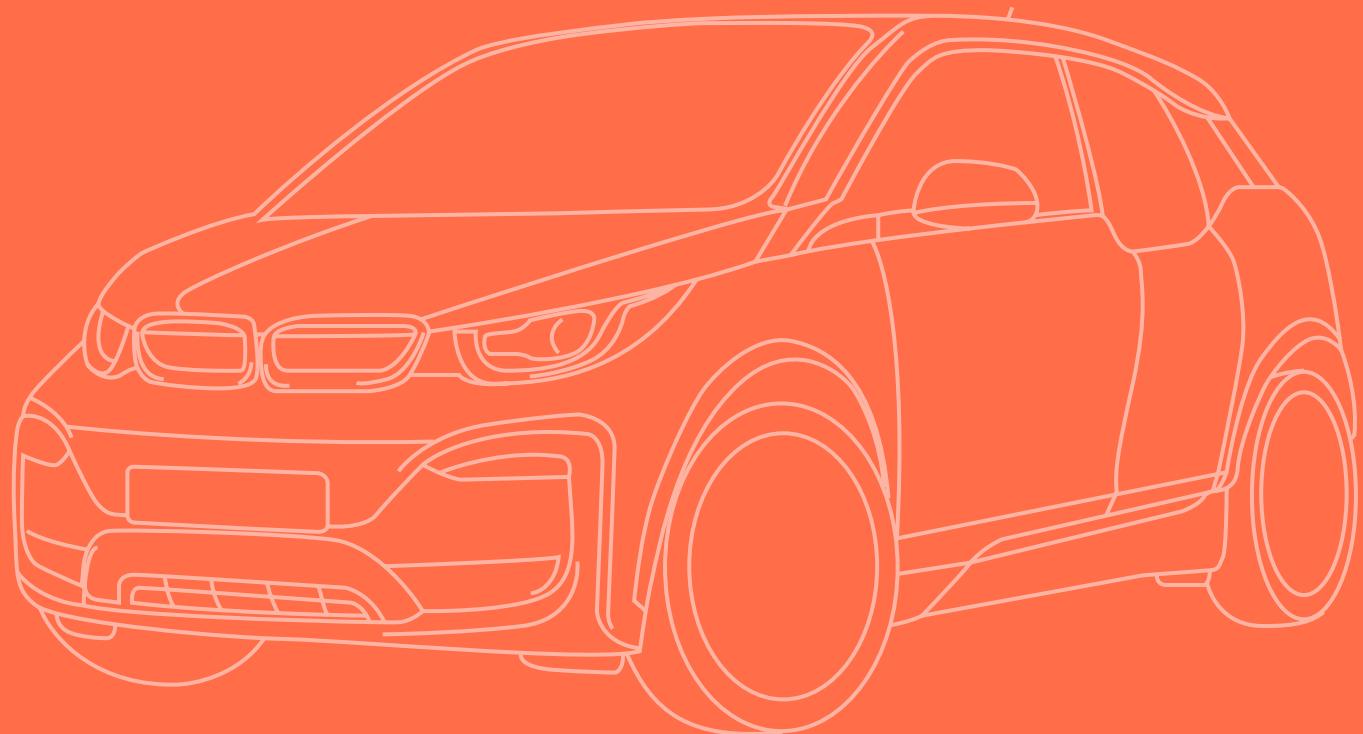


UNDRIVE



2020 Project Report



Undrive

**Group 7 – User Centered
Design Course, Master's in
Computer Science and
Engineering, Instituto
Superior Técnico, Lisboa,
2020**

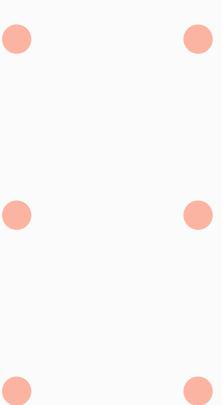


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1

Executive Summary



Executive Summary

Undrive is a **carpooling** application for **daily commutes** where you can publish or search a trip to share the costs of transportation with people that live near each other and go to the same workplace/school areas.

