

Preliminary Design: Heart Protector Application

Ruizi Dong-drq12345

Ting Ding-shikiding

Namuhan-bauminds

1.Elevator Pitch

Approximately 7 million people around the world die from heart attacks every year, and cardiovascular disease, which causes heart attacks and other problems like strokes, is the world's leading killer. At the same time, "lonely death" refers to a Japanese phenomenon of people dying alone and remaining undiscovered for a long period of time because of increasingly elderly population. We are developing a mobile application combines with bracelet with monitoring function that is specifically designed for patients with heart disease to help with:

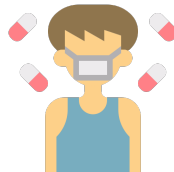
- Regular monitor of symptoms
- First aid function when sudden heart attack occur
- Provide lifestyle suggestions from personal doctor

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

2.User analysis

The target user of Heart Protector, is the people with heart diseases. They are not in hospital, but they have needs to track their heart health at the same time.

In this part, I would like to make a user persona to make detailed analysis.



Name Age	Bob, 30	Susan, 54	Jackie, 78
Sick Severity	Less sick	Moderately sick	Serious sick
Job	Tech Lead	Teacher	Retired
Accommodation	Wife & Child	Husband	Alone
Main Goal	<ul style="list-style-type: none">• Healthy diet & lifestyle• Record heart condition regularly	<ul style="list-style-type: none">• Record heart condition regularly• Report daily health condition to family doctor	<ul style="list-style-type: none">• Call first all when sudden heart attack occur• Report daily health condition to family doctor

Age	Age: 18+, Mostly 35+
Job	Designer, Worker, Actuary, Recruiter, Retired, etc
Sick severity	Severe, Moderate, Less. <ul style="list-style-type: none"> • Severe patients need medical treatment everyday, and have high potential of relapse and need first aid • Moderate patients need regular treatment, and track heart condition and get regular hospital treatment • Less severe patients also need regular treatment, track heart condition
Potential user	Potential user is in great quantity. 7,900,000 Americans have had a heart attack or 3.1% to 4% of the U.S. adult population.
Lifestyle Risk Factors	High blood pressure, high LDL cholesterol, and smoking are key heart disease risk factors for heart disease. About half of Americans (49%) have at least one of these three risk factors. Several other medical conditions and lifestyle choices can also put people at a higher risk for heart disease, including: <ul style="list-style-type: none"> • Diabetes • Overweight and obesity • Poor diet • Physical inactivity • Excessive alcohol use
Living	With family members; live alone; With care workers

3.Task analysis

3.1 Connect with smart wristband and monitor symptoms

User can make settings and connect their smart wristband with this application. Connecting with smart wristband, the application will be able to detect user's heart beat and monitor user's heart condition 24 hours a day. It can also record user's daily life statistics such as sleep, walking distance etc. This feature will be able to know patient's daily heart condition and record the health condition regularly. When user goes to see their doctor, this monitoring statistics can be directly provided to their doctor. This can help doctors with the diagnose process.

3.2 Recommendation of healthy lifestyle choices

By recording user's health condition and daily lifestyle statistics, the application will provide user a list of recommendations. Such as food choices, exercises, sleeping time, drug reminder, etc. By adapting the tips, users will be able to keep a healthy life style and reduce the possibility of relapse of heart attack.

3.3 Questionnaires and providing health report

This application will ask several questions to the users that are related to patients' health condition, such as mind condition, physical feelings. Users will need to answer these questions. And the answers will be recorded, and the answers will be made to an analysis trend chart. The report will also be able to provide to doctors to help with diagnose.

3.4 Call 911 to contact doctor when sudden heart attack occur

Some people may meet heart attack when they are alone. When sudden heart attack occur, the condition might be very severe. And if there is nobody around them, they may miss the best first aid opportunity and lead to loss of life. The application can detect the condition and directly inform the hospital and patient's doctor and ask for first aid.

4. Conceptual Model

4.1 Key Objects: Patients

Object Attributes:

- Name
- Date of Birth
- Age
- Gender
- Doctors
- Insurance information

Relationships: A patient can have one or more private doctors

Actions on Objects:

- Can add/change/connect private doctors
- Can report health condition

Actions on Object Attributes:

- A patient's age goes up by one every year
- A patient may change their private doctors
- A patient may change their insurance
- A patients' health information can change according to heart monitoring

Actions on Object Relationships

- Items can be deleted from a 'private doctors' page
- A patient's 'private doctors' page can be clicked on and reviewed

4.2 Key Objects: Doctors

Object Attributes:

- Name
- Age
- Gender
- Hospital(working place)
- Position

Relationships: A doctor can have one or more patients to take care of

Actions on Objects:

- Can add patients
- Can edit health related suggestions

Actions on Object Attributes:

- A doctor's age goes up by one every year
- A doctor may change their working place

- A doctor may change their position

Actions on Object Relationships:

- Items can be deleted from a 'patients' page
- A doctor's 'Patient' page can be clicked on and track patients' symptoms

4.3 Key Objects: Health Report

Object Attributes:

