Department of Computer Science & Engineering
The University of Texas at Arlington

Project Charter
CSE 4316: Senior Design I
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Swift Start
Sprint O' Clock

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Revision History

Revision	Date	Author(s)	Description
0.1	03.03.2024	GS	document creation

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1 Problem Statement

Running apps are immensely popular in the app store; however, the majority are designed for health-conscious individuals and are not well-suited for sprinters. For instance, many running apps only offer countdown timers, which suffice for casual runners but fail to simulate the competitive setting required by sprinters. Sprinters necessitate features such as a "ready set" option and the simulation of unpredictable gunfire to initiate races. This distinct requirement for a randomized start timer tailored to sprinters forms the foundation of this app, which will also incorporate additional features to address sprinters' competitive needs.

2 Methodology

The app will incorporate the randomized start time feature, replacing the traditional countdown timer, thereby challenging sprinters' reaction times. This functionality will add an element of unpredictability to simulate real race scenarios and enhance the competitiveness of training sessions. Furthermore, the app will accurately calculate the distance covered by the sprinter along with the precise time elapsed, displaying this information in minutes and seconds for easy tracking of performance. Additionally, the app will feature a calendar interface to record the history of runs, including their respective finish times, allowing sprinters to track their progress over time and identify patterns in their training regimen. These enhancements will provide sprinters with comprehensive tools for improving their performance and achieving their competitive goals.

3 Value Proposition

According to a 2017 report, the global running community boasts a staggering 621.16 million participants, encompassing a diverse range of enthusiasts from casual joggers to dedicated sprinters. This app, meticulously tailored towards the sprinting community, fills a distinctive niche with its unparalleled features. Yet, its appeal extends far beyond the competitive realm, catering to casual aerobic runners as well by incorporating a versatile countdown timer. Thus, the app meets the diverse needs of both competitive anaerobic sprinters and leisurely aerobic runners alike. Investing in this revolutionary app signifies more than just financial support; it signifies an endorsement of technology that advocates for cardiovascular health.

4 Development Milestones

- Project Charter first draft - March 3rd 2024
- System Requirements Specification - March 2024
- Architectural Design Specification - April 2024
- Demonstration of User Interface Design - April 2024
- Detailed Design Specification - April 2024
- Demonstration of Randomized Start Timer - May 2024
- Demonstration of GPS Distance Tracking- May 2024
- CoE Innovation Day poster presentation - May 2024
- Demonstration of Calendar Interface with history of runs - June 2024
- Demonstration of Data Analysis Interface - June 2024

- Demonstration of Competition/Leader-board feature - July 2024
- Final Project Demonstration - July 2024

5 Background

The problem is that most running apps on the market today do not focus on anaerobic running, which limits the scope and effectiveness for certain types of training. Anaerobic running, which involves short bursts of intense activity where the body's demand for oxygen exceeds the available supply, is crucial for improving speed, power, and overall fitness. Apps that neglect anaerobic training may not provide adequate support or guidance for individuals looking to improve their performance in activities such as sprinting, interval training, or sports that require quick, explosive movements. Without proper emphasis on anaerobic training, users may miss out on key benefits and risk plateauing in their fitness progress. To address this issue, the Sprint O' Clock app will offer a balanced approach that includes both aerobic and anaerobic training components. This could involve incorporating specific workouts, training plans, or guidance tailored to anaerobic running to help users achieve a well-rounded fitness regimen and reach their performance goals.

6 Related Work

Running apps and wearable devices have seen significant advancements in recent years, offering a range of features to track and improve running performance. These solutions vary in their focus, from basic tracking of distance and pace to more advanced features that analyze running dynamics, provide personalized training plans, and offer real-time coaching. Commercially available running apps such as Nike Run Club, Strava, and Garmin Connect offer a comprehensive suite of features for runners of all levels. These apps use GPS technology to track distance, pace, and route, while also providing insights into running form and performance metrics. Some apps even offer social features, allowing users to connect with other runners and participate in challenges. Wearable devices like smartwatches and fitness trackers have also become increasingly popular among runners. These devices can track various metrics such as heart rate, cadence, and even oxygen saturation, providing a more holistic view of one's running performance. Advanced models like the Garmin Forerunner series or the Apple Watch offer features like GPS, advanced running dynamics, and even integration with other sports and activities. In terms of academic research, there have been numerous studies focusing on the use of wearable technology for running performance analysis and improvement. Research has explored the use of sensors to monitor running biomechanics [1], the impact of wearable feedback on running performance [2], and the development of personalized training programs based on individual running data [3]. While existing solutions offer a wide range of features and capabilities, they may not always meet the specific needs or preferences of every runner. Some runners may find these solutions too expensive, especially high-end wearable devices with advanced features. Others may prefer a more simple and intuitive interface, which some apps may lack. Additionally, issues like data privacy and accuracy of measurements can be concerns for some users. In summary, the state-of-the-art in running apps and wearable technology offers a wealth of features and capabilities for runners to track and improve their performance. However, there is still room for innovation and improvement to better meet the diverse needs of runners worldwide.

