National University of Ireland, Galway

BSc. Computer Science and IT

Final Year Project

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21 March 2020

Declaration

I hereby certify that the material, which I now submit for assessment on the programmes of study leading to the award of Master of Science, is entirely my own work and has not been taken from the work of others except to the extent that such work has been cited and acknowledged within the text of my own work. No portion of the work contained in this thesis has been submitted in support of an application for another degree or qualification to this or any other institution.

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Student Name
21 March 2020

Acknowledgements

Personal acknowledgements and/or dedications may be included by the candidate directly after the declaration page. Where possible these should be kept to one page and be of a tone appropriate to a higher degree.

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Abstract

Present thesis abstract here, typically there are no references, figures or tables in the abstract.

1 Introduction

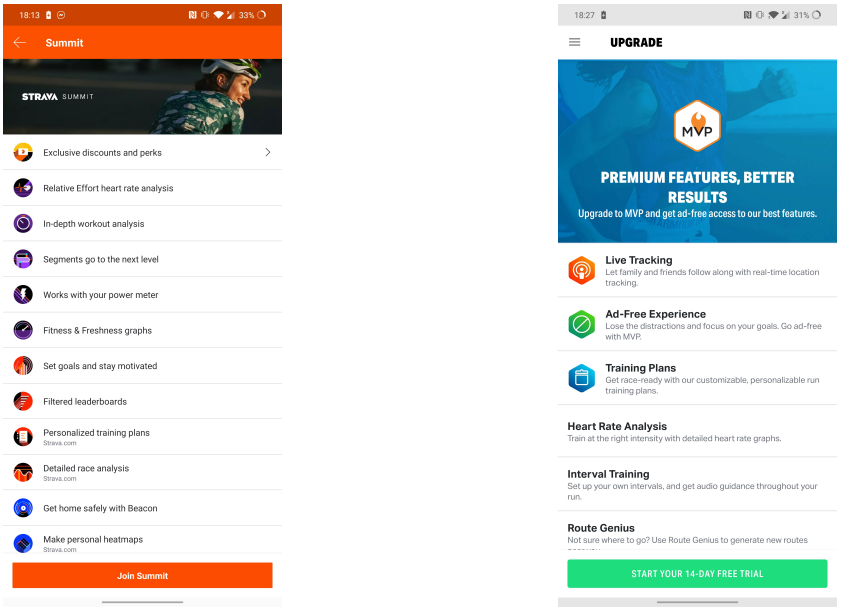
1.1 Background

My final year project was based on the premise of creating a 'Healthy App,' the aim of my project was to create an application that encouraged people to improve their overall fitness through going for runs. I wanted to provide a platform that people of all experiences could find beneficial, through the use of charts and graphs where users can accurately monitor progress while also providing sample exercises for newcomers to the running game.

My personal interest in the area is enhanced by the interest my mother has in the sport. She has recently completed her 100th ParkRun event and has run in multiple half marathons. When I saw her enter her times into a tattered copy with half torn out pages in, that's when the I began investigating the current market of running applications an companion applications.

After investigating the most popular applications like Strava, Runkeeper and Under Armour Run with Map my Run, each of which have over ten million downloads, I found that most of the best features were hidden. Although the application itself was free to download from the App Stores, once you launched the application, most of the features were kept behind a paywall for "Premium" users. Strava keeps "Fitness graphs" and "Set goals" features only available to Strava Summit™users. You have to "Upgrade to MVP" for an ad-free experience and custom features on the Under Armour Map Run application, as you can see in Figure 1.

Applications polluted with ads and unprofessional, poorly designed interfaces dominated the next tier down in popularity. Having studied these applications and seeing on a personal level the lackadaisical approach of people, I decided that for my final year project I wanted to create a mobile running companion application with an intuitive design and provided features that could compete with the most popular fitness trackers.