- General information of patient
- Weight
- Blood pressure
- Mood
- Activity

Relationships: A patient can have their own health report

Actions on Objects:

- Can represent patient's health conditions
- Can track patient's symptoms

Actions on Object Attributes:

- A patient may change their general information
- A patient's weight, blood pressure can change according to monitoring
- A patient's mood and activity may change according to questionnaire filled by patient

Actions on Object Relationships:

- A patient's information can be reviewed by clicked on 'patients' page

4.4 Key Objects: Heart Health Care

Object Attributes:

- General information of patient
- General information of doctor
- Medications
- Last hospital admission
- Health-related tasks
- Insurance information

Relationships: A patient can have their own heart health partner

Actions on Objects:

- Can Represent detailed information of patient's medication, last hospital admission, health-related tasks and insurance information
- Can get alerted and call health care provider(hospital and private doctors) if a worsening of heart failure detected

Actions on Object Attributes:

- A patient may change their general information
- A doctor may change their general information
- A patient medications, health visits and health-related tasks may change with therapy

Actions on Object Relationships:

- A patient's information can be reviewed by clicked on 'patients' page
- A doctor's information can be reviewed by clicked on 'doctor's' page

5. Functionality and Usage Scenarios

5.1 Monitoring symptoms of patients

The health app keeps records of patients' health data and monitors change like heart rate variability, blood pressure, weight, sleep, activity and movements, etc.

John is a 70 year old user of our health app at home. John was diagnosed with heart disease half an year ago. John uses our health app to record his physical conditions like pain or discomfort, and to monitor his health data, heart rate, blood pressure, weight, etc., and watch for symptoms that may indicate a sign of heart failure to maintain his health condition.

April is a 70 year old user of our health app recovering at a hospital. April was sent to ER and was diagnosed with mild heart failure. Recommended by her sons and daughters, April started to use this health app to monitor symptoms that may indicate a worsening of heart failure, heart rate variability, irregular rhythm, high heart rate notifications, etc. April's caregivers can check up her health data through the app and decide whether they need additional help from the doctors.

Michael is a 75 year old user of our health app at home. Michael was diagnosed with heart failure one year ago. Recommended by his caregiver, Michael started to use this health app along with his health care devices. His smart bracelet can monitor his heart rate variability, blood pressure, weight, sleep, activity and movements, etc., and can work with our health app even more convenient and more accurate through his health id. Michael and his caregiver can check on any change of his health data, and pay attention to the ones that may indicate a worsening health condition, or directed by the app to call for additional help.

5.2 Displaying readily available health information

The health card functionality displays all health information of patients all in one place, such as blood type, date of birth, height, weight, medications, last hospital admission, healthcare providers, etc.

John is a 70 year old user of our health app at home. John was diagnosed with heart disease half an year ago. When John goes to see his doctor, he can talk about his health condition based on his own knowledge of his body condition, and more importantly, based on the health data on his health app. His doctor can quickly notice any change and learn about his health condition, then give Michael suggestions on improvements or adjust his medications, etc.

April is a 70 year old user of our health app at home. April was diagnosed with mild heart failure. She had a heart attack during the holiday season. The health app on her son's phone is a great benefit since it made it easy for him to answer questions at the ER. It's hard for the caregivers to keep track of any change on health data of the patients, but the health card has all the information readily available at their their fingertips. The doctors can quickly learn about April's existing health problems, any severe change on her health data in the past few hours, or history of her medications, which all make a huge impact on emergency treatments.

Michael is a 75 year old user of our health app at home. Michael was diagnosed with heart failure one year ago. He recently moved to another state with his son's family so that they can take better care of him. Michael met with a new doctor. To let the doctor have a detailed understanding of Michael's health condition, he added the doctor as one of the contacts in his health app so he can access all the information. The health card made it easier as well. The doctor went through the health card information, then he had a knowledge about Michael's records of doctor appointments, medications, hospital visits, and health-related tasks all in one place.

5.3 Pushing notifications of symptoms

The health app on the patient's phone pushes notifications of irregular symptoms to the caregivers either by the health app or by calling doctors directly.

John is a 70 year old user of our health app working at a library. John was diagnosed with heart disease half an year ago. He enjoys his work a lot and doesn't check his health data very often. John's daughters has the partner version of the health app on their phones. When the app monitors any symptoms that may indicate a worsening of heart failure, it notifies them immediately. If there's any severe symptom, it calls for an ambulance.

April is a 70 year old user of our health app working at a nursery. April was diagnosed with mild heart failure. She added her family doctor to one of the contacts in her health app. If any irregular change on her health data appears and stays for a week, it automatically alerts her doctor and then also notify herself to make an appointment with her doctor.

Michael is a 75 year old user of our health app and the smart bracelet at home. Michael was diagnosed with heart failure one year ago. Instead of having to do physical examination by himself, Michael has the smart bracelet to automatically keep track of his health data and send them to his health app. The health app then pushes notifications twice a day to remind him of his health data, give relevant suggestions like improve his activities or make an appointment with his doctor.

Reference

https://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_heart_disease.htm