iHeart Rate

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CST-451 Capstone Project Proposal

Grand Canyon University

Instructor: Professor Mark Reha

Version 1

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Abstract

The project consists of two main applications, an Apple Watch app and a website. The combination of these two applications provide a user with a more informational and interactive interface to display the user's heart rate data. From the user's Apple Watch the application will send the heart rate information collected by it and send the data to the website. The website will be able to display the collected information such as the current heart rate and view past heart rate data entries. The website will also offer inputs to select certain period of time to display that on a table and chart for visual aid. Overall this project is to be able to get more use of the information collected on a person smart watch.

History and Signoff Sheet

Change Record

Date	Author	Revision Notes
20 - 27 September 2020	Bryce Schmisseur	Initial draft version 1.0

Overall Instructor Feedback/Comments

Overall Instructor Feedback/Comments

Integrated Instructor Feedback into Project Documentation

☒ Yes ☐ No

Project Approval

☐ Professor Mark Reha

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Project Overview and Project Objectives

State the Problem and Background

With the advancements of technology through every area of life, especially wearables, it is very impressive to see how far the industry has come. Wearable tech gives the user the ability to have at-a-glance information right from the wrist. Though with the small designs, like the Apple Watch has, the features of the applications have to be limited to the form factor of the device. Even though these wearables are very powerful devices they can only do so much with such a small display. That is the problem that this application is trying to fix, taking the information from an Apple Watch and putting it on a display that you can fully interact with the information.

What this application hopes to provide is a user interface to display the heart rate data from an Apple Watch onto a web-based application. Through any Apple Watch the user can see the past and live data on a screen that is less than 2 inches. With the web-based application it will provide the user with an interface of heart rate information they can easily see and interact with. The user will be able to interact with both past and present heart rate data in order to see more clear results and information about each entry.

The idea of this project has come from any instance where a person is trying to do an action on their smart watch but later turns to their phone in order to complete the same action. Though heart rate data is not fixing the Apple Watch in its entirety it does give the user a way to use the power of the watch in more of its entirety.

Project Objectives

The list below provides all the objective that will be meet through the development of this project:

- Give the user the ability to link their Apple Watch to an iHeart Rate account online
- Ability to view live heart rate data on web application
- The user can select a time period of when they want to view past heart rate data entries
- The Apple Watch app gives the user the ability to start and stop recording to the iHeart Rate website
- Create a secure and efficient application

Challenges

The list below states all the challenges that are anticipated throughout the length of this project:

- Linking Apple Watch to user account for the web application
- Unknown technologies
    - React being used for the front end of the application
    - Node JS being used for the backend of the application
    - Using Mongo DB for the database

Benefits and Opportunities

This product is intended for anyone that likes to use the heart rate feature on their Apple Watch or was turned away because of the interface it has. Having a web-based application to view this information can provide many opportunities not just to have another screen to view it on. One of these being as an athlete, if a coach could have access to their athlete's heart rate during a workout. Or if doctors could check their patients current and past heart rate without any equipment besides a tablet or web browser. All these applications involve the same thing, a secondary place that the user can check their heart rate live or from past records.

Project Scope

In the table below are the projects features that will hopefully be implemented. On the right side, in scope, are the features that will be in the final release of the product. Whereas the left side, out of scope, are a list of features that are not critical to the final product but are hopeful implementations.

Scope	
In Scope	Out of Scope
Start/Stop recoding and sending data form the Apple Watch	Deploying application to app store
Implement Sign in with Apple	iPhone Application
Link Apple Watch to a user's account on website	Using Docker to deploy application to the cloud
View live feed from the users Apple Watch on the web-based application	
See past heart rate information on the website	
Select time period of past recorded heart rate entries on web application	
Securing website (passwords, rest service request, inputs)	

The table below shows all the features that will go into the completion of the project. Besides that, this table gives a timeline of when everything is expected to be done. It will also keep track of the hours that are put into each of the features.

