Full Design and Specification: Heart Protector Application

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1. Design Specification

1.1 Conceptual level Design

We are developing a mobile application combines with bracelet with monitoring function that is specifically designed for patients with heart disease to help with:

- Regular monitor of symptoms
- First aid function when sudden heart attack occur
- Provide lifestyle suggestions from personal doctor

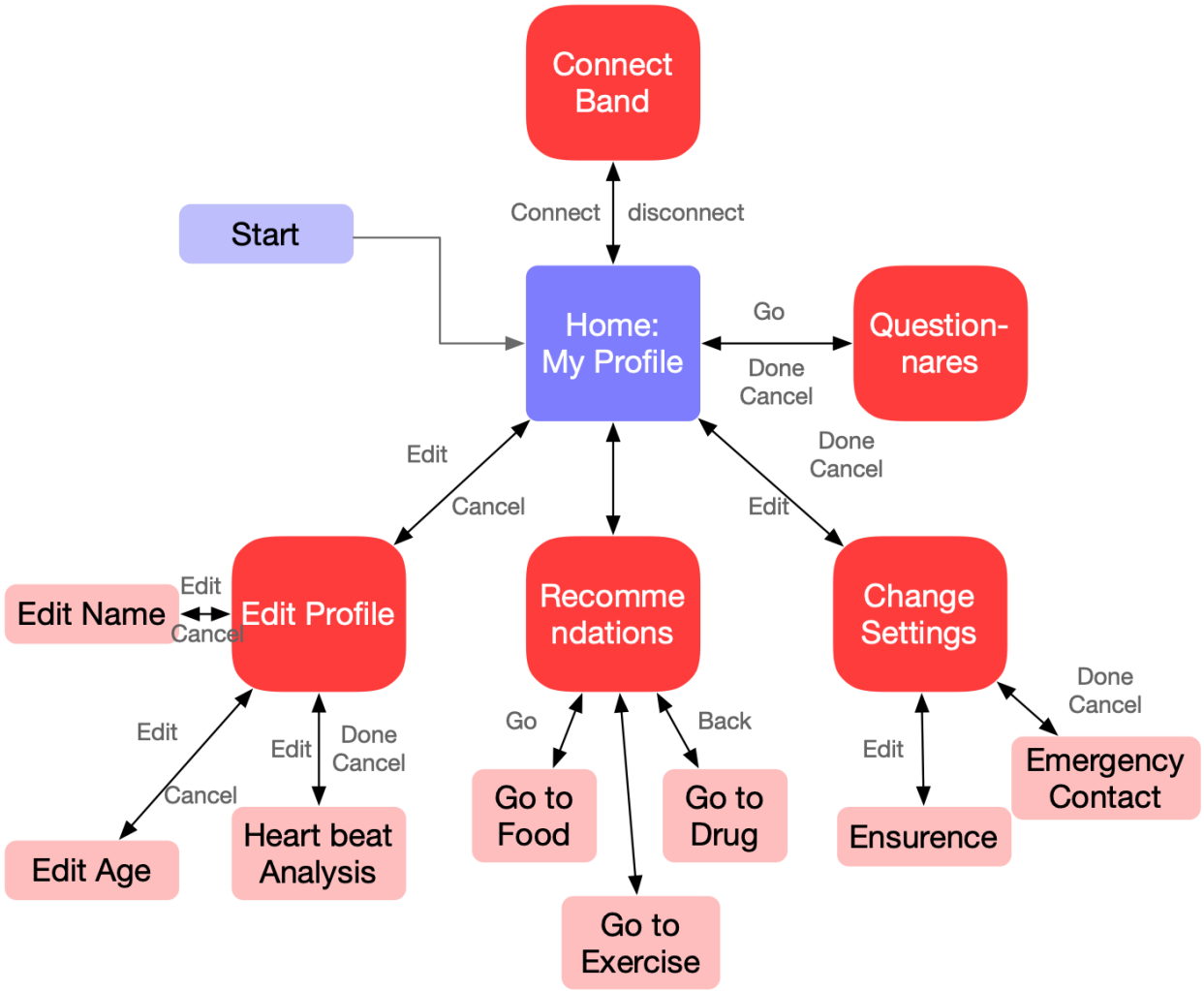
With the help of Heart Protecter Application, heart disease patience will have a tighter connection with medical system, so as to prevent heart attacks steal live from people.