7 System Overview

The Sprint O' Clock will implement a randomized timer system to provide ultimate flexibility to runners performance. The user interface will allow runners to interact with a customizable timer system. It will display the timer, with the options of it being randomized or timed, giving runners the flexibility of getting started while also providing unpredictability. When the start button is pressed, the phone will vibrate and will provide an audio of "Ready...Set...Go!". When the voice says "Go!", the gun sound will hit and the app will simultaneously use GPS location to track the distance of your run. When you hit the stop button or run your manually set meters, the distance and time will finish being tracked and

the run statistics will be inputted into a calendar interface that shows the runners' recorded history of their runs. Another option is that the app will integrate with external systems such as smartwatches to provide additional data and feedback to the runners. This is an optional option in case the runner wants their distance tracked without holding their phone. The data from the smartwatch will be sent to the app, and the data will be inputted applicably

8 Roles & Responsibilities

The project involves a number of stakeholders, such as Cesar Frayre, Gin Sang, Shaheen Nijamudheen, Kosuke Satake, Lauren Bryant Eyum, and our professor, Dr. Conly. As the product owner and primary point of contact, Gin represents stakeholder interests and guides the team. Bryant fulfills the role of scrum master, which rotates per semester to offer diverse experiences. Kosuke, experienced in UI design, specializes in this aspect. All team members contribute collectively to coding, testing, and debugging tasks, ensuring comprehensive project coverage and effective collaboration. Gin's consistent role as the product owner maintains continuity in representing stakeholder needs, while the rotating scrum master role promotes team growth.

9 Cost Proposal

With a budget of 800 dollars provided by the CSE Department, our primary focus is on securing essential equipment for our project. This includes buying an Apple Watch and an armband phone holder, crucial tools for accurately measuring sprint times during training sessions or competitions. Additionally, a portion of the budget will be allocated towards obtaining cloud storage for Apple/Android cross-sync and sign-in. Should there be surplus funds, we intend to invest in premium developer tools to enhance our software development processes.

9.1 Preliminary Budget

Include a high level budget table for components, fabrication, software licensees, development hardware, etc. This should be in a tabular format broken up into appropriate line items.

EXPENSE	**BUDGET**
Apple watch	400
Armband phone holder	15
Cloud storage	20
Miscellaneous	50

Table 1: Overview of project budget

9.2 Current & Pending Support

We do not have any outside funding.

10 Facilities & Equipment

We do not require any facilities since our project is fully software. We just need our computers.

11 Assumptions

After analyzing our app implementation on how our project is going to be structured, here are our assumptions:

- Able to learn UI/Programming implementations that correlates with a watch

- Able to keep track of the goal information of the user using the app which requires data implementation
- Have access to watches in order to test/debug errors with time or distance
- Have someone be able to frequently run,sprint,walk, in order to test the watch and our app
- A suitable system in order to keep our codes and programs in place

12 Constraints

The following are the major key constraints that are out of our control for this project:

- Technical constraints such as iOS/Android compatibility
- API implementations that could require permission from the government for our watches
- Customer installation site will only be accessible by development team during normal business hours
- Total development costs must not exceed $800
- All data obtained from customer site must be reviewed and approved for release by the Information Security Office prior to being copied to any internet connected storage medium

13 Risks

This part shows 5 of the most critical risks that will be at a probability of loss in days and exposure in days

Risk description	Probability	Loss (days)	Exposure (days)
Misunderstood use of technology/programs	0.3	10	3
Our resources malfunction. Ex: Watches	0.20	7	1.4
Internet access not available at installation site	0.3	9	2.7
Outdoor testing not available. Ex:Rain,Snow	0.15	1	.15
Certification/Government API use delays such for our watches	0.4	20	8

Table 2: Overview of highest exposure project risks

14 Documentation & Reporting

14.1 Major Documentation Deliverables

14.1.1 Project Charter

We anticipate that the final version of the project should be completed by the summer of 2024. We will make revisions to this document as additional project details come to light and will update it accordingly if there are any impacts on the project's fundamentals.

