# Initial Plan: Can Music Make You Run Faster?



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## **PROJECT DESCRIPTION**

Smartphone users are increasingly finding the need to utilise mobile applications to streamline their lives; whether it be using a planner application to help organise their workflow, a social media application to keep in touch with their friends, or a stock market application to help manage their investments. Following this, runners are now using a multitude of services to track their activities and progress to help achieve their fitness goals, such as Strava, Fitbit and Runkeeper. Whilst exercising, runners may also listen to music from services such as Spotify and Last.FM, to help control their breathing and pace. The aim of this project is to answer the question spanning between these two uses of mobile applications: can music make you run faster?

This project will answer this question through the creation of an Android mobile phone application, that will enable comparison between a user's running history and their listening history. As a result, each user should be able to understand what music made them run faster, what metrics (pace, heart rate etc.) were affected by each song, as well as be able to modify the time period that the comparisons are enabled from.

Some similar solutions already exist, such as RockMyRun. This app offers music "personalized based on your steps per minute, heart rate or ideal cadence" (RockMyRun,2020). In 2018, Spotify offered a similar solution that used the phone's internal accelerometer to match music played to the pace of the runner - but it has since been retired. This was then used in combination with Runkeeper, which allowed the user to match their activities with the music they were listening to (Runkeeper,2021). It does not appear that any insights into what music made the user run faster were made however. Other apps such as Runtastic, Fit radio, and hit your run offer simple music-to-pace functionality, but no insights into what music can make you run faster (Price, 2019).

## ETHICAL CONSIDERATIONS

As this project is aimed primarily around the manipulation of existing user data (namely users running activities, containing personal health information), research and user testing will require ethical approval. Both the supervisor (Dr. Martin Chorley) and myself have already completed the Research Integrity Online Training Program in the required areas, and as such the next step is to submit the Ethical Approval Form. It is vital that ethical approval is given as soon as possible, as this will enable multiple rounds of user testing to ensure the solution meets the user's needs.

## **PROJECT AIMS AND OBJECTIVES**

## **Primary Aims**

These aims constitute what the minimum requirements for the project are.

- 1. To create a mobile application for Android, integrating at least 1 running application and 1 music application.
- 2. To create the necessary logic required to enable a comparison between the user's running activities and their running history, comparing metrics such as pace and average cadence to the music they were listening to.
- 3. To create a user-centred, clean user interface that is fit for purpose and encourages ease of use.

## **Secondary Aims**

These aims constitute what the project would be "nice to have".

- 1. To create a secure login system, complimented with back-end database to store user information.
- 2. To extend the availability of the mobile app by offering support for iOS.
- 3. To extend the logic comparing music and running activity data, enabling the user to view various impacts of music on their activity.
- 4. To extend functionality to suggest other songs that may be used to increase a user's running average running pace.

## **Objectives**

- 1. Investigate the extent of data available from music and running sources' respective APIs.
- 2. Create a mobile application using the Xamarin framework, that will enable the creation of both iOS and Android mobile applications.
- 3. Employ Test Driven Development and Behaviour Driven Development to ensure the creation of a well tested, robust mobile application.
- 4. Create an intuitive and functional user interface.
  - Log in screens to enable connectivity between the Xanarim application and the user's running or music application.
  - Activity screens that enable the user to view their running history over a period, view what music they were listening to and the effect that it had on their activity and metrics.
  - 'Insights' screens that enable the user to view what music made them run faster.

## WORK PLAN

## Approach

To tackle this project, I will be adopting a SCRUM approach, adopting aspects of agile with 1 week sprints. As such, there will be individual reviews of progress at the end of each week, with each week's workload adjusted accordingly to the progress made. Each task will involve its own analysis - design - implementation - test process, meeting the requirements for an agile methodology.

To develop this project, The Xamarin C# framework will be adopted; enabling the development of both iOS and Android applications. Services such as Spotify and Strava will be access through their respective API calls. To ensure a robust solution, the minimal viable product (MVP) can be defined as the production of an Android application, that has a link to at least 1 music service and 1 running service, as well as having the ability to measure what recently played tracks made the user run faster.

Secondary aims will then be incrementally added onto the MVP, as this is both in line with my skill set, and ensures the creation of a robust, well tested, modular system. As a result, other data sources can be added, and other "insights" can be determined easily as these should only expand the systems functionality slightly. Other secondary aims such as the iOS app may prove to be harder, as iOS development requires the use of an iOS compiler, which I do not have access to, and as such will only be attempted if seen feasible.

To achieve the well tested UI aim, User Acceptance Tests will be employed as soon as possible (depending on ethical approval), and will ensure that the phone app will be developed to meet the end user's needs.

## Milestones

- 1. Minimum Viable Product (MVP) produced.
- 2. Full date range functionality has been added.
- 3. Secondary data sources added.
- 4. Add iOS functionality.
- 5. Add suggested music functionality.

## Deliverables

- 1. Initial plan.
- 2. Final report.
  - Android Application.

## Time plan

See Appendix A for a Gantt representation of the time plan. This has also been uploaded as a supporting material. Below is a detailed, week by week breakdown of tasks, milestones and supervisor actions.

There are two review meetings scheduled, one in week 8 and week 9.

### Week 01 (01/02/2021 - 07/02/2021)

#### **Tasks and Goals**

- Set up development environment to support Xamarin mobile app development, as well as the GitHub repo, TDD and BDD.
- Begin preliminary background research into one music API; Get listening history and log in.
- Begin preliminary background research into one running API; Get activities by date and log in.
- Begin preliminary background research into Xamarin capabilities, identifying caveats and areas for further research.
- Draft the initial plan.
- Complete student ethics training.

