by the admin
Home for admin		This page serves to show the admin page which contains Home, Data Input and Configuration.
Patient data page		This page is for managing patient data (add, edit, view, delete)
Registration data page		This page is for managing registration data (add, edit, view, delete)
History result data page		This page is a page for managing historical data
Form user		This page is a page that is for managing users

Health History Information System consists of several pages including User homepage, Patient page, Consultant page, Schedule page, Contact page, Form login, Home for admin, Patient data page, Registration data page, History result data page, and Form user.

3.2 Effectiveness Testing

Effectiveness testing is measured by how well a product or service satisfies the needs of its users and how easy it is to use [14], [15]. The percentage of respondents who were successful in completing the tasks at hand is one factor that is considered when calculating the measurement of the efficacy of various components. Five users acted as respondents for the purpose of testing the effectiveness of the product. Effectiveness testing show as Table 4 and 5.

Table 4: Effectiveness Testing (User)

User Task	Task scenario	Number of Respondents	Number of Error	Success percentage (%)
Task I	Users are prompted to access the homepage	5	0	100
Task II	User prompted to access patient page	5	0	100
Task III	User prompted to access consultant page	5	0	100
Task IV	Users are prompted to access the schedule page	5	0	100
Task V	User prompted to access contact page	5	0	100

Based on the results of effectiveness testing by users, it was found that all tasks were successful, so that the system built was good.

Table 5: Effectiveness Testing (Admins)

User Task	Task scenario	Number of Respondents	Number of Error	Success percentage (%)
Task I	Admins are prompted to access the login page	5	0	100
Task II	Admin is asked to login using admin account (input username and password)	5	0	100
Task III	Admins are prompted to access the home page	5	0	100
Task IV	Admins are prompted to access the patient data page	5	0	100
Task V	Admins are required to manage patient data (add, edit, view, delete)	5	1	80
Task VI	Admins are prompted to access the registration data page	5	0	100
Task VII	Admins are required to manage registration data (add, edit, view, delete)	5	1	80
Task VIII	Admins are prompted to access the History result data page	5	1	100
Task IX	Admins are required to manage history result data (add, edit, view, delete)	5	1	100
Task X	Admin prompted to access user data page	5	1	100
Task XI	Admins are required to manage user data (add, edit, view, delete)	5	2	60

Based on the results of effectiveness testing by the admin, it was found that some tasks that have not been successfully implemented by users such as tasks V, VII, and XI. The average for system effectiveness (percentage of success) in admins is 93 percent.

3.3 Effectiveness Testing

Efficiency testing pertains to the amount of time necessary to complete a task [16]. Aspects of efficiency are measured by examining the time required to complete the tasks. Effectiveness testing show as Table 6 and 7.

Table 6: Efficiency Testing (User)

User Task	Task scenario	Time (seconds)	Time taken by Respondent (Avg)
Task I	Users are prompted to access the homepage	30	3
Task II	User prompted to access patient page	30	7
Task III	User prompted to access consultant page	30	14
Task IV	Users are prompted to access the schedule page	30	8
Task V	User prompted to access contact page	30	13

The system is already quite good in terms of its efficiency. The results of an efficiency test conducted with five users show that all of the tasks were completed within the allotted amount of time. This can be seen from the results of the test.

Table 7: Efficiency Testing (Admins)

User Task	Task scenario	Time (seconds)	Time taken by Respondent (Avg)
Task I	Admins are prompted to access the login page	30	11
Task II	Admin is asked to login using admin account (input username and password)	30	27
Task III	Admins are prompted to access the home page	30	11
Task IV	Admins are prompted to access the patient data page	30	20
Task V	Admins are required to manage patient data (add, edit, view, delete)	240	200
Task VI	Admins are prompted to access the registration data page	30	26
Task VII	Admins are required to manage registration data (add, edit, view, delete)	240	224
Task VIII	Admins are prompted to access the History result data page	30	15
Task IX	Admins are required to manage history result data (add, edit, view, delete)	240	230
Task X	Admin prompted to access user data page	30	16
Task XI	Admins are required to manage user data (add, edit, view, delete)	240	136

This also occurs when admins test the efficacy of their systems. All of the activities are carried out in the appropriate manner and do not go over the allotted amount of time.

3.4 Discussion

Our study's Health History Information System was well constructed. This is evident from the results of user and administrator testing of effectiveness and efficiency. According to Rahman et al. [16], an information system must incorporate aspects of effectiveness and efficacy in order to solve problems and enhance an organization's performance. Effective indicates that the Health History Information System is able to support the organization's business strategy, as an enabler for business processes, enhance organizational structure and culture, and increase customer and business value, particularly in the health sector. While efficient indicates that this system has been developed to its fullest capacity with the necessary features.

4   Conclusion

The Health History Information System was developed with consideration given to both the efficacy and the effectiveness of its components. systems that are utilized to make storage and information retrieval easier. Due to the fact that it has a look that is friendly to users, this system is very simple to operate. in order to make it possible for this system to give patients who monitor their health with a Medical Machine Analyzer simple access to the information they need.

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