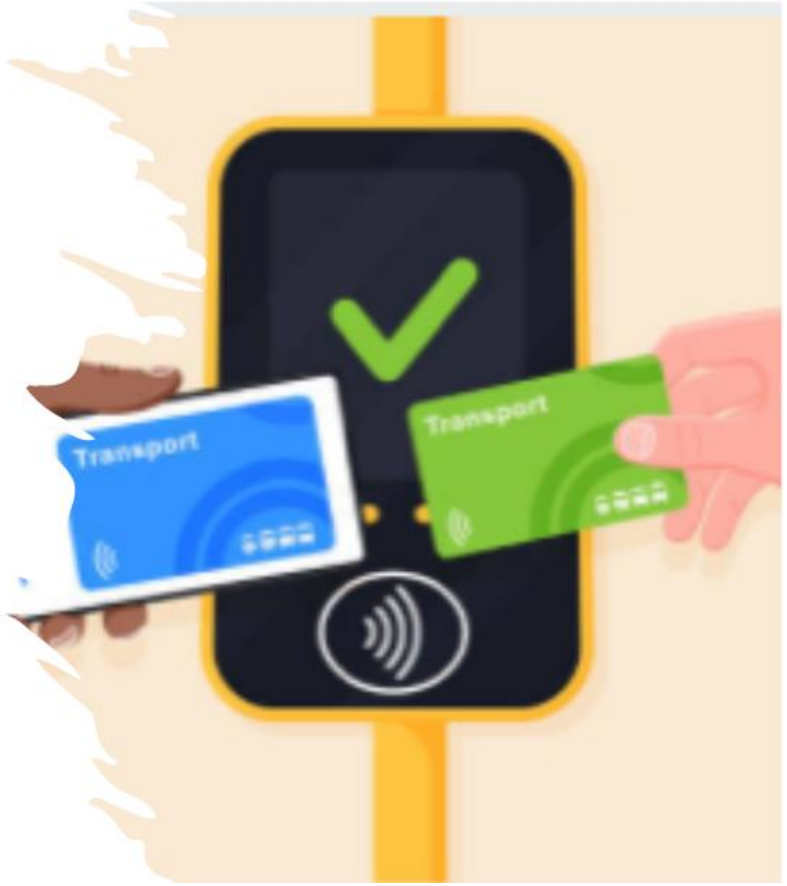

RFID, NFC and Public Transportation

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- Hernán Capilla Urbano - 1462773
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SISTEMES MULTIMEDIA
ESCOLA D'ENGINYERIA. UNIVERSITAT AUTÒNOMA DE BARCELONA
PROFESSORS: JORDI SERRA, FERNANDO VILARIÑO I RONNY ROMERO

RFID, NFC and Public Transportation

"Hackathons of Cloud Services: Co-creating and deploying"

Sistemes Multimèdia 2021– 2022

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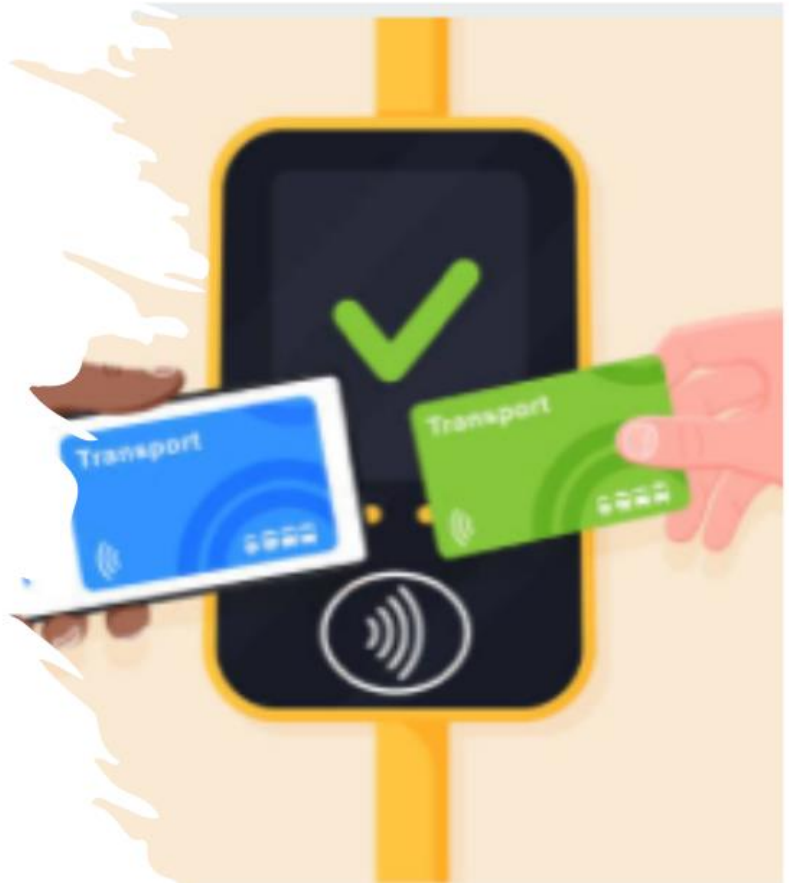

