Technical Project Report - Android Module

Open Air Running Tracker (OART)

Subject:	Computação Móvel
Date:	Aveiro, 4 de janeiro de 2023
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Project abstract:	The OART project was developed in the scope of the Android module of the Mobile Computing course. This project aims to manipulate and present essential information that helps the user understand the development of his training over time, as well as that of his friends. Focused on a minimalist style, this application allows the user to perform a workout, save the information from that workout and analyze the information in a future moment.

Report contents:

1 Application concept

With all those new features in recent running apps it can be hard to understand all the information that is given to you. The OART app's main goal is to achieve the most simplistic and minimalist design while providing you with only the necessary information. You can see all your progress condensed into a single program.

This app lets you keep track of all your personal records and training progress so you can check it at any time. You also can take pictures of your surroundings and share your training information with your friends.

2 Implemented solution

Architecture overview (technical design)

The application is composed of 3 main fragments. The map fragment is where the user is first directed to. It makes use of the GoogleMapsAPI to present the map, get the user location and draw the workout route in real-time. It also has two trackers, one for time and one for distance, the timer is a built-in android widget called "Chronometer", that updates on itself; the distance tracker is a TextView that is updated when a new point is added to the route, the distance is calculated using the Haversine formula. A camera option is also added for the user to take pictures, the icon is visible only when the workout is in "PAUSED" state. By clicking the "terminate" button, an alert dialog appears and prompts the user either to save the workout or discard it. If the user decides to save the workout, a connection to the Firebase is opened and the workout is saved there.

The feed fragment consists of a RecyclerView that is populated with the contents of a GET method to the Firebase. The Firebase store gives the application all the workouts from the user and from the user's friends. The RecyclerView is inside a SwipeRefreshLayout that enables users to scroll down on the RecyclerView to check if there are updates to be made. And if there are, make them.

The personal records fragment is the simplest one. It is a RecyclerView, but only displays three workouts: the one with the longest duration, the one with the biggest distance and the one with the better average speed. The remaining features are similar to the feed fragment.

On the app bar there are three buttons, the leftmost button is a QR code generator, when clicked, it opens an alert dialog that shows a QR code generated from the user email. The second button is a QR code scanner, when clicked, it opens a camera with a scanner feature (also by clicking the volume buttons when the scanner is on the screen the device flashlight can be turned on and off), by scanning another user's QR code, friends can be added. The third button is a dropdown menu, with only one option, logging out.

The Firebase is used to authenticate users and store their credentials. It is also used to save workouts, their images and to retrieve them.

Implemented interactions

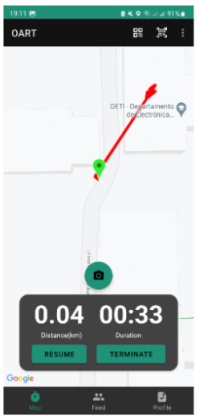
The main interactions can be observed on the diagrams that follows:

Add workout

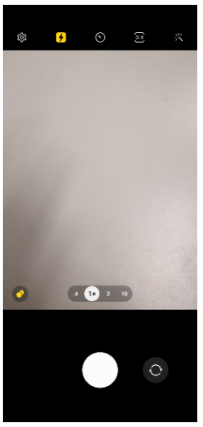
Imagem 1: Início do treino

Carregar em "Start", fazer o treino e carregar em "pause"

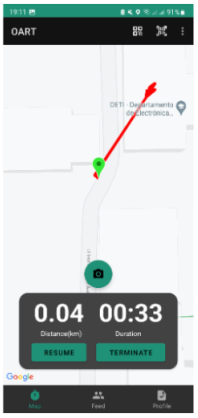
Imagem 2: Fim/Pausa do treino



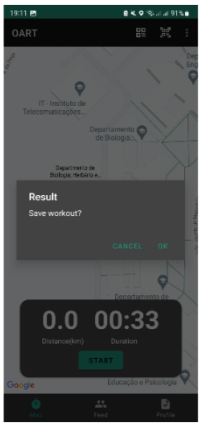
Carregar no ícone da câmara



Tirar fotografia e carregar no visto



Carregar em "Terminate"



Carregar em "Save workout"

Imagem 5: Pop-Up de salvar o treino

Imagem 4: Retorno ao Fim/Pausa do treino

Imagem 3: Foto do treino

After saving, the workout can be found on the feed page.