#### **Actions With Supervisor**

- Fortnightly group meeting (1)
- Individual meeting (1)

### Week 02 (08/02/2021 - 14/02/2021)

#### **Deliverables / Milestone**

• Deliverable : Initial Plan by 08/02/2021

#### **Tasks and Goals**

- Submit the initial plan.
- Begin research into OAuth token acquisition.
- Create basic Visual Studio solution, and begin to develop API call to music application & basic log in functionality.
- Begin writing Ethical Approval form.
- Begin to conceptualise UI designs.
- Individual review of progress.

#### **Actions With Supervisor**

• Individual meeting (2)

## Week 03 (15/02/2021 - 21/02/2021)

#### **Tasks and Goals**

- Create functionality to call running application API & basic log in with functionality.
- Begin to implement logic to compare listening history with running history on a singular date.
- Individual review of progress
- Submit Ethical Approval form.

#### **Actions With Supervisor**

• Fortnightly group meeting (2)

## Week 04 (22/02/2021 - 28/02/2021)

#### **Tasks and Goals**

- Finish implementing logic to compare listening history with running history on a singular date.
- Begin simple front end development; a button that uses fixed log in credentials and a pre-set date to create a comparison.
- Begin to "flesh out" music and running application login functionality.

#### **Actions With Supervisor**

• Individual meeting (3)

## Week 05 (01/03/2021 - 07/03/2021)

#### **Deliverables / Milestone**

• Milestone: Minimum viable product achieved.

#### **Tasks and Goals**

- Finish "fleshing out" of the log in systems.
- Complete any other necessary tasks to ensure minimum viable product has been delivered.
- User Acceptance Tests conducted, providing ethical application is approved.
- Individual review of progress.

#### **Actions With Supervisor**

• Fortnightly group meeting (3)

## Week 06 (08/03/2021 - 14/03/2021)

#### **Deliverables / Milestone**

• Milestone: Full date range functionality has been added.

#### **Tasks and Goals**

- Add functionality to compare music and running data over a long time period.
- "Flesh out" metrics and conclusions gathered from comparing music and running data.
- Improve on UI, focused on insights the users can gather and the feedback from UAT.
- Research feasibility of incorporating secondary data sources.
- Individual review of progress.

#### **Actions With Supervisor**

• Individual meeting (4)

## Week 07 (15/03/2021 - 21/03/2021)

#### **Deliverables / Milestone**

• Milestone: Secondary data sources added.

#### **Tasks and Goals**

- Add functionality to support a secondary music source.
- Add functionality to support a secondary running source.
- Individual review of progress.

#### **Actions With Supervisor**

• Fortnightly group meeting (4)

## Week 08 (22/03/2021 - 28/03/2021)

#### **Tasks and Goals**

- Finish off any technical debt prior to prototype presentation.
- Begin adding iOS functionality.
- Showcase functioning prototype to supervisor. Constructive feedback will be taken and improvements / changes to be made will be logged and acted upon.
- User Acceptance Tests conducted, providing ethical application is approved.
- Begin writing the Final Report.
- Individual review of progress.

#### **Actions With Supervisor**

• Individual meeting (5) - **Review meeting** 

### Easter Recess (27/03/2021 - 18/04/2021)

#### **Tasks and Goals**

- Work on optimizations and improvements, including those from UAT and any technical debt remaining.
- Continue writing the Final Report.

#### **Actions With Supervisor**

• No actions with supervisor.

## Week 09 (19/04/2021 - 25/04/2021)

#### **Deliverables / Milestone**

- Add suggested music functionality.
- Add iOS functionality.

#### **Tasks and Goals**

- Develop suggested music capability.
- Continue writing the Final Report.
- Work on any adjustments suggested by previous UAT or supervisor in review meeting.
- Conduct final round of UAT, collecting and compiling conclusions from results.
- Begin to evaluate on the strengths and weaknesses of the solution.
- Individual review of progress.

#### **Actions With Supervisor**

• Individual meeting (6) - **Review meeting** 

## Week 10 (26/04/2021 - 02/05/2021)

#### **Tasks and Goals**

• Continue to work on the final report.

#### **Actions With Supervisor**

• Fortnightly group meeting (6)

### Week 11 (03/05/2021 - 09/05/2021)

#### **Tasks and Goals**

• Continue to work on the final report.

#### **Actions With Supervisor**

• Individual meeting (7)

### Week 12 (10/05/2021 - 16/05/2021)

#### **Deliverables / Milestone**

• Deliverable: Final Report by 14/05/2021 23:00.

#### **Tasks and Goals**

- Final adjustments to the Final Report.
- Submit the Final Report.

#### **Actions With Supervisor**

• Fortnightly group meeting (7)

## Week 13 (17/05/2021 - 23/05/2021)

#### **Deliverables / Milestone**

• Deliverable: Project Viva.

#### **Tasks and Goals**

• Conduct the viva for the project.

#### **Actions With Supervisor**

• Project Viva.

### REFERENCES

- RockMyRun. 2020. RockMyRun FAQ. Available at: https://www.rockmyrun.com/faq/ [Accessed: 08 February 2021]
- Runkeeper. 2021. Introducing Runkeeper + Spotify Running!. Available at: https://runkeeper.com/cms/rkrunner-guide/use-the-app/introducingrunkeeper-spotify-running/ [Accessed: 08 February 2021]
- 3. Price, D. 2019. The 7 Best Running and Workout Music Apps. Available at: https://www.muo.com/tag/best-running-music-apps/ [Accessed: 08 February 2021]

## Appendix A