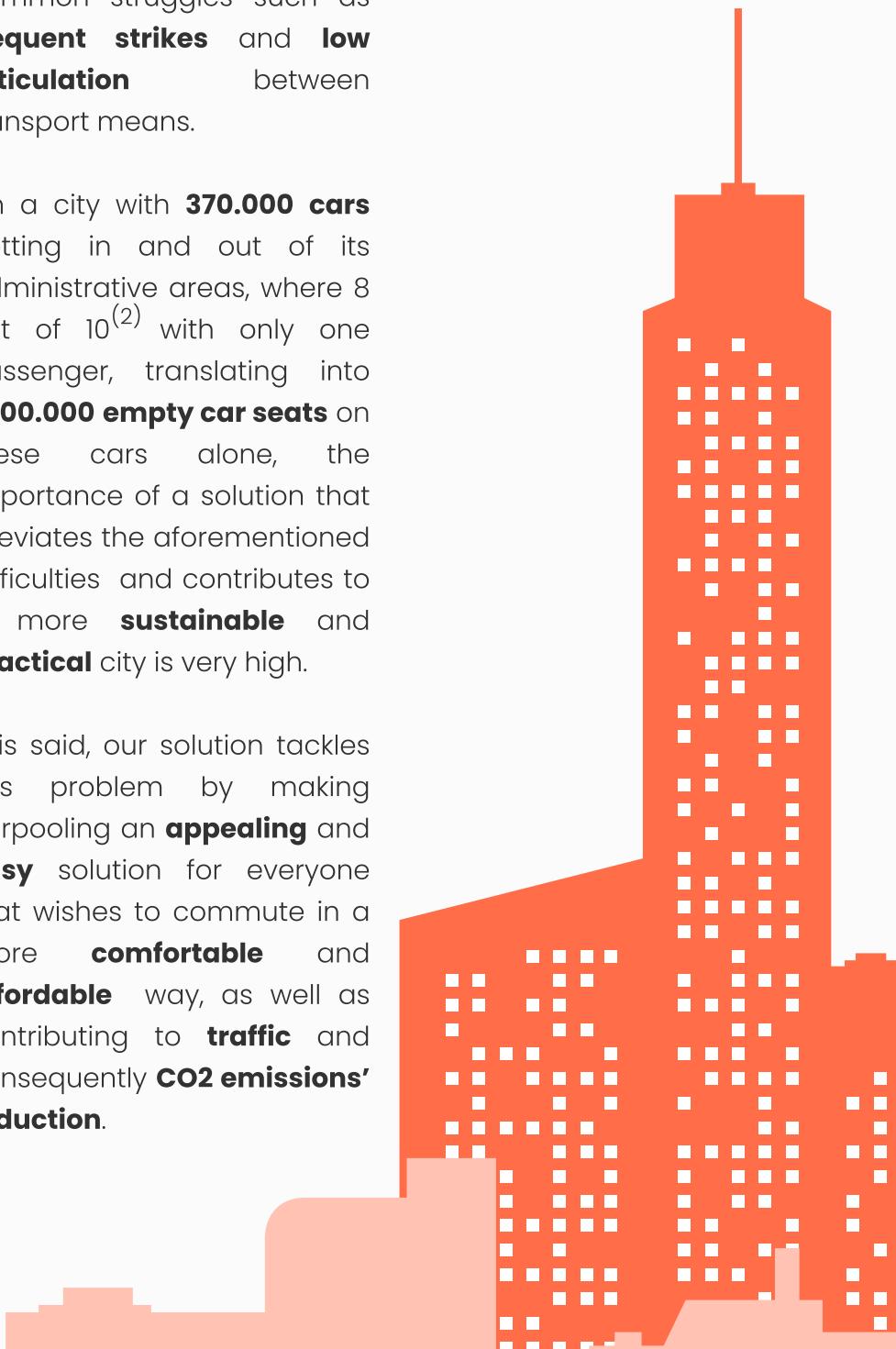
This way, if you are either a driver with available seats or someone looking for a **cheaper** and more **comfortable** way of transportation, such as a car, Undrive provides a platform that easily **matches** users, allowing them to schedule **monthly** trips so that they fit their daily routines perfectly and relieving them of the constant worry of **transport payment** and **delays** (usually common in public transports).