Work Breakdown Structure									
ID	Task	Dependencies	Status	Effort Hours	Start Date	Planned Completion	Estimate to Completion	Actual Completion	Resource
1	Documentation	Use case, UML diagrams, system logical model, database design and many others for the initial design on the project.	Not Started	12 hrs	28 Sept	19 Oct	19 Oct	N/A	
2	Test Cases	Outline all the features of the application: inputs, outputs, logging, anything in the applications	Not Started	5 hrs	28 Sept	19 Oct	19 Oct	N/A	
3	Front-end of web application	User interface to interact with the application including inputs, graphs, and views	Not Started	8hrs	30 Dec	28 April	15 Mar	N/A	
4	Backend and database of web application	Creating rest services, database, and middle wear in order to connect the frontend to the database	Not Started	9hrs	30 Dec	28 April	15 Mar	N/A	
5	Redesign of Apple Watch app	Redesigning the front-end and the rest service call from the apple watch application	Not Started	3hrs	30 Dec	28 April	15 Mar	N/A	

6	Implementation of Security	Implement security of all aspects of the applications: front-end, database, rest service	Not Started	5hrs	30 Dec	28 April	15 Mar	N/A	
7	Testing Application	Testing all the features of the application. Also test the security of the application to ensure the safety of the data.	Not Started	10hrs	15 Mar	28 April	28 April	N/A	

Project Success Measures

In the table below to states all the targets point of what should be completed in order for the project to be considered completed:

Project Completion Criteria
1 – Learned React as a front-end technology in order to complete my project with an intuitive user interface
2 – Learned Node JS for my backend to build a function and efficient application
3 – Learned Mongo DB in order to store the applications data securely and efficiently
4 – Provide the user with an intuitive and simplistic user interface to see their hear rate information
5 – Complete Project by the deadline

The table below states the assumptions and constraints of the project. The assumptions are anything that will allow the project to be successful that are already known. The constrains are any issues that are holding the project back from being completed.

Assumptions and Constraints					
ID	Description	Comments	Type	Status	Date Entered
1	Having the ability to connect an Apple Watch to an account on the web application.	It is hard to find another website that does have to same capability. This is a big part of my application and will have to spend a lot of time implement this feature.	Assumption	Good	27 Sept

Project High-Level Solution

Aspirations for iHeart Rate

The goal of the application, iHeart rate, is to provide the user with an interface that will allow them to easily get more information on their heart rate. Though the Apple Watch is a very powerful device on its own its output is limited to the size of the screen. To get more use of this iHeart Rate will bring the information of the Apple watch to a web-based application. By creating this website, the user will be able to interact with their current heart rate and past entries of heart rate information as seen in Figure 1. With the Apple Watch application, the user will be able to turn on and off the data sharing to the website whenever they want as seen in Figure 2.

