

PERSONALIZED HEALTHCARE SYSTEM (FITNESSCARE)

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Abstract

Stress typically describes a negative condition or positive condition that can have an impact on a person's mental and physical well-being. Stress is simply reaction to stimulus disturbs physical or mental equilibrium. Stressful situation can caused blood pressure to spike temporarily. When someone get in stressful situation, the adrenaline amount in blood is getting higher. The blood will pump faster than usual and cause the blood pressure to increase. It can damage the system in human body. Able to weaken body to a certain point where the immune system becomes weak. If this happens, the individual is expose to deadly diseases such as cancer and heart problems. Especially if you are dealing with a health problem, it may make things worse. This is inevitable in view of the lifestyle in this modern world. With the progress we're in, various actions can be taken to help to overcome this problem. With the advanced technology now, it enable people to live healthier and happier. Patients who use this application will be monitored by a trainer who will monitor each patient to achieve the required objectives. Conclusion, Personalized Health Care System is easy to use and users will certainly be able to live a healthy life.

Keywords: Stress, Blood pressure, Personalized Health Care System.

1.0 Introduction

Healthcare is the analysis, treatment and prevention of disease in human beings. Access to healthcare are different across countries, groups and individuals, largely influenced by social and economic conditions as well as the health policies in every places. Every countries have different policies and plans to the personal healthcare goals within their societies.

Stress typically describes a negative condition or positive condition that can have an impact on a person's mental and physical well-being. Stress is simply a reaction to stimulus that disturbs our physical or mental equilibrium. Stressful situation can cause blood pressure to spike temporarily. When your heart beats, it pumps blood round your body to give it energy and oxygen it needs. As the blood move, it pushes against the blood vessels. The strength of this pushing was called blood pressure. When someone get in stressful situation, the adrenaline amount in blood is getting higher (hormone). Hence, the blood will pump faster and cause the blood pressure to increase.

The objectives for the proposed study are to study the existing system and analyze the requirements that address the real time monitoring for blood pressure and stress, to design and develop web-based system to input blood pressure reading and measuring stress on blood pressure, and to evaluate and test the effectiveness of proposed system in observing stress on blood pressure.

2.0 Problem Background

The existing healthcare system allows the users, together with their care providers (doctors, physicians and nurses) will choose and combine the provided options (home help, home nursing and welfare services) that suit the individual user needs for care and services and the different ways of financial will be applied for different activities

The problem with the existing system is they still use the system manually which mean it is highly depends on user's manual input. Users have to update their profile or health record straight to the system. Besides that, the existing system is a standalone system which mean it does not connected to the providers such as the doctor or the physician.

This proposed system, FitnessCare, propose a function which user will input their blood pressure reading and calculate blood pressure and stress level. It also consist the function called 'Patient-Doctor Matching' which is every patient will choose their own trainer according to the patient needs and the trainer's expertise. It can be monitored directly by the trainer through this system.

3.0 Methodology

The rational Unified Process (RUP) is chosen as methodology for this web application development among a few software development processes. RUP is further discussed in details phase in this chapter. The related activities for each phase were identified.

There are four phases in RUP namely inception, elaboration, construction and transition phases. Inception phase states the idea of the project and the development teams will determines if the project is worth to continue and what resources are needed. Inception phase is where the whole idea is stated and the development team will decide if the project is worth pursuing and what resources will be needed to develop the project. Inception phase is the first phase in conducting any system development. The project of the system is prepared and discussed includes success factor (i.e. revenue), assessment of risk, creating a project plan and use case model.

Elaboration phase evaluates the project's architecture and required resources. The goals of this phase are to analyze the problem domain, establish a solid architectural foundation, develop the project plan and eliminate the highest risk elements of the project. In this phase, the project's architecture and required resources are evaluated. Developers would consider possible software applications and costs associated with the development.