14.1.2 System Requirements Specification

We anticipate that the final version of the project should be completed by the summer of 2024.

14.1.3 Architectural Design Specification

The System Requirements Specification document will be updated every two weeks or as necessary. The initial version will be delivered within the first two weeks, and the final version will be delivered at the end of the development phase.

14.1.4 Detailed Design Specification

The System Requirements Specification document will be updated every two weeks or as necessary. The initial version will be delivered within the first two weeks, and the final version will be delivered at the end of the development phase.

14.2 Recurring Sprint Items

14.2.1 Product Backlog

We compile a list of tasks, and the group collectively decides which ones will be added to the backlog by a scrum master. It is imperative that we choose a task management tool to organize and maintain our stories effectively.

14.2.2 Sprint Planning

The weekend preceding each sprint will be dedicated to its planning. We aim to conduct four sprints per semester, resulting in a total of eight sprints for this period.

14.2.3 Sprint Goal

The group will collectively determine the sprint goal. We will showcase our progress to both the Senior Design class and Professor Conly.

14.2.4 Sprint Backlog

The project group takes charge of this decision. Weekly, the group will review and make necessary adjustments to both backlogs.

14.2.5 Task Breakdown

Every week, individual tasks will be assigned within the group collectively. Members will voluntarily claim tasks they are willing to undertake. Each person will document the time spent on their respective tasks individually.

14.2.6 Sprint Burn Down Charts

we haven't decide that yet. Also, we need more time to estimate the estimate for the chart.

14.2.7 Sprint Retrospective

The sprint retrospective will take place during the weekend immediately following the completion of the sprint. It will be documented collectively by the group on Google docs.

14.2.8 Individual Status Reports

Each team member is obligated to submit their assigned task on a project management toll, as per Professor Conly's requirements. Essential elements of the report comprise the current tasks and estimated time frames.

14.2.9 Engineering Notebooks

We're using Google Docs and updating our documents as we observe changes. It's expected that approximately one page will be completed per month. The entire team will review the project documents every month.

14.3 Closeout Materials

14.3.1 System Prototype

We haven't decide it yet. However, we are planning to provide it on summer 2024, around June.

14.3.2 Project Poster

We are planning to include Project Title, Objectives, Methodology, Timeline, Key Stakeholders, and Anticipated Outcomes for now. we will delivery it on Summer 2024.

14.3.3 Web Page

we haven't discuss about that yet. However, we will include the requirements of the system, features and usage.

14.3.4 Demo Video

We will include required features and demonstrate them on demo video and how to use them.

14.3.5 Source Code

Our code will be maintained using GitHub. Also, we will use React Native to implement our software.

14.3.6 Source Code Documentation

We are still figuring that out.

14.3.7 Hardware Schematics

We don't use hardware schematics for this project.

14.3.8 CAD files

We don't use CAD for our project.

14.3.9 Installation Scripts

We are planning to implement smart phone app mainly. Also, if we need to develop a web page for more features, we will make the scripts to setup the environment. We need to discuss about this more to decide it.

14.3.10 User Manual

We are planning to develop user-friendly app to avoid leaning usage of the app for users as much as possible. If it's necessary, we will provide the instruction in the app.

REFERENCES

[1] Fasel, Benedikt, et al. "Mobile monitoring of running mechanics using inertial sensors: A systematic review." Sports Medicine-Open 6.1 (2020): 1-14.

[2] Moya-Ramos, M. E., et al. "The influence of wearable feedback devices on physical activity and sleep in adults: a systematic review." International Journal of Environmental Research and Public Health 18.3 (2021): 1083.

[3] Thompson, Will R., et al. "Personalized Exercise Prescription Tool Based on Data from Wearable Sensors." Sensors 20.15 (2020): 4302.