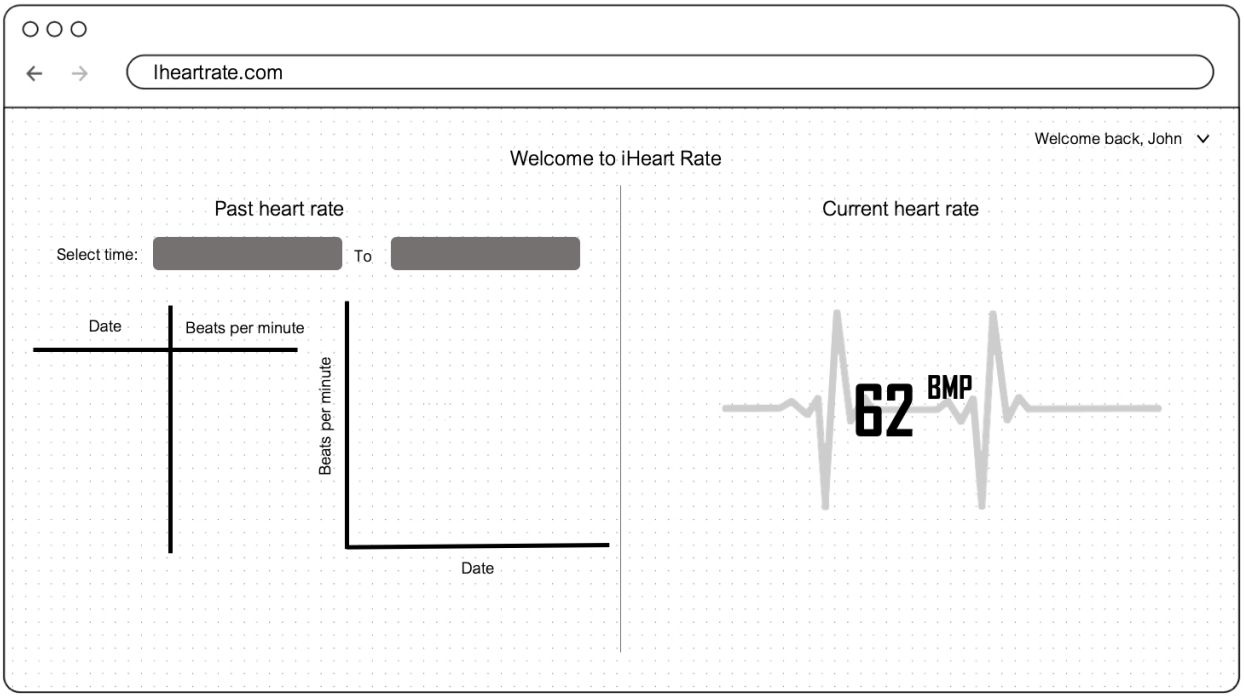

Figure 1. iHeart Rate website design.

Figure 2. iHeart Rate Apple Watch Application design.

Solution

Both the iHeart Rate applications, web-based and Apple Watch, are to provide the user with an easy and intuitive way to check the users heart rate. This application is to give the user an external tool that they could use in any way they want. As started before these applications are more than just another screen it is a tool that could be used in so many different ways such as an athlete and coach. In the web application the tools are laid out in a way to provide the user with a lot of information without overwhelming the user. There are three sources of input for the user: two being the input of time to select past results and the other being an input for the user account management as seen in Figure 1-1. Also, in the web application there is three main views: the live heart rate display, the table to show past heart rate entries and the graph for a visual aid of the table which is also seen in Figure 1-1. The Apple Watch application is very simplistic with only two inputs, start and stop of sharing the data with the web application as seen in Figure 2-1.

Web Application

The first page, *Figure 2-1,* that will be displayed to the user will be the home page where the iHeartRate Applications are described. There will be a little section on why the app was created as well as how the app works with the apple watch. This page will also contain the 'Sign in with Apple' button that will lead them to the user's dashboard.

