

project proposal



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# Introduction

Health and fitness issues are becoming increasingly prominent in societies across the globe. Regardless of age, gender, social status, or otherwise, people have been becoming more conscious of their physical health and wellness. Coupled with the ever-increasing prevalence of smartphone use in developed nations, this provides an abundance of opportunities for new and improved technologies. Our team comprises of users of such technology in the form of smart watches which are equipped with heart rate monitors. Additionally, team members have personally experienced or are familiar with those who experience the desire to improve their health and fitness but struggle to remain motivated in their pursuit. This has prompted our interest in developing an application which can help people remain dedicated to their fitness goals.

# Positioning

## Problem Statement

Young adults between the ages of eighteen (18) and twenty-eight (28) in Trinidad and Tobago are noticeably more concerned about their fitness and physical activity between the start of the new year and Carnival celebrations. While this is a small subset of the country’s population, it bears a strong relevance to the greatest challenge faced by those new to exercise: staying motivated and achieving their fitness goals.

Gymnasium (hereafter referred to as “gym”) memberships tend to spike in the first month to two months of any given year as the identified demographic join to fulfil “new year’s resolutions” or prepare for Carnival. After this time, however, attendance at the gym is noticeably lower. While a portion of people fulfil their short-term fitness goals and therefore choose to stop attending, gym coaches have identified that a major challenge for new members is staying motivated (thus dissuading these individuals from renewing their membership). Furthermore, in most gyms, members must pay separate fees for training tailored to their individual needs. For those whom do not opt for this, another challenge involves knowing what exercises to complete during the week to meet their needs.

We seek to provide a mobile application which will tailor appropriate exercise programming for a given user. This application utilises the user’s profile and preferences to achieve this. The application also monitors their heart rate to feed back how well they are performing the given exercise, seeking to motivate them through a pseudo-“scoring” of their performance.

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## Product Position Statement

There exist a variety of applications which can use a smart watch to monitor one’s heart rate *or* which allows users to select from a pool of generic exercises. However, our team has not found another product which successfully integrates or expands upon both ideas.

While there are many users downloading exercise applications, these do not take their user profile into account to program specific workouts. Rather, the user can choose from a set list of exercises and often may gravitate towards those with which they are most comfortable. This means the user may inadvertently neglect an aspect of exercise necessary for their overall fitness and/or specific goals. There is also the ever-present possibility of the user losing interest in completing the exercises as the generic list offers no feedback nor motivating factor.

# Stakeholder Descriptions

## Stakeholder Summary

Our stakeholders are comprised of the users of the application being developed, the client to whom we are presenting the application, the development team, and fitness industry professionals whom are consulted during the development process.

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### User Stakeholders

The users of the application have been identified as young adults between the ages of eighteen (18) and twenty-eight (28) from Trinidad and Tobago. The application is pertinent to both male and female users. The socioeconomic status of our users is specified to the extent that users require a smartphone and smart watch of some description to utilise the application.

A subset of the users are individuals within this group whom wish to start exercising to get ready for Carnival or to achieve a resolution set at the beginning of the new year. This group of users have been identified as likely to need motivation from the application more than others in order to continue exercising beyond the Carnival season or the latter end of February.

Users will input their personal data to the application. This includes measurements such as their current height, weight, age, and any pre-existing health conditions. It should be noted that the application calculates the appropriate heart rate zones for the user based on this data. Additionally, they will input their goal (for example, increased endurance or 20% body fat) and how many times a week they would like to exercise. The application uses this profile to generate different workouts for each requested day of exercise.

Our application’s demographic comprises of individuals with differing levels of experience with physical activity. In displaying the programmed workout, then, the application accommodates users whom require further descriptions of specific movements through links to such information. This seeks to remain clear and concise and users can provide feedback if they require improvements to the descriptions provided.

While exercising, the user’s heart rate will be captured through their smart watch. Any given exercise has a heart rate range (or “zone”) in which the user should aim to remain. The application will notify the user if they are outside this zone in either direction (if the user’s heart rate is too high, they are unlikely to maintain their pace; if it is too low, they are not performing sufficiently to achieve the most from the exercise). The frequency with which users maintain the optimal heart rate can used to provide a type of scoring, which can motivate the user to continue completing further exercises by adding an element akin to game scoring to their physical fitness regime. This data will be stored in the application for future analysis of user performance and improvement.

### Non-user Stakeholders

#### The Clients

The clients for whom the application is being produced are the lecturer and tutor of the course (COMP3990) and the head of department (Department of Computing and Information Technology at the University of the West Indies, St Augustine campus).

The clients require a functioning application at the end of the twelve-week period of development (i.e. the duration of the school term), inclusive of appropriate documentation regarding the various stages of development. The application needs to demonstrate to the clients that the technologies are appropriately integrated and the user’s requirements fulfilled.

The documentation throughout the project needs to be clear, understandable, and thorough. It should allow the clients to understand the activities undertaken by the development team and the relevant information regarding the application itself.

#### The Development Team

The development team need to produce the application to meet the users’ and clients’ requirements. To do so, they will need to complete the appropriate research into required technologies and fitness-programming information. This research includes user profiling, data capture from a smart watch, and how to set appropriate exercises for a specific subset of people.

Continued communication with the users, clients, and the chosen fitness industry professional/s will allow the development team to succeed in these tasks. The appropriate time management, prioritisation, and task delegation is necessary to accomplish the goals of the development team within the above-stated time.