Description

Contactless technologies as RFID, NFC and other are now part of our current life, and they can help developing a much better and human-centric approach to public transportation

Instead of the traditional way of paying, a new eco friendly way by using a smart phone and cloud services. We could get real time information of the bus occupation. Each client would be identified and be charged at the end of the month. By using their card when they leave the bus as well, we can charge them accordingly to the distance they travelled. Using a GPS in the device, we can also get real time location of the bus. Additionally, a whole lot of new statistics could be gotten using this system.

Additionally, by using a smarthphone app, the user is now able to check how to get from point A to point B by public transport and their profile statistics such as trips and CO2 emissions saved

We decided to embark into this project because it seemed very interesting and we are all very eco friendly and love plants. Actually, we are trying to go vegan. Nontheless, we also wanted to learn how to use API's and link it with app developing frameworks like flutter.

The main aim of this project, along with the biggest contribution, is to abolish the use of disposable paper tiquets.

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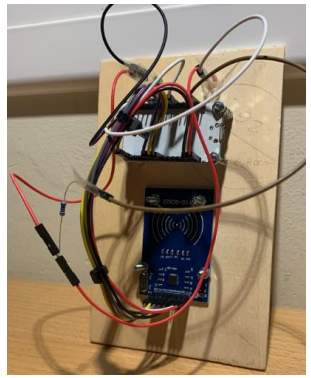
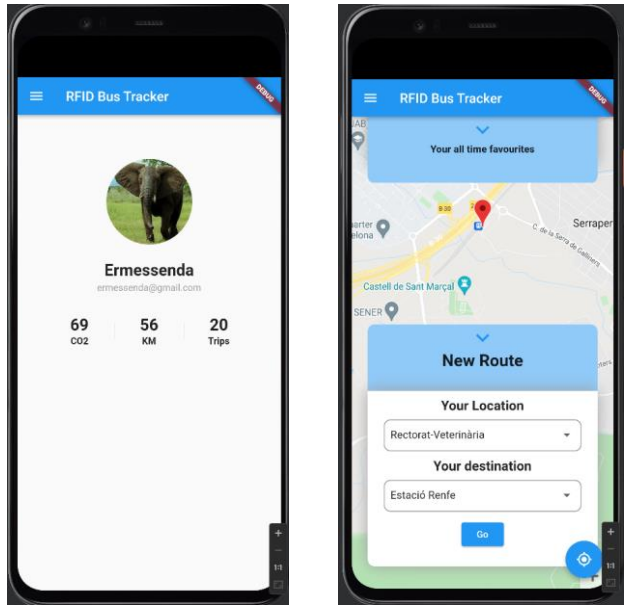
Our challenge



RFID Reader on the bus

State of the art

Currently a lot of cities are introducing this kind of billing system for public transport. Even Barcelona is now trying to use "T-Mobilitat".