(a) Strava (b) UnderArmour Map with Map my Run

Figure 1: Screenshots from popular mobile Fitness applications

1.2 Stakeholders

According to Concepta Inc, the term "stakeholder' refers to the people or groups affected by a software development project [2]. Anybody that is impacted or could possibly be impacted by the project. I've divided my stakeholders into three sub-sections.

1.2.1 Users

The first stakeholder group and definitely the most important will be the users themselves. Without users there is no point working long hours to create, develop and improve the application.

Users will be very important to the initial stages of the application's development because we will be able to get genuine and honest feedback on what the users liked and disliked when using the app, what features they found themselves using, what features they neglected. That type of information is imperative to the future of any mobile app. It allows the developers to focus in on a few 'core' features that

the users really enjoy while also improving features that may have not been liked as much.
Going into more detail on the type of users, I will be targeting people with interest in running and improving their overall fitness. The level of interest though will not be targeted, I am going to provide an app with global features that work equally as well for beginners as it does for the most advanced runners.

1.2.2 Developers

Developers are the next stakeholder group that I thought would be the most influential. The developers are in charge of monitoring, maintaining and developing the app. Initially they would have to be in direct communication with the users to get their opinions and plan the next stages of development.
Another role for the developers in the early stages of production would be promotion of the product. The developers will need to attract funding from businesses in order to improve the app.
Developers are major stakeholders in the app because without them, there is no growth or future.

1.2.3 Potential Third Party Companies

As mentioned in the developers section, the app and developers will need funding in order to grow. But in order for the companies to provide funding, they will need to see a potential benefit from endorsing the app.

Fitness Watch Companies

As you've seen with companies that sell fitness watches like FitBit, Garmin and Samsung, they each have their own high-powered fitness app. It would be unrealistic to try and target those high-end companies for a funding partnership but there are many smaller, cheaper fitness watches and bands on the market. The only interface many of the cheaper options come with is on the band itself, there was no accompanying mobile app. That is where a potential collaboration could come in to play.

Parkrun

Parkrun is a collection of 5 kilometre running events that take place every Sat-

urday morning at over 1400 locations in twenty-two countries across five continents [4]. According to their own website, there are ninety-six locations in Ireland and almost two hundred thousand people have ran in a Parkrun event in Ireland. After some research, I found that the only mobile application that Parkrun has on the market is one for volunteers to help track the times of the runners.
There is a huge potential market there to potentially branch in to. Providing all the functionality that the app will already have, while also providing news and unique parkrun related features.

Clubs

My final, potential company or group that could get benefit out of using the app would be social clubs, running clubs, any gathering of people. Developers could create customised apps for specific clubs and groups with unique and personalised features.

1.3 Document Outline

In the rest of the report, I will discuss the journey that I went on while undertaking this project. With emphasis on stages such as research, design, implementation, testing and future work.

2 Requirements

2.1 Functional and Non-Functional Requirements

At the beginning of my project, I had envisioned creating an app similar to all the other ones on the market, with a live map tracker and pedometer implemented in the application. But as I researched more and more about the market I was developing for I found out that that kind of an application would be redundant. The majority of people I talked to find it uncomfortable to run with their phone in their hand or pocket, and most of their phones already have a pedometer built in to them. So I decided to focus my time and therefore my features more on the pre-run and post-run aspect of running as opposed to tracking data during the actual activity.

2.1.1 Functional Requirements

Functional requirements describe how the app behaves, what the features and functionality of the app is going to be. I asked people close to me and also on public forums what they would like to see in their ideal running application. I made functional requirements out of the results:

- A feature that allows the user to enter results from runs and displays my most recent ones
- A calendar like feature where the user can plan out their week ahead
- A chart feature where I can monitor my progress and times using professional charts
- A feature where I can set monthly and yearly goals for how far I run
- A feature that gives me expert advice about what I should be doing before and after runs
- A feature that provides information about local runs and events
- A weather feature that tells me the local weather forecast

2.1.2 Non-Functional Requirements

In my Project Definition Document, I talked about the following non-functional requirements.