Construction phase is where the project is developed and completed. The software is designed, written and tested. In this phase, the main focus is on the development of components and other features of the system. The coding is implemented and documented. Lastly, transition phase is where the project is released to the public and all the adjustments or updates are made based on feedback from end users

4.0 Result

Personalized Healthcare System (FitnessCare), propose a function which user will input their blood pressure reading and calculate blood pressure and stress level. It also consist the function called 'Patient-Doctor Matching' which is every patient will choose their own trainer according to the patient needs and the trainer's expertise. It can be monitored directly by the trainer through this system.

Three-Tier Architecture has been chosen as the architectural design for the FitnessCare. Three-Tier Architecture is an architecture that consist of three layers, namely presentation layer, business logical layer and data access layer. Each layer is logically separate process.

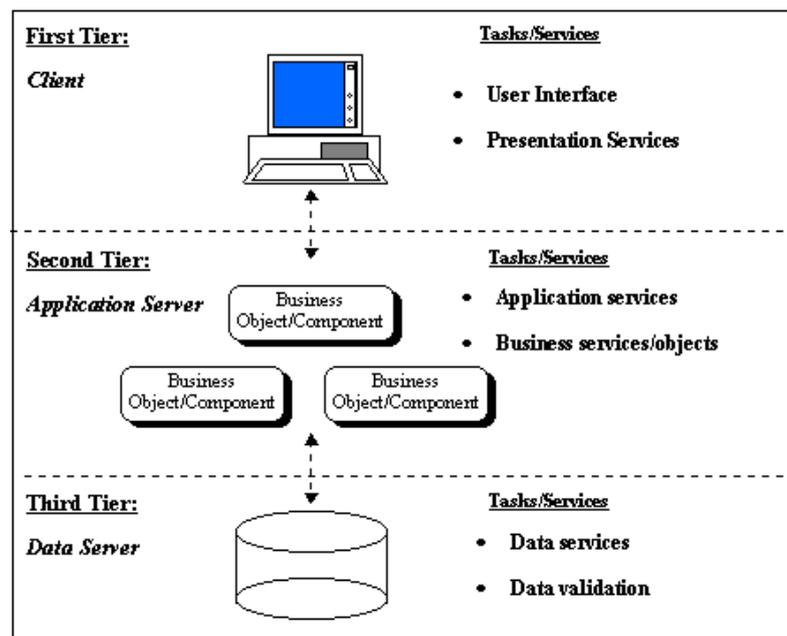


Figure 1 Three tier architecture

Table 1 below shows the database table for login use case which the table has two attribute which are username and password and the username as the primary key.

Table 1: Database table for login use case

Table	Field Name	Type	Size	Key Type	Description
Login	Username	varchar	10	Primary Key	Unique ID to differ each user.
	Password	varchar	10		Password to authenticate user

From the research that has been carried out on the existing system, the comparison of the advantages and limitations in between three existing systems was done and the findings were listed in Table 2. Below is an example of a figure. Place your figure in the center. Shorten the margins to accommodate the title for the figure. Begin the numbering of your figure with 1.

Table 2 Comparison between existing systems			
PRODUCT	MyFitnessPal	Mio Fuse	RevUp
ADVANTAGES	<ul style="list-style-type: none"> • Allows profiling • Automatically adjust the personalized goal in daily basis 	<ul style="list-style-type: none"> • Track heart rate • Easy to be connected to existing applications 	<ul style="list-style-type: none"> • Integrate data from various health devices and identifies patterns that can develop into chronic conditions
LIMITATIONS	<ul style="list-style-type: none"> • Standalone (not connected to physicians and doctors) • Only focus to nutritious intake • Highly depends on user's manual input 	<ul style="list-style-type: none"> • Standalone (not connected to doctors and physicians) • No profiling features 	<ul style="list-style-type: none"> • Payable plan • Only available for patients who subscribed to the offered plans and services

The screenshot shows the 'Blood Pressure Reading' interface. At the top, there is a navigation bar with 'FitnessCare', 'Home', a search bar, and 'View all users'. The main content area has a background image of a hand holding a blood pressure cuff. The text 'Blood Pressure Reading' is prominently displayed. Below this, there are four input fields labeled 'SYSOLIC', 'DIASTOLIC', 'TIME', and 'DATE'. A blue 'CALCULATE' button is positioned at the bottom right of the form area.

