EUROPEAN UNIVERSITY OF LEFKE

FACULTY OF ENGINEERING

Graduation Project I

Fit-work Run Tracking Application

SOFTWARE ENGINEERING

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This project is a fitness application, its functionality will be to track the users steps and display data and history to the user. It also features live run tracking, the user clicks a button on the application and as they run their route is displayed and the distance is calculated. These and other smaller features are centred around assisting the user in their fitness journey. To that end the user can also track their daily habits over time.

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1.Introduction

1.1 Problem definition

Users interested in fitness can sometimes find it hard to know what exactly they do or how much they are doing. By tracking users' daily/weekly habits, users can feel rewarded or get encouraged to be consistent.

Example-Problems :

- John, age 27, would like to know his daily habits, how many steps he takes on his commute to work and how much calories he burns per day. He downloads fitwork for exactly that reason, by selecting the features related to that he can be aware of his daily activity from the information available at the tip of his finger.
- Lisa,age 37, knows that it is important to watch your daily activity but doesn't know how to do so, she wants to start by tracking her steps and calories burned and she downloads this application. She is able to turn off the location service and just use the application as a step tracker.
- This application helps athletic users track their runs, how long they were running and how much distance they travelled, it also displays the steps taken by the user, each main feature will be modular, and isolated in such a way that it can be disbled without affecting the application.

1.2 Goals

- Step tracking.
- Calorie Calculation.
- Run distance and location tracking

2. Literature Survey

The proposed application is an application centred around fitness and user health tracking, similar applications exist, examples are samsung health,

Samsung Health : like its name implies, this is an application helps track the users sleep, weight,diet and physical activity, it then serves insights as graphs into the users daily habits, it is a free application that comes bundled with newer versions of samsung phones, its core features are:

- Sport session tracking
- A pedometer.
- calorie tracking.
- dietary tracking.

Strava: Strava like samsung health, is an application that centers around user health, unlike samsung health, it requires users to pay to access certain features. but it focuses more on physical activity and motivates the user more in that direction. it is built to encourage a community of runners, cyclists and swimmers to share their runs and it allows users to see the activity sessions and top distances of their friends, its features are:

- Sport session tracking
- A pedometer.
- activity sharing with photos and videos

It allows users to pair with a gps watch and head sensors to get a wider range of data.

In summary, these are the applications that are the basis for comparison, Fitwork will differentiate itself by being a daily log for user activity. By boiling down the unnecessary features it will be lightweight and feature slim, meaning new users will not be overwhelmed by an excess of features and will be able to know what the application allows them to do with a single glance.

3. Background Information

3.1 Required software

- **Visual Studio Code :**
  Good Code editor.
- **MYSQL :**
  MYSQL for database.
- **Flutter :**
  Application will be developed using the flutter Graphical User Interface library.

3.2 Required Hardware

- **An android phone with a step tracking and gyroscope :**
  This will be used for testing and deployment, as the application will be an android application.

3.3 Other software

- **BitBucket :**
  Used for repository, this is where the application code and artifacts related to the project will be stored.
- **Google Maps API :**
  Used for tracking location and displaying the data in a map.

4. Modules

4.1 Run tracker

This module is responsible for all functions related to user run data tracking and displaying, it will track location and distance and speed as a function of distance over time

4.1.1 Location Tracker

This module will take the location data from the user's system and store it in the database.

4.1.2 Run Distance calculator

This module will take the location from the location tracker at certain intervals and use that to calculate the location. It could also input the user's run journey into the google maps api to find the total travel distance for redundancy and accuracy.

4.2 Step counter

After requesting the Users permission beforehand, This module queries the User device and receives the step data, before displaying it to the user.

4.3 Calorie calculator

With prior information collected, like the users Weight, Age and Height this module will calculate the total calories burned per time and display it in a readable fashion or store it and use that to build a graph of the users exercise history.

5. Risk Analysis [1]

- Step trackers are a new phenomenon in society and the act of checking and being constantly aware of step counts and distance travelled may have unknown effects on the mental state of the user.
- The application runs on a mobile device which is described as a ‘bare metal- single user’ device, this means it runs natively on the systema with only a single user accessing the application. its data becomes vulnerable to attacks on the device and the applications data can be extracted.
- Sensitive location data is logged by the application which would need to be kept safe or cleaned at regular intervals.
- Users' step data and activity patterns are logged by the application; the risk of sensitive data being stolen or used maliciously exists and steps must be taken to prevent such an occurrence.

6. Ethics

Developing an application that tracks user location and activity does not come without its own set of concerns and issues, a case study being an incident in which a feature on the strava fitness application led to users accidentally revealing confidential information regarding the location of infrastructure critical to national security [2]. An ethical framework based on all these concerns is listed below:

- Users will have full control over their data and how long it would be stored, they will also have full visibility on what has been collected.
- User will also be able to determine which features are enabled and which ones will be disabled.
- Consent must be requested from the user before tracking can begin.
- It should be clear at all points when the user's steps are being recorded.

7. Conclusion

This application is built to help users log their physical activity to a greater extent, its defining features are that it is built to be functional without sending data to and will poses a greater range of customizability as users will be able to enable and disable certain features of the application,

7.1 Benefits

a. Benefits to users :

1. Step tracking: Users will have their step activity recorded daily and insights will be generated based on data, users will be able to reflect on

2. Health tracking: by recording weight, height and user activity, the application will be able to give the user insights into their health and activity over time.

3. It promotes walking: users being aware of their activity during the day will be incentivised to increase their step count for a higher number and a sense of satisfaction at the thought of meeting a goal.

b. Benefits to me :

Through this project i will learn about the following topics:

1. I will learn about Mobile application development and the inner workings of applications.
2. I will learn about User experience design.
3. I will learn about User privacy and how to safeguard it.

Why did I choose this project?

I chose to build a mobile application because I would like to add this to my portfolio. This application and one other will be the basis of my CV with which I would like to work in the field of application development in the future. I am a big supporter of user privacy and autonomy, so when the choice to build a mobile application came up I knew it had to be something that reflected that, this application would be an entry into the space of fitness tracking that would bring the most freedom and choice to its users.

7.2 Future Works

In the future with more time and experience,I will build upon this application and work to improve the user interface to suit different accessibility needs. I will consider the feedback from users of the application and update it to suit different requirements better.

8. References

[1] *How to Assess the Risk of Your Application*. (n.d.). Intel. Retrieved December 27, 2022, from https://www.intel.com/content/www/us/en/developer/articles/training/software-security-guidance/secure-coding/how-assess-risk-your-application.html

[2] Nebeker, C. (2018, March 3). *The Strava Heat Map: How a Social Network for Athletes Turned into a National Security Threat*. ReCODE Health. Retrieved December 27, 2022, from https://recode.health/2018/03/03/strava-heat-map-social-network-athletes-turned-national-security-threat/