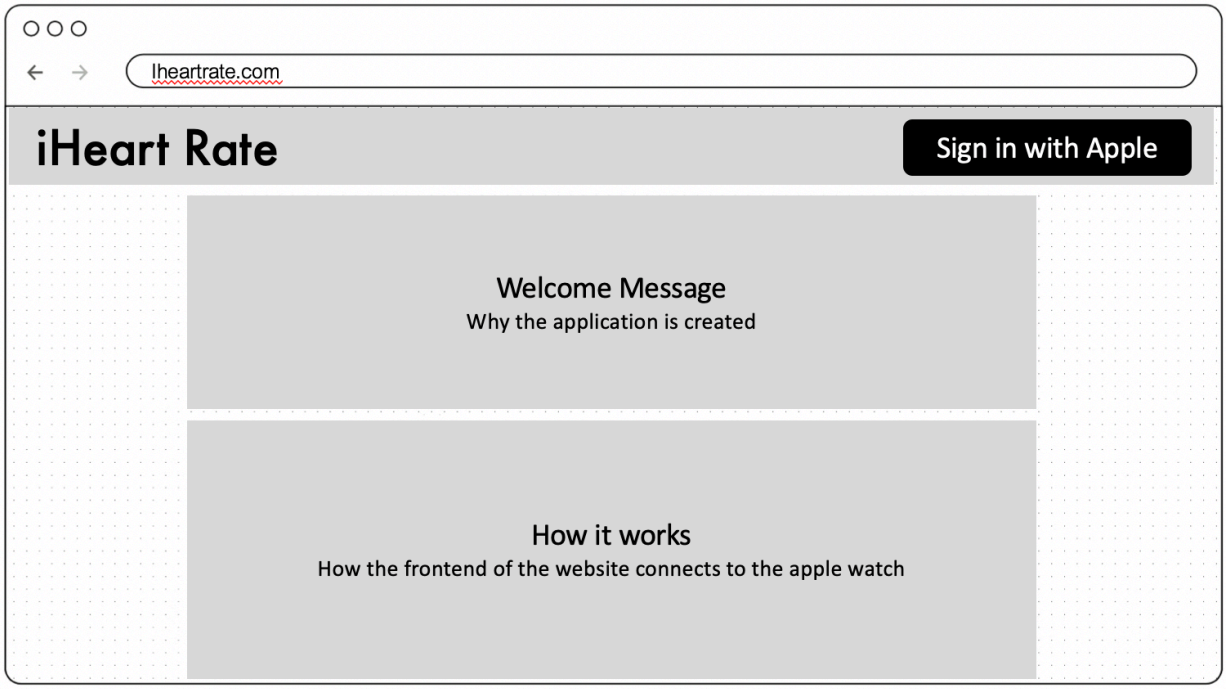

Figure 2-1. Home Page of Web application

The dashboard page shown in *Figure 2-2* that the user can access within the web application is the main page displaying all the users heart rate information. This is where the user will spend most their time as it is the page where the information is actually provided to the user. The page is set up with a side menu that displays a welcome message, their own image, name, and the contents of the page. The right panel of the page will contain a graph, a paginated table, the average heart rate, and the last recorded heartrate. Lastly in the upper left and corner there will be a button in order to select dates. Once pressed it will give a popup to the user that will allow them to enter certain dates and time in order to grab heart rate information with the selected time span.

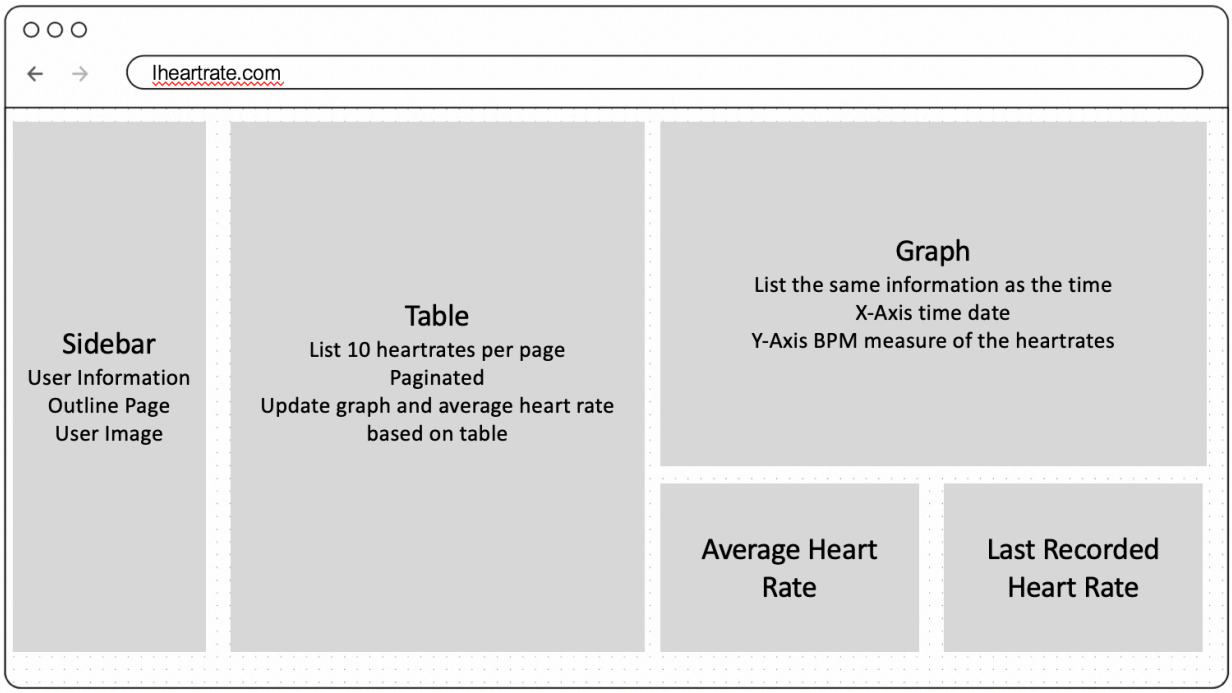

Figure 2-2. Dashboard Pages

Apple Watch Application

Just as the website did the Apple Watch application will only contain to pages, *Figure 2-3*. The first page being a welcome page will display a welcome message and the Sign in Apple Button. The second page will contain a singular button that will change to start if the application is off but stop if the application is recording.