1.2 Semantic Level Design

Function Name	Parameters	Description	Feedback	Errors
Connect Band	Explicit - Band(Band's name and model) Implicit- Band(searching)	Connect the wristband and start monitoring heartbeat	Successfully connected with the smart wristband	Cannot find/ connet with brand through Blue Tooth
Lifestyle Recommendation	Explicit - User information(with user's data) Explicit - User information(without user's data)	provide user a list of recommendations (Food/ exercises/ sleeping/ drug reminder) to help users keep a healthy life style and reduce the possibility of relapse of hearth attack	"Recommendations for You" will follow up	No Internet connection/ No healthy data provided(such as no band statistics)
Start Questionnaires	Explicit - Questions(if user does not complete answering) Implicit - Questions(if user completed answering)	Ask several questions to the users that are related to patients' health condition	All the questions have been completed!	No Internet connection

Function Name	Parameters	Description	Feedback	Errors
Call 911	Explicit - Phone number(Able to call) Implicit - Phone Number(Unable to call)	Contact doctor when sudden heart attack occur	“Successfully contacted 911 and Doctor” shows after calling	No Mobile phone signal

1.3 Syntactic Diagram



Connect Band:
User decides to either undo the connecting band command or confirm connecting band with phone.

User Action	system responses
Start Connection	Finding Blue Tooth Pairs
Choose Band	Connect Band
Disconnect	Disconnect a band

Start Questionnaires:
User decides to either select one of the answer and go to next question or cancel continue answering the questions.

User Action	system responses
Start Questionnares	Start and provide questions
Select Answer	Save answer data and continue to next QA
Cancel	Go back to previous page

1.4 Lexical Model

Name	**User Action**	**System Response**
Edit Name	Input String	Done Edit
Edit Age	Input number	Done Edit
Edit Heart Analysis	Choose Data to show	Done Choice
Go to Food	Tap Food (choose)	Go to food recommendation
Go to Exercise	Tap Exercise (choose)	Go to exercise recommendation
Go to Drug	Tap Drug(choose)	Go to drug recommendation
Change Insurance Info	Input String	Done Edit
Change Emergency Contact	Input String	Done Edit
Questionnares	Choose answer	Record answer and go next
Connect Band	Choose band to connect	Connect band

2. Documentation and Guidelines

2.1 Documentation

1. Connect with smart wristband and monitor symptoms

Features	Details
Connect the smart wristband with application	Connecting with smart wristband, the application will be able to detect your heart beat and monitor your heart condition 24 hours a day
Record your daily life statistics	This feature will be able to know your daily activities such as sleep, walking distance etc. and daily heart condition and record the health condition regularly
Help doctors with the diagnose process	When you go to see your doctor, the monitoring statistics can be directly provided to your doctor

2. Recommendation of healthy lifestyle choices

Features	Details
Provide a list of recommendations	By recording your health condition and daily lifestyle statistics, the application will provide you a list of recommendations. Such as food choices, exercises, sleeping time, drug reminder, etc.
Prevent further heart attack	By adapting the tips, you will be able to keep a healthy life style and reduce the possibility of relapse of heart attack

3. Questionnaires and providing health report

Features	Details
Collect health data	This application will ask you several questions that are related to your health condition, such as mind condition, physical feelings
Make an analysis trend chart	The answers to the daily questions will be recorded, and they will be made to an analysis trend chart. The report will also be able to provide to doctors to help with diagnose

4. Call 911 to contact doctor when sudden heart attack occur

Some people may meet heart attack when they are alone. When sudden heart attack occurs, the condition might be very severe. And if there is nobody around, they may miss the best first aid opportunity and lead to loss of life.