Smartphone App

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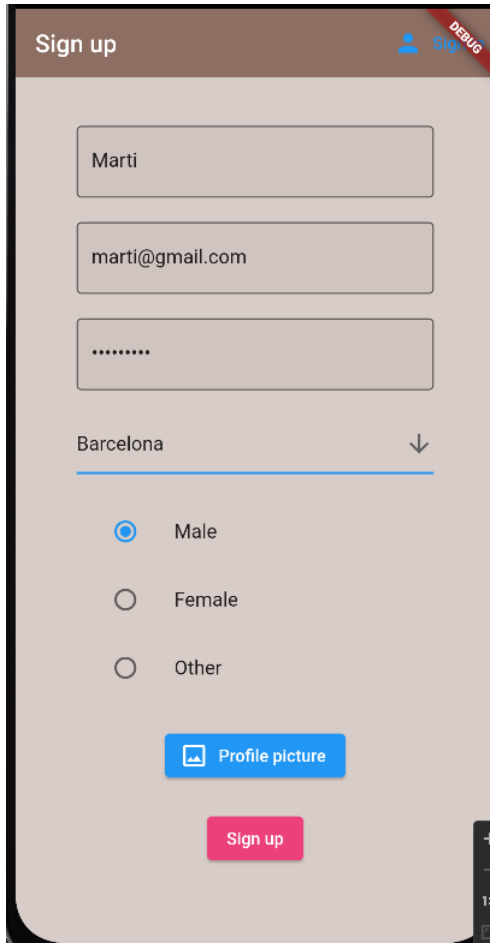
Methodology

User Sign Up

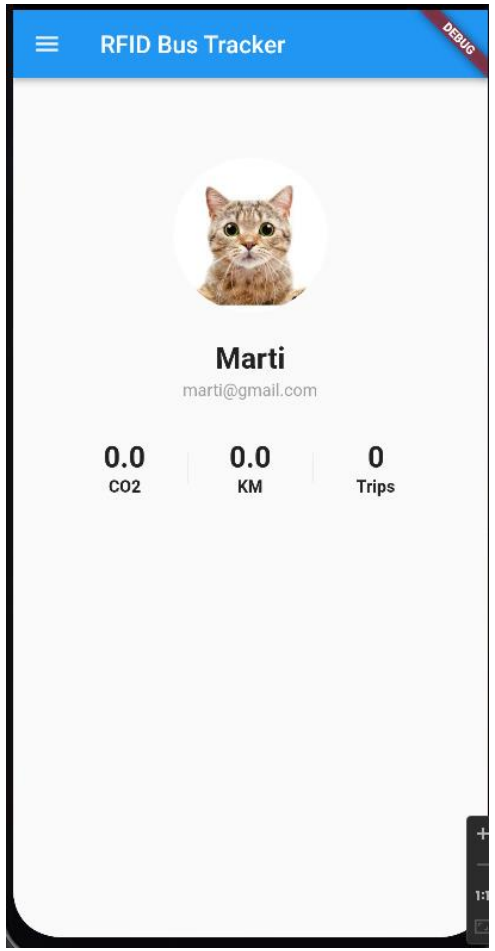
API’s used:

- Firestore: store user data
- Auth: manages encryption and login service
- Storage: profile picture



Gets presented with their profile.

They can see the statistics, now being 0.



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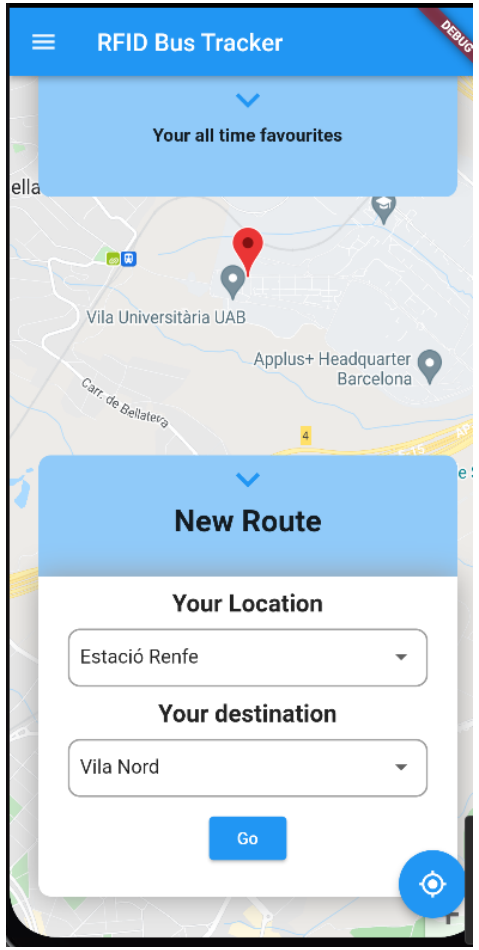
Methodology