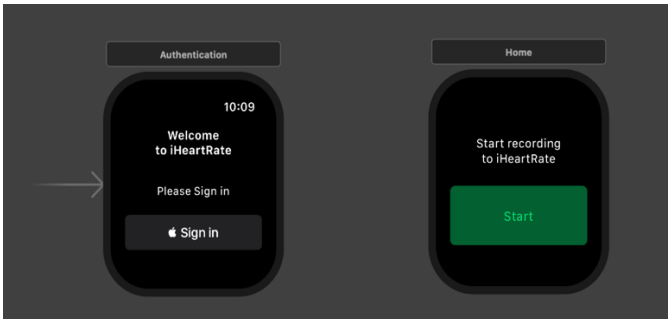

Figure 2-3. Apple Watch Application Wire Frame

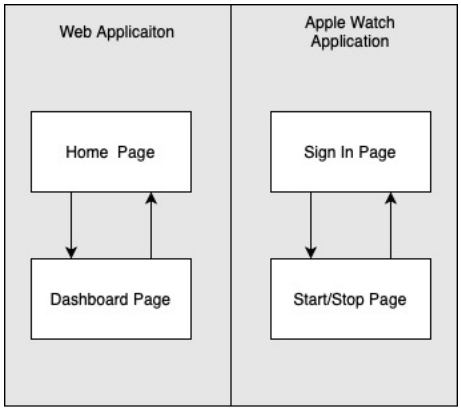

Figure 2-4. Sitemap

Project Controls

In the table below it outlines all the risks that could possibly affect the outcome of the project. Furthermore, it includes mitigation for each of the risk to hopefully not have to risk become a problem but, if all else fails each of them have a contingency plan for backup.

Risk Management				
Event Risk	**Risk Probability (high, medium, low)**	**Risk Impact**	**Risk Mitigation**	**Contingency Plan**
What is the risk?	What is the probability?	What is the impact if the risk occurs?	What can be done to minimize the risk?	What can be done to minimize the impact of the risk?
Building my front end with React	Medium	Not being able to make a user interface for the user to interact with	Spend time and research/learn how to create a project using that technology	If all else fails and I cannot use React due to a lack of knowledge I will be switch my front end to Spring.
Building by back end in Node JS	Medium	If I do not have enough knowledge the functionality off the application with not work at all.	Create simple application using Node JS to get an understanding of the technology	If I cannot get Node JS to work my backend, then I will be converting the project to spring.
Using Mongo DB for my database	Low	Without enough knowledge my application could not be able to store data about user or their heart rate information	Watch instructional videos on how to set up a Mongo database properly	If the setup of the mongo database does is not implemented properly then I will be switching to a SQL database
The size of the project	Low	Given this is the biggest project that I have ever done working through this project could leave me not knowing what to-do	Doing the documentation and initial design of the project properly will help	Prioritize the main features of the assignment and be sure those are completed before trying to implement something that is not critical to the assignment

The table below list all the currently known issues of the project. It also is meant to display the effects the issue has and the plan to resolve the. Also listed are dates of the first known occurrence of the problem and the date that the issue would need to be resolved by.

Issues Log								
ID	**Description**	**Project Impact**	**Action Plan/Resolution**	**Owner**	**Importance**	**Date Entered**	**Date to Review**	**Date Resolved**
1	THERE ARE NO ISSUES AT THIS TIME							

Appendix A – References

As of right now there are no references to be listed.

Appendix B – Copyright Compliance

As of right now there are no tools or applications that have been used to be listed.