These struggles affect a large portion of a city's population. Looking specifically into the city of Lisbon, there are more than **1.000.000 citizens⁽¹⁾** that rely on public transportation,

many of whom share common struggles such as **frequent strikes** and **low articulation** between transport means.

On a city with **370.000 cars** getting in and out of its administrative areas, where 8 out of 10⁽²⁾ with only one passenger, translating into **1.200.000 empty car seats** on these cars alone, the importance of a solution that alleviates the aforementioned difficulties and contributes to a more **sustainable** and **practical** city is very high.

This said, our solution tackles this problem by making carpooling an **appealing** and **easy** solution for everyone that wishes to commute in a more **comfortable** and **affordable** way, as well as contributing to **traffic** and consequently **CO2 emissions' reduction**.



(1) <https://observador.pt/2014/10/21/mais-de-metade-dos-habitantes-da-grande-lisboa-nao-usa-transportes-publicos/>

(2) <https://www.energy.gov/eere/vehicles/fact-946-october-10-2016-driving-alone-private-vehicle-most-common-means>

2

Background



Introducing the Team



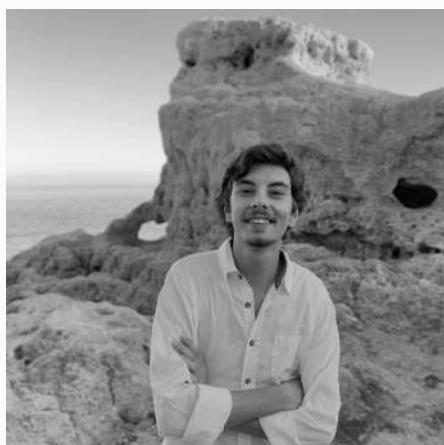
The team that makes Undrive possible is formed by **6 young engineering students** from Instituto Superior Técnico. All the elements are graduates on **Computer Science and Engineering** and currently enrolled in a **Master's degree** in the same area, even though each on **different specialization** areas.

This made the Undrive team a **multi-disciplinary** team with background on web developing, design and data visualization. This **diversity** in knowledge allowed the project to be **successful** and for the **goals** to be met.

"The strength of the team is each individual member. The strength of each individual member is the team"

Phil Jackson

Meet the Team



Henrique Carvalho

Design

Henrique is a student of Software Engineering at IST. Besides this major area he is also very interested in the areas of web development and web design as well as IoT. He is very curious about new technologies and tries to learn as much as he can on every opportunity, so this project served him as a great chance to improve his skills. On this team he took his expertise into his main role of designer but also worked on the fronted.



Francisco Silva

Project Manager

As a Computer Science and Engineering student at IST, Francisco is undergoing the specialization in Software Engineering and IT Systems Technologies. The study of these areas, added to some leadership traits obtained through his years practicing extra-curricular team sports, made him take on the Project Manager role where he assisted the remaining members on most tasks, having special impact on supporting the backend development and on the presentations given.

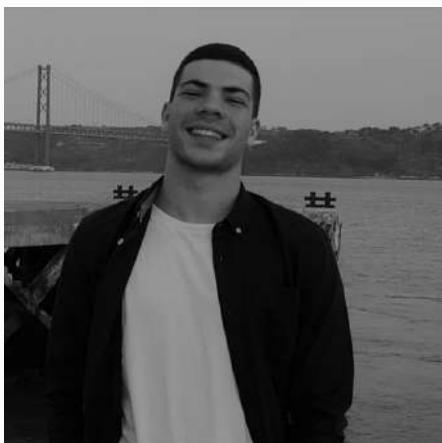


Ana Gonçalves

Frontend

Ana Rita lives in Lisbon and has seen this city that she loves so much become more and more crowded with cars over the years. She is passionate about frontend development but also has an interest in backend development. This was the perfect opportunity to get a deeper understanding of all the key aspects that come into developing the right product.

Background



Miguel Coelho

Frontend

As a student of the IST and a resident of Lisbon's suburbs, Miguel is concerned about the social issues surrounding traffic in the Portuguese capital. With this project he was able to be part of a team that created a way to relieve the excess of vehicles while developed programming skills and teamwork. He had the responsibility to cooperate in developing frontend of Undrive application.