Features	Details
Detect severe condition and ask for help	The application can detect the condition and directly inform the hospital and your doctor and ask for first aid

2.2 Guidelines:

The overall goal of this guideline document is to set a common ground for designers to reach a level of standard, where users can make the most use of the hardware and software application at the same time.

The design principles of the guidelines toward the user interface set standards for displaying a clear layout for users, making the contents easy to read and easy to use. The guidelines toward the user interactions encourages designers to put users in the first place, consider their needs and convenience under any circumstance.

I. Guidelines For user interface:
• Make full use of the screen, discard redundant white spaces or borders, whether the mobile application or display of the wristband device
• Simplify the display and focus on the contents by abandoning borders, separating contents in different pages
• Keep consistency in fonts, buttons, images, icons
• Ability of adjusting display based on user skill levels, for example, older users should have options to adjust to a bigger font size, first-time users should be suggested to be guided through the features of the app
• Design of the interface should highlight the upper and lower level relationship between different pages to enable the users to keep track of the logic of different features

II. Guidelines for user interactions:
• Design of the app should provide the users with a clear path of how to get to a specific feature. Complicated or nested design would be a bad implementation and easily causes confusion.
• Simulate the user scenario before implementing new features and keep the features simple and necessary. Users should have the options to customize their display as well as to make adjustments to the display of the features.
• Keep consistency of progress between the mobile application and the wristband device. Users shouldn’t need to keep track of different progress or complete duplicate records.
• Design of the application and wristband device should follow the users’ customized settings, for example, notification, variety of the data, or time period of data organized and displayed.
• Avoid any involuntary interrupt caused by data error, low battery, multitasking and keep a balance between quantity of data and efficient operation.
• Inform users of their privacy during first use, in case of any further issue.

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3. Task-Command Analysis

3.1 Connect with smart wristband and monitor symptoms

Operator sequence:
1. Initiate the connection(decide to do the task) M
2. Find the settings button M
3. Move hand to settings button H
4. Point to settings button P
5. Press settings button B
6. Find the connect button M
7. Verify the wristband or monitor information M
8. Point to connect button P
9. Press connect button B

Actions	Count
Button Press	0.2 sec(0.1 per)
Point	2.2 sec(1.1 per)
Mental: check monitor information	4.8 sec(1.2 per)
Home	0.4 sec(0.4 per)
Analysis	Total: 6.8 sec This is optimal because connecting to monitor/ wristband is not commonly used task for a user, so it can be put into the settings.

3.2 Review recommendation of health life care choices

Operator sequences:
1. Initiate the review(decide to do the task) M
2. Move hand to screen H
3. Find the recommendation page M
4. Point to recommend button P
5. Press the recommend button B
6. Read content on the page M

Actions	Count
Button Press	0.1 sec(0.1 per)
Point	1.1 sec(1.1 per)
Mental: Read content on page	32.4 sec(1.2 for initiate/find, 30 for read)

Actions	Count
Home	0.4 sec(0.4 per)
Analysis	Total: 34 sec Improvements: this action is commonly used for patients, it's necessary to make it more convenient by canceling recommendation button so that users can read content directly once moving to the recommendation page

3.3 Fill questionnaire and provide health report

Assumption: For each questionnaire, there are about 10 questions

1. Initiate the filling questionnaire(decide to do the task) M
2. Find the questionnaire page M
3. Point to each question P
4. Read questions provided by questionnaire M
5. Think about body condition M
6. Move hand to keyboard H
7. Print answer to each question B
8. Move hand back to screen H
9. Scroll to next question(back to step 3, totally 10 times for each questionnaire) S
10. Press submit button after finishing questionnaire P

Actions	Count
Scroll	5 sec(0.5 per)
Button Press	1 sec(0.1 per)
Point	11 sec(1.1 per)
Mental: Think about answers	62.4 sec(1.2 for initiate/find, 3 for read/think)
Home	8 sec(0.4 per)
Keystroke(Type)	(totally 200 characters) 20 sec(0.1 per character)
Analysis	Total: 107.4 sec Improvements: Change some questions from typing answers to selection, since click button can save much more time