Refresh feed

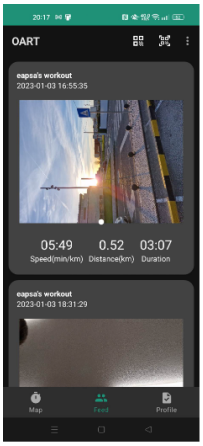


Imagem 1: Feed antigo

Deslizar para baixo no topo da lista para atualizar

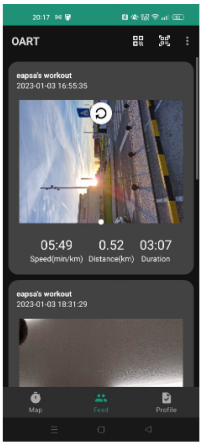


Imagem 2: Feed atualizando

Se houver novos treinos, eles irão ser apresentados

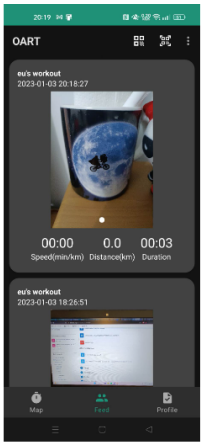
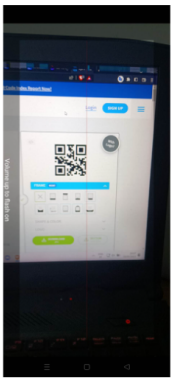


Imagem 3: Feed novo

Add friend

Deteção de um QR Code



Deteção de um QR Code

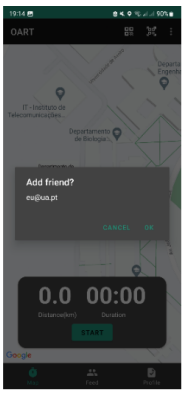


Imagem 1: Amigo gera o código QR

Imagem 2: O utilizador abre o scanner

Imagem 3: O utilizador recebe um pop-up de confirmação

Keep track of personal records

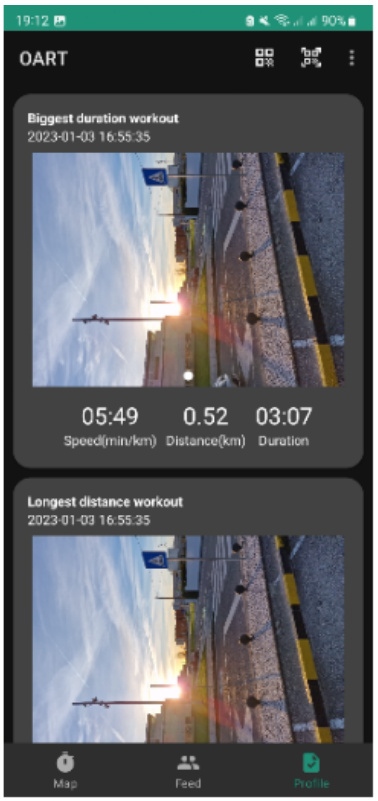


Imagem 1: Recordes pessoais do utilizador

Project Limitations

It is not possible to see the workout map after the workout is saved.

The application does not run in the background, foreground only.

3 Conclusions and supporting resources

Work distribution within the team

Taking into consideration the overall development of the project, the contribution of each team member is distributed as follows: Eduardo Almeida did 50% of the work, and Roberto Graça contributed 50%.

Project resources

Resource:	**Available at:**
Code repository:	eapsa/cm_android_oart (github.com)
Ready-to-deploy APK:	eapsa/cm_android_oart (github.com)

Reference materials

Kotlin Programming Language (kotlinlang.org)

Android Development with Kotlin Classroom Course | Android Developers

Android Mobile App Developer Tools – Android Developers

Firebase (google.com)

journeyapps/zxing-android-embedded: Barcode scanner library for Android, based on the ZXing decoder (github.com)

denzcoskun/ImageSlideshow: Android image slider. (github.com)