Pedro Rodrigues

Backend

Pedro is a student of Interaction and Visualization and Software Engineering at IST. He wished to be part of a project where these two areas went hand in hand, so this project was the perfect opportunity for him. He got to put in practice his skills in software engineering in the development of the app Undrive and as the responsible for the backend he got to improve and develop new skills.



Tomás Costa

User Research

Tomás is a student at IST, lives in Lisbon. This project met one of his greatest interests which is developing mobile applications and this project also solves a problem that he faces daily: the high amount of traffic in Lisbon. With this work he could contribute to a solution to solve this serious problem, focusing on the people's needs by leading the user research activities.

The Target: Lisbon

Lisbon is the capital and the **largest city** in Portugal, with a population of 506 892 within the administrative limits. In the last decade the city has been making a great commitment in becoming a **greener** and **friendlier** city to its people. Therefore, it was elected the **European Green City 2020**, a prize that recognizes all this work. This effort has been translated into a set of new green spaces, enlargement of public sidewalks, a network of bike lanes to cover a larger portion of the city, a more efficient residue management and the increase of energy efficiency⁽²⁾. The city prides itself in being in vanguard of **electric mobility** in Europe containing one of the **largest networks** of charging points for electric vehicles.



(2) <http://www.cm-lisboa.pt/noticias/detalhe/article/lisboa-e-capital-verde-europeia-2020>