Performance
For my application to compete with the other applications on the market, I will need to ensure a fast response time. As my application will be relatively unknown, if the user finds any sort of problem, they are likely to uninstall. So fast response times and minimal lagging is imperative.

Security
The importance of the security and protection of data in mobile applications and all web applications has never been more important as it is in today's world. Keeping the user's data and information safe and protected from cyber attacks is a vital requirement in every mobile app development process.

Scalability
Developing the app to be scalable is very important. Whether there is ten users or ten thousand users, the function and features of the app must maintain.

Portability
As this will be a native application, portability is an important non-functional requirement. Being able to run the application on both Android and iOs devices is a huge advantage but requires a lot more maintenance and testing than compared to an Android only or iOs only device. The app will be tested on a wide range of devices with different device capabilities to ensure that the app works properly in all situations.

I did not mention **Usability** in my Project Definition Document but in mobile app development, Usability is imperative. According to the company altexsoft, usability consists of: [1]

- **Learnability:** How fast is it for users to complete the main actions once they see the interface?
- **Efficiency:** How quickly users can reach their goals?

- **Satisfaction:** Is the design pleasant to use?

Making the app intuitive with a consistent and clean design that is easy to use is as important as having extravagant features.

2.2 Use Cases

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2.3 Data

The majority of data added into the app will be user entered.

- Username
- Running statistics: Distance and Time
- Calendar Events
- To-Do items

There will also be data that is not user entered, like the following:

- Warm-up, Cooldown and Training exercises
- Information about the Parkruns in Ireland
- Weather
- Motivational Quotes
- Information "About" the app and it's features in the Settings page

2.4 Constraints

Users have to enter all their own data. So that means they have to access accurate data from another app or device or something.

3 Design

3.1 Development Method

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3.2 Architecture

I am a sub subsection

3.3 Data

3.4 Interaction/Prototypes

3.5 Design

4 Implementation

4.1 Architecture

I am a subsection

4.2 Technologies

I am a sub subsection

5 Testing and Evaluation

5.1 User Testing

Moderated in-person: Have family pick up the app, try and complete some certain tasks.

5.2 Snapshot Testing

6 Project Management

6.1 Code Management

I used GitHub as the tool for code management. From experience obtained during my time on placement and also with assignments in this course, I have become very comfortable using GitHub. I made a private repository and consistently pushed to the repository whenever a significant change in the code was made. The repository will be made public on the submission of this report.