Figure 2 User interface design

The screenshot shows the 'Welcome Trainer!' interface. The navigation bar at the top includes 'FitnessCare', 'Home', a search bar, and the user name 'Zack Lion'. Below the navigation bar, the text 'Welcome Trainer!' is centered, followed by links for 'Edit your profile', 'View all users', and 'Logout'. A large teal banner contains the text 'Welcome To FitnessCare' and a smaller 'Welcome to FitnessCare' below it. At the bottom of the banner, there are three buttons: 'BMI CALCULATOR', 'ACTIVITY', and 'TRAINERS'.

Figure 3 Interfaces for Trainers

5.0 Discussion

This project, FitnessCare System is a project that attempts to build a web-based system to track all the fitness activities done by the users and to track their stress and blood pressure level. This system propose a function which user will input their blood pressure reading and calculate blood pressure and stress level. It also consist the function called 'Patient-Doctor Matching' which is every patient will choose their own trainer according to the patient needs and the trainer's expertise. It can be monitored directly by the trainer through this system. After that, the background problem is carried out. All components in the introduction chapter have been constructed. After the introduction and problem statement is built, proceed with the second chapter which is literature review. It is been constructed to study the problems and strengths of existing systems.

After all the strengths and problems of the existing system be analyzed, the detail of the methodology to be used in developing this system has been identified. Rational Unified Process (RUP) has been chosen as a methodology in developing this project after done a few research about this methodology. It is the most suitable methodology to be implemented in this system compare to other methodology such as waterfall, incremental delivery etc.

There are several objectives need to be achieved to successfully develop the proposed system. The first objective of this project is to analyze the existing system that addressing the real time monitoring for blood pressure and stress. This objective is to identify whether the existing application system has cover on blood pressure and stress or not. This is important to know because this proposed system only focus on blood pressure and stress only which it never be done by any existing system. The first objective will assist in reaching the second objective which is to design and develop mobile application for measuring stress on blood pressure using Samsung gear. The problems and strengths are determined by analyzing and studying the existing system. After the system are designed and built, developer need to evaluate and test the effectiveness of proposed system in observing stress on blood pressure and ensure the system is functioning as expected.

6.0 Conclusion

In conclusion, this project aims was to develop a web-based system that provide both trainee and trainer a healthy lifestyle. Enable to have better engagement between both, patient and provider.

A black box testing was been conducted for this system. Below was one of the Black box testing for Registration. The test as shown below:

		Equivalent class	status	Representative	TC01	TC02	TC03	TC04	
Input	first name	x = string	valid	"abu"	X		X		
		x = null	invalid	""					
	last name	x = string	valid	"bakar"	X	X	X	X	
		x = null	invalid	""					
	email	x = string	valid	abu@gmail.com	X	X	X		
		x = null	invalid	abu				X	
	username	x = string	valid	"abu"	X	X		X	
		x = null	invalid						
	password	x = string	valid	abu	X		X	X	
		x = null	invalid						
	Expected output	Redirect to Update Profile				X			
		Please fill in this field					X	X	X
Please include an '@' in email field							X		

Figure 4 Black box testing for Registration

The major challenge encountered during the development of this project was to coding the whole system using PHP which never learn PHP before. It is quite challenging problem.

In the next phase, a few ideas have been suggested due to the limitations of the project. For the future enhancement, the idea for the mobile application and collect the data using

wearable technology had been suggested. This is because nowadays people always with their gadget in their hands. It is much easier if the application could be something more relevant to other people. And for the functionality enhancement, sleep monitoring will be added as the current function is to monitor blood pressure and stress.

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