Background



3

Schedule

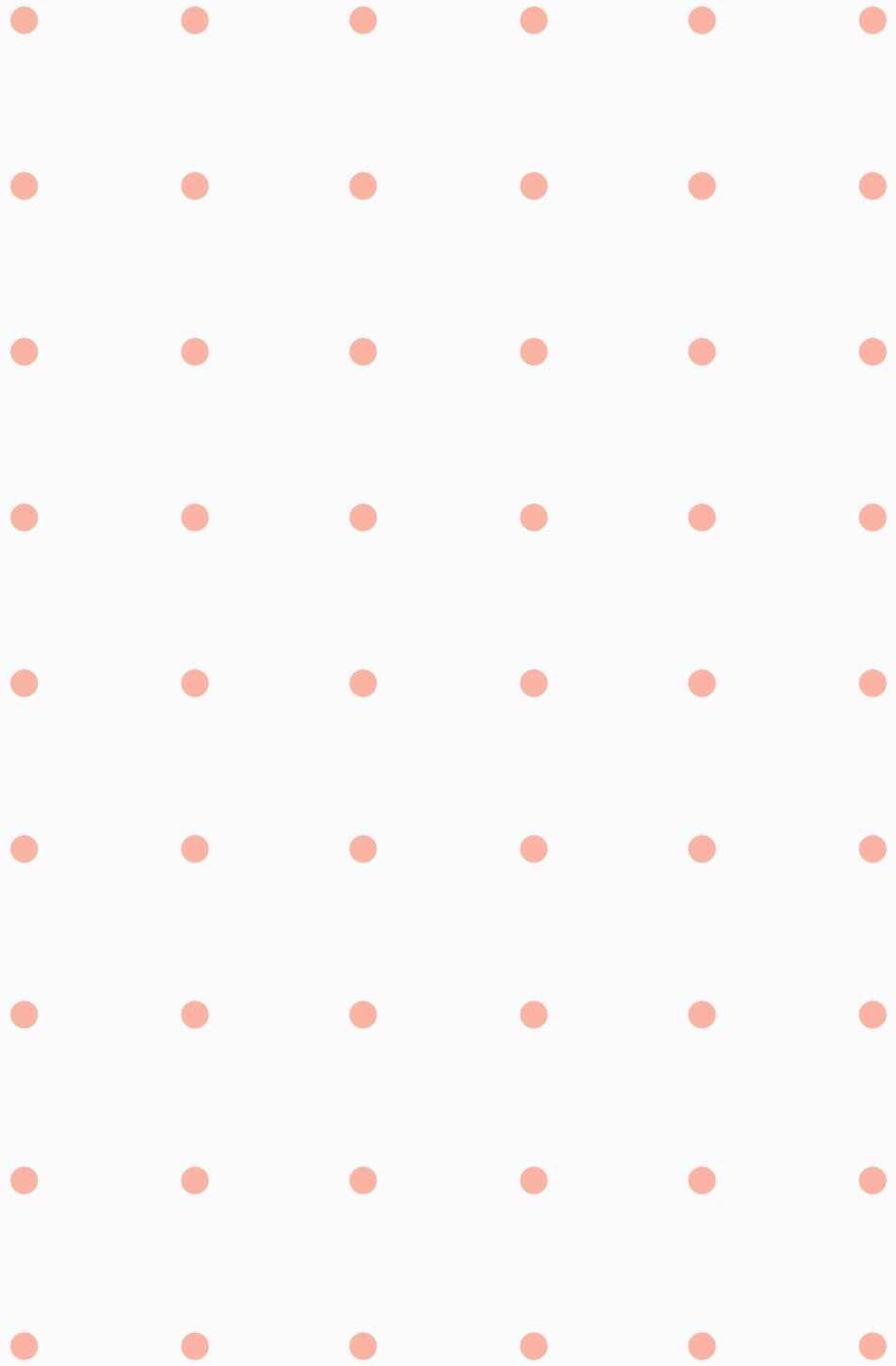


Schedule





Schedule



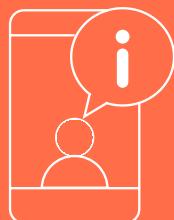
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Overview



Scope

The main goal of this project was to create a solution that could help solve the predominant problems associated with urban transportation:



Communication



Emissions &
Energy Efficiency



Safety & Labour



Space

These problems include users not having the information they need when they need and the cost of labour being the primary driver of operation costs for passenger transport. Besides, transportation accounts for 25% of CO2 emissions in the EU and is the main cause of pollution in cities, adding to the vast amount of urban space it occupies.

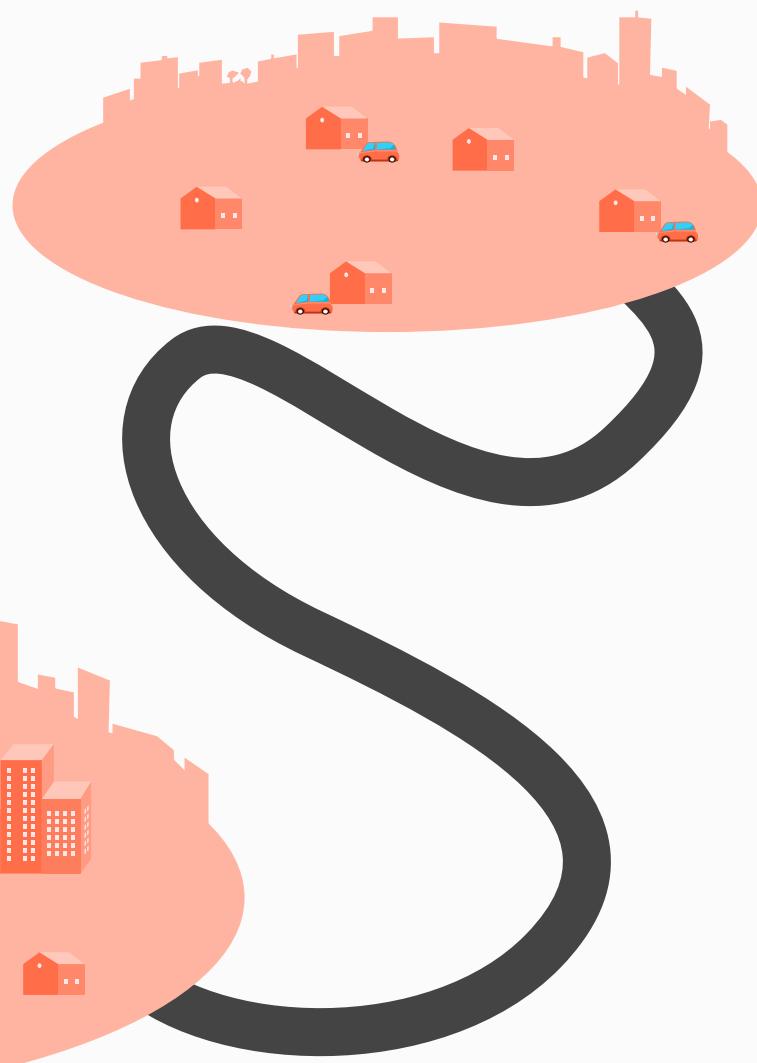
After analysing these problems and **reflecting** on the reality of **living** and **working** in Lisbon we started to conceptualize a **technical** and **inventive** approach to tackle the problem presented to us.