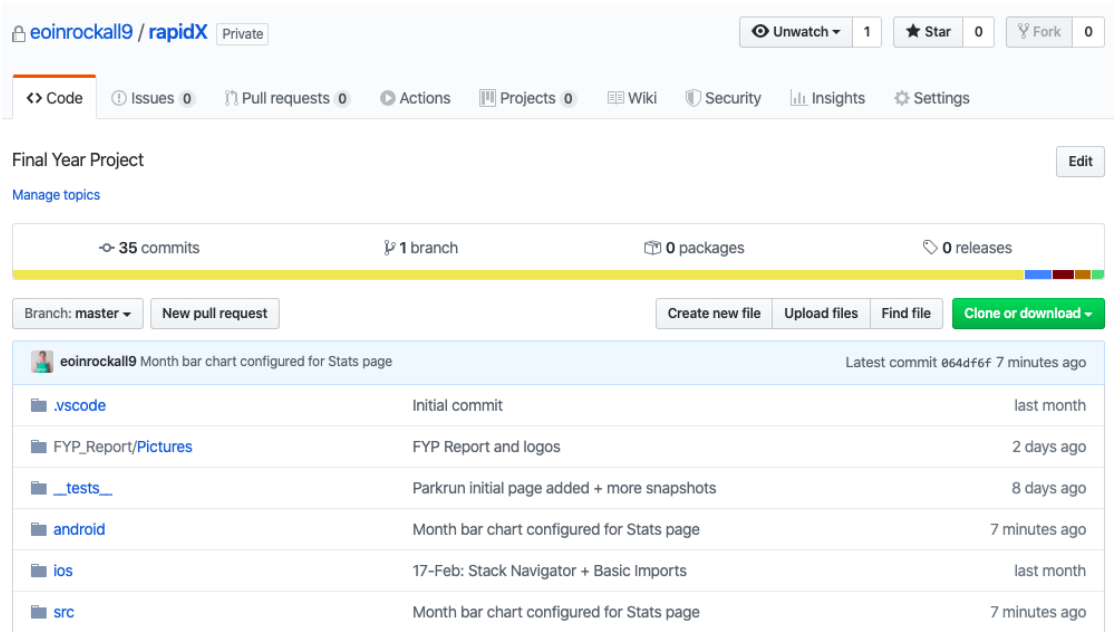
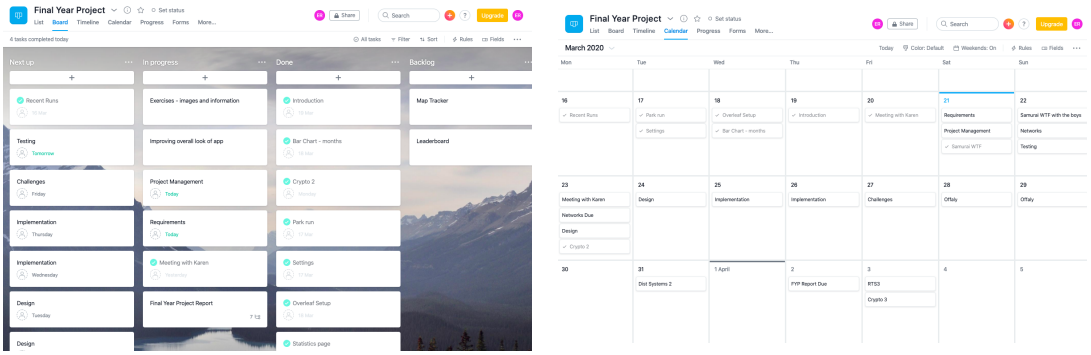


Figure 2: Screenshot of GitHub repository

6.2 Schedule

I used the free version of the tool Asana for my management of tasks and backlog. Asana is a web and mobile application designed to help teams organize, track, and manage their work [3]. Their free version contains a synchronised list, calendar and board which I found very useful. During my placement in third year, I worked for BrightWork who are a company that provides project management tools so I

was very accustomed to working with the Boards and Calendar features found in Asana.



(a) Asana Board

(b) Asana Calendar

Figure 3: Screenshots of my Asana utilisation

6.3 Documentation

At the beginning of the project, I had said I was going to continually edit a Google Doc that I had shared with my supervisor. I had trouble initially in keeping the document up to date and updating it consistently. Instead, I used a regular A4 copy to document my journey in undertaking this project. In the copy, I took notes on my thought process when it came to design or implementation decisions, planned out the design of the different screens and logged any packages I had to add to the project.

6.4 Communications

I kept in contact with my supervisor throughout the process through emails and bi-weekly meetings. In the bi-weekly meetings, I updated my supervisor on what I had done in the two weeks prior and also talked about the future of the project and the deadlines. I also talked on reddit pages and other forums where I asked people of their opinions when it came to the fitness apps and other running related questions.

7 Challenges and Future Work

7.1 Subsection Example

I am a subsection

7.2 Sub Subsection Example

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8 Conclusion

References

[1] Altexsoft. *Non-functional Requirements: Examples, Types, How to Approach.* URL: https://www.altexsoft.com/blog/non-functional-requirements/#usability.

[2] Concepta. *How to Define Stakeholders for Your Software Development Project.* 2020. URL: https://www.conceptainc.com/blog/how-to-define-stakeholders-for-your-software-development-project.

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[4] Wikipedia. *Parkrun.* URL: https://en.wikipedia.org/wiki/Parkrun.