The development team need to maintain comprehensive documentation throughout the project for several reasons: to maintain the application, to provide said documentation to the clients and users as needed, and to be able to employ other developers in future builds as necessary.

Furthermore, the development team need to be conscientious with regards the costs of the resources used (including the time and labour spent on development).

#### Fitness Industry Professional/s

One or more fitness industry professionals will be consulted in the generation of the pool of exercises which can be generated for the user. As active coaches and/or personal trainers, these stakeholders have an interest in ensuring users of the application receive appropriate and correct information such that they may pursue their fitness goals safely. Appropriate credits will be attributed to these consulted professionals, which may be useful for advertising their services.

#### Testers

A small group of testers may be utilised to test the functionality of the real-time heart rate capture. These testers are users of smart watches and smart phones, much like the identified users. The testers may also provide feedback on the application functionality and/or display.

## User Environment

The software is being provided as a mobile application as the users will need to access the prescribed workouts and movement descriptions while at the gym. The initial development of the application will be specific to Android smart phones, though cross-platform development would be ideal.

The presentation of information (both the prescribed exercises and the feedback on performance) needs to be clear, concise, and easy to interpret from a small mobile device’s screen in a public environment. Concurrently, the user’s profile needs to be secure despite the use of the application in said public environment.

To address the requirements for information access, the display will be of an appropriate font family and size to allow users to read the text on the screen without difficulty. The user input will utilise radio buttons and dropdown menus which are adequately sized and spaced for selections to be made with minimal chances of error. Where text inputs are required, the user’s device’s native keyboard will be used to avoid the possibility of developers selecting a keyboard which is not agreeable to all users.

Images or videos may be used for exercise explanations, depending on feedback from the testers, as mentioned above.

The user’s password will be required before allowing access to any part of the application regarding the user’s profile. This protects the user’s privacy from any undesired viewing or altering of their information and/or preferences. Settings regarding the display of information do not require this level of security but may be included in the same menus to reduce potential for confusion or menu clutter.

# Product Overview

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## Product Perspective

There will be a finite selection of exercises available to this version of the application. The selection of which exercise is provided to the user will be determined by the user’s profile (including the number of times they wish to exercise per week). The exercises will be stored in a tree (or similar) structure which the application will access to format the day’s workout.

The application utilises the appropriate API(s) to capture data from a smart watch. The development team will establish which brands/makes of smart watches will be best suited to the application, based on the smart watch and API accessibility during the research and development stages. Regardless of the smart watch and API used, the connection via which the data is captured will be a Bluetooth connection to the smart phone.

## Needs and Features

The development team needs access to a usable smart watch and the appropriate API with which to capture the watch’s data. The application needs to be able to establish a Bluetooth connection to the mobile device.

The application needs to perform accurate user profiling from the information provided by the user to output the correct exercises for the user’s capabilities and goals. This information needs to be stored in an appropriate manner within the application (on the user’s mobile device) as well as records of the user’s performance in various workouts (as outlined above).

## Alternatives and Competition

The desired functionality is real-time heart rate data capture which can be displayed on the application, prompting feedback if the user’s heart rate is outside the prescribed zone. If this cannot be achieved within the time constraints, access to the smart watch’s log of the user’s heart rate can be used to inform the feedback to the user.

Applications from companies such a Garmin and FitBit provide summaries of the user’s heart rate and performance after a workout, much like the alternative stated above. The development team needs to achieve the primary functionality goal to be more attractive to users than these applications.

A key consideration for the development team is that these alternatives are provided by the smart watch manufacturers and are often free to use and free of advertisements. The development team would not be able to utilise this same model as it would result in operating at a financial loss.

# Other Product Requirements

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## Browser Compatibility

The product being developed is a mobile application rather than a browser-based Web application. This means it does not necessitate specific browser compatibility, so much as it requires functionality on one or more specific mobile operating systems.

## Usability

Small “pop ups” of information may guide new users in their first setup and use of the application. The user should be able to navigate to their profile and enter their information with ease. Along with “pop up” instructions, the layout and size of font and selection items should enable this ease of use. The utilisation of the native device keyboard should allow text inputs to be uncomplicated for the user.

## Responsiveness

A high degree of responsiveness is required of the application. Before the user begins their workout, they should not be subject to a lengthy wait for the generation of their day’s (or week’s) exercises. During the workout, the application needs to be able to capture data from the smart watch and display the appropriate feedback about the user’s heart rate zone in real time.

## Visual Design

The visual design should be sufficiently neutral to appeal to users regardless of gender or social backgrounds while remaining interesting to look at and use. Complementary colour palettes will be chosen which also allow users to read the information displayed without difficulty. The display of the heart rate zone during the workout needs to be large enough for the user to read from a short distance (likely less than 5 metres) while they are exercising.

## Long Term Scalability

The limitations set on the current scope of the application are as follows:

* Men and women in Trinidad and Tobago in the age group eighteen (18) to twenty-eight (28)
* A finite set of exercises will be used to generate the workouts for the user
* Android smartphones are the initial development target for the application
* Garmin or Android smart watches are used in development due to ease of access by the developers

In the long term, the target demographic would be expanded to first include a wider age group within Trinidad and Tobago and then users in other countries. The set of exercises from which the application can generate a user’s workout would be more varied; and the generation itself can be more randomised than following the branches of a set tree.

Cross-platform development would be included in long-term scalability if the current timeline does not permit it.

The integration of other smart watches could be added as the developers gain access to a method of testing their use with the application.