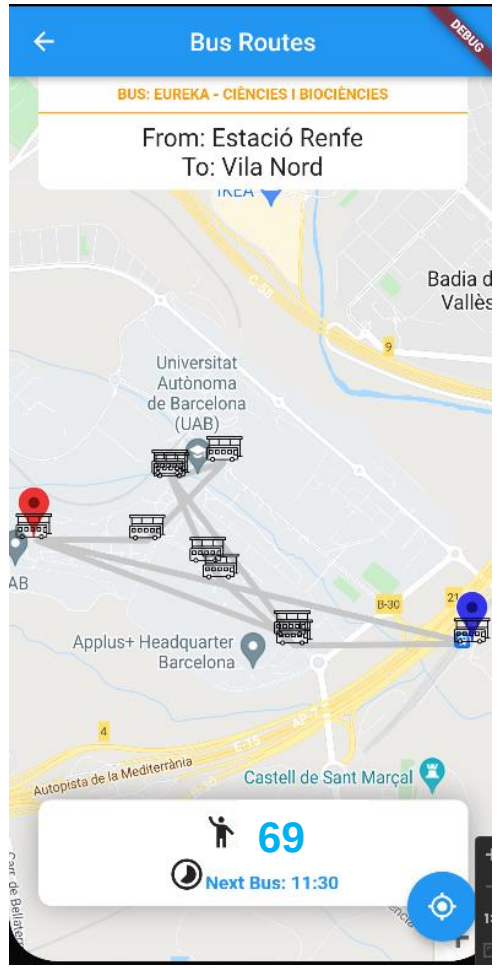
Get bus indications

API's:
- Maps
- Places
- Directions
- Realtime Fireabse

Services:
- Python script updating bus locations on realtime to Realtime Firebase



User can choose point of origin and destination and sees the directions they should take along with the ETA for the bus and how many people are on it.



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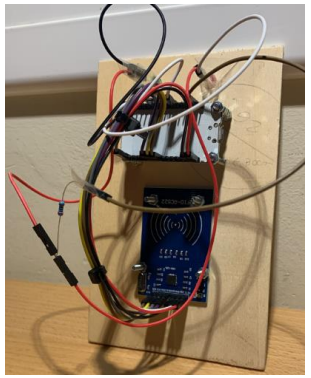
Methodology

Client gets on the bus

A → **B**

origin — Destination



Updates user statistics.

Updates bus current capacity.

API’s:
- Realtime Firebase
- Firestore

Services:
- Python script calculating new values such as distance travelled.

Hardware:
- ESP32 with RFID reader

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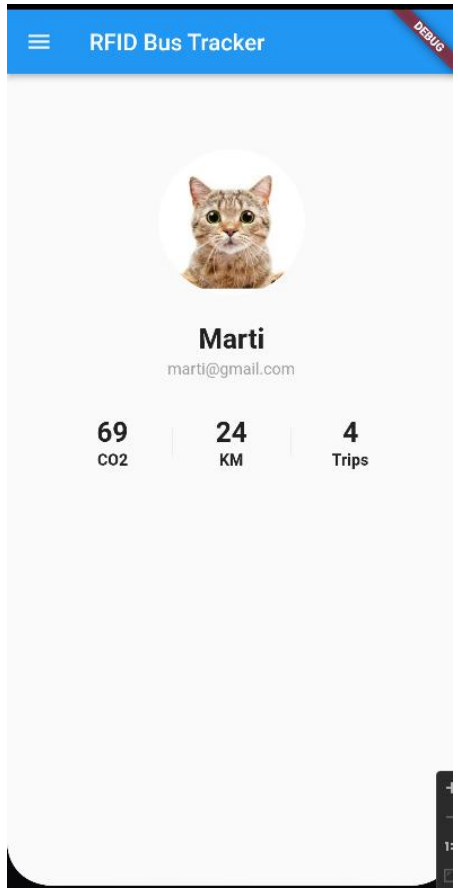
Methodology

Updated statistics are shown to the user



Additionally, the user is also able to send feedback