We decided to focus on the mode of transportation that usually comes to our minds when we think about **traffic** and **pollution** caused by transportation: **cars**. Our main objective was to **reduce traffic**, and thus reduce the number of cars coming into Lisbon every day, **occupying a big portion of the urban space**. By reducing the number of cars coming in and out of Lisbon, we can also **reduce CO2 emissions**.

Core Idea

Our core idea resides in the concept of **carpooling**. Even though the concept is not new, the **lack of trust** on other possible commute partners and difficulty to find people with **similar commuting routes and schedules** has been a **large obstacle** for the adoption of this concept on our society. It's a solution that is **extremely scalable** as it could be applied to a **vast number of cities**, not just in Portugal, whether they are suffering from the **same problems** - which most of the big cities are - or not, as a way to **prevent** these problems. Through our app, users can **post trips** and **find drivers** who have matching commuting routes and schedules, with whom they can commute daily from that time forward. Our application is not only for people who own a car and want to **reduce costs** that come with it, but also creates a **cheaper** and **reliable alternative** for people that don't drive or own a car.

We are aware that there already are **other carpooling apps**, but they **all** provide the **same service**: Single-Trip carpooling. With Undrive, we offer a platform for users to schedule **monthly** trips, so that the trips are as **reliable** as possible and **fit** the users' daily routines **perfectly**.



Primary Features

Once the core idea was defined, we focused on what should be our application's **primary features**. With the **Undrive app** we wanted to make our users' life **easier** as well as providing the **best experience** possible. With this in mind, we defined a set of **important features** that would integrate our app.

Profile

The profile tab allows users to manage their account, from adding a bio to adding a car and even their method of payment, among others. It also allows the user to get a comprehensive look at their rating, as a drive and as a passenger.

Publish

The publish tab is where the users who wish to use the app as a driver can publish their trips. They have full control over the trip they wish to publish, from the origin and destination, to the days and times, and even the price they'd like to charge.

Search

In the search tab users can find trips that suit their daily commuting needs. After defining their commute details – origin, destination, days, time –, the users can pick their favourite offer based on the schedules, ratings and monthly price and request it.



Messages

To facilitate the pickup arrangements, if the user wishes to talk to other drivers and passengers, the message tab is where the chat conversations are located.

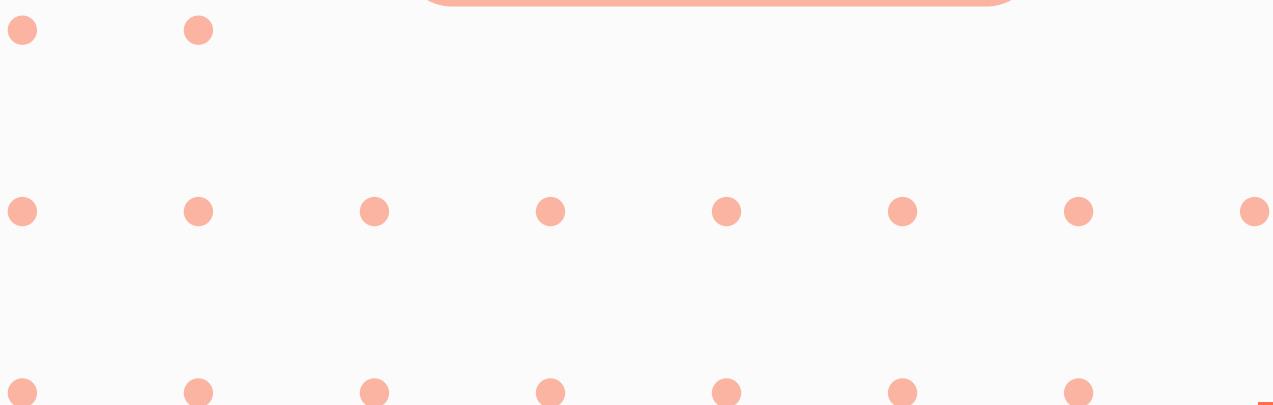
My trips

In this tab, the user can find the history of his/her trips, taken both as a driver and as a passenger. Information like the status of the trip (requested, accepted, cancelled), the corresponding driver, days, schedule, and the trips' places of departure and arrival.



5

Development Process



Business Plan

Our main revenue stream would be the **commissions taken from scheduled trips**. However, this would not be our only revenue stream. Pollution and space occupied by cars is a continuously growing problem that has a major negative impact on cities such as Lisbon. For that reason, **City Halls** and other **benefactors** have been showing a lot of interest in **financing projects** such as ours, creative ideas that in the long run can improve the life of its' citizens and of everyone

going into the cities. By lowering the number of cars coming in and out of Lisbon every day, the profit made in gas stations may drop, so it would be important for the associated companies to keep their existing clients and even attract new ones. Our goal would be to have **brand sponsorships** (from **oil** and **gas companies**, for example), associated with **in-app discounts**, which would work as publicity for those companies.

Stakeholders



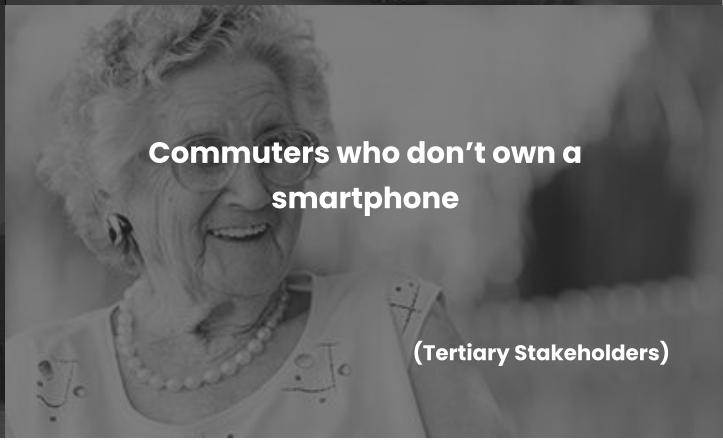
**Commuters who own a car
and have available seats**



**Commuters who don't own a
car**



City Hall



**Commuters who don't own a
smartphone**

(Tertiary Stakeholders)

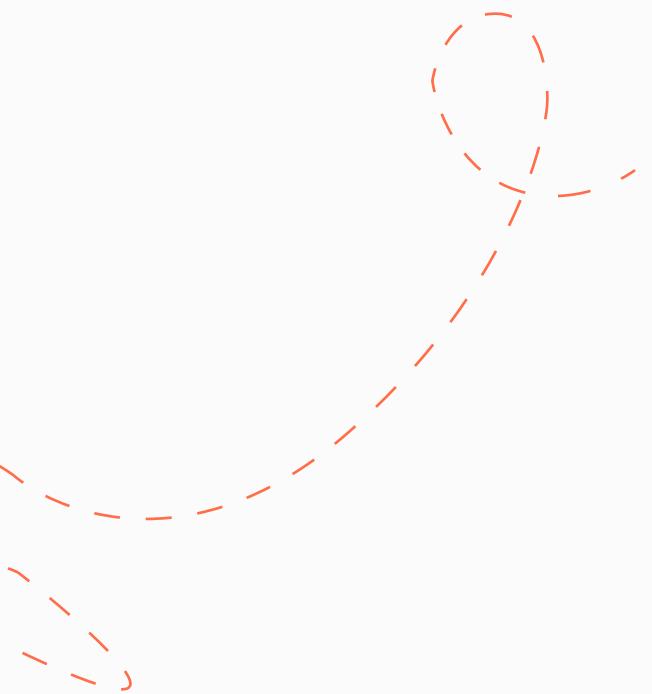
User Research

To create a solution, we first needed to know our stakeholders, mainly our users through **user research**. This said, our user research plan consisted of:

- A Questionnaire;
- A Think Aloud exercise;
- A Contextual Inquiry;



We decided to use a **questionnaire** because it's a good way to get a big number of answers to help us early development decisions, **receiving a good spectrum of different opinions**. With this, we can also identify specific clusters of people with **similar**



Questionnaire

opinions, helping us to understand **who** our end users will actually be, so we can **guide** the development of the app towards their preferences.

The questionnaire can be found on **annex 1**.

For this specific questionnaire, our questions concerned three main aspects:

Mobility → Current mobility habits and preferences;

Carpooling → Familiarity with concept, experience with it and prospects/obstacles to its adaption as a mobility solution;

Application Interaction → How people interact with existing applications (preferences/obstacles);

User Research

Synthesis

144

questionnaire
respondants



50%
women

50%
men



2

major age
groups

responses 71 18 to 25
responses 59 41 to 65

2

main clusters based
on ethnography



Female
workers with
age from 41
to 65

Male
students with
age from 18
to 25



Commuting Analysis

60%
use their car

30%
take more than
30 minutes



Price



Security



Comfort

Most valued transport factors

Think Aloud

At this stage, a secondary method to research **user impression of our concept** was required.

To test this, we made a **Think Aloud** exercise, using a **similar app** to **book a carpooling trip** and take it.

The guide for this exercise can be found on **annex 2**.



Contextual Inquiry

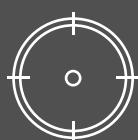
Participants



3 users
1 driver
1 Observer

Carpool with other people

User Goals



Because the **Think Aloud** exercise can **break the reality** of the experience of sharing a ride with other people, especially if you do not know them, we made a **second exercise**.

To test this experience we decide to make a **Contextual Inquiry** exercise where we would expose people to **sharing a ride with strangers** and **ask about their impressions after**.

Observer Tasks



Instruct and inquiry user
Supply resources
Observe and take notes of user interaction

The guide to this exercise can be found on **annex 3**.

Personas



Rodrigo Almeida Castro

19 years, Algés

Rodrigo is an university student at Instituto Superior Técnico, but all of his lectures take place in the Taguspark campus. Since Rodrigo is actually from Viseu, he is currently living with his uncles for the semester. His only income consists of the allowance that his parents give him, so saving money is really important to him. To attend lectures he has to take the train to get to the bus stop in Paço de Arcos where he can catch the bus to Taguspark.

Scenario

On Mondays and Thursdays, Rodrigo has lectures starting at 8 AM in Taguspark so he must wake up at 6:50 AM to leave the house at 7:20 AM and to be able to take the train at 7:25 AM in order to get to the bus station in time. In that day, the train workers are on a strike, which means that Rodrigo had to wake up earlier to try to get to Paço de Arcos. He only managed to get on the train at 7:55 AM, which means that, after a 19 minute bus ride, by the time he got to Taguspark he had already missed half of the first.

Maria Ribeiro Azevedo

50 years, Loures

Maria has been working as an English teacher for the last 20 years, and giving private classes after working hours in a study centre near her school. She lives in Loures with her husband and their two kids. At the moment she is teaching 7th to 9th grade at Escola D. Filipa de Lencastre, in Lisbon. Both of her children are attending the university, so they go together by car to the Nova SBE campus in Costa da Caparica daily. Since her husband works at a walking distance from their home, Maria takes their second car to work every day.

Scenario

Maria wakes up around 6:30 AM every day in order to get to work at 8 AM. She lives in Loures and after taking a shower and having breakfast with her husband she gets to her car and drives do Escola D. Filipa de Lencastre, in Lisbon. She leaves the house around 7:20 AM due to the traffic at that time in the morning. She always takes the car because it's faster.

**Occupation**

English Teacher

Salary

1600 € (classes) +
600€ (private classes)

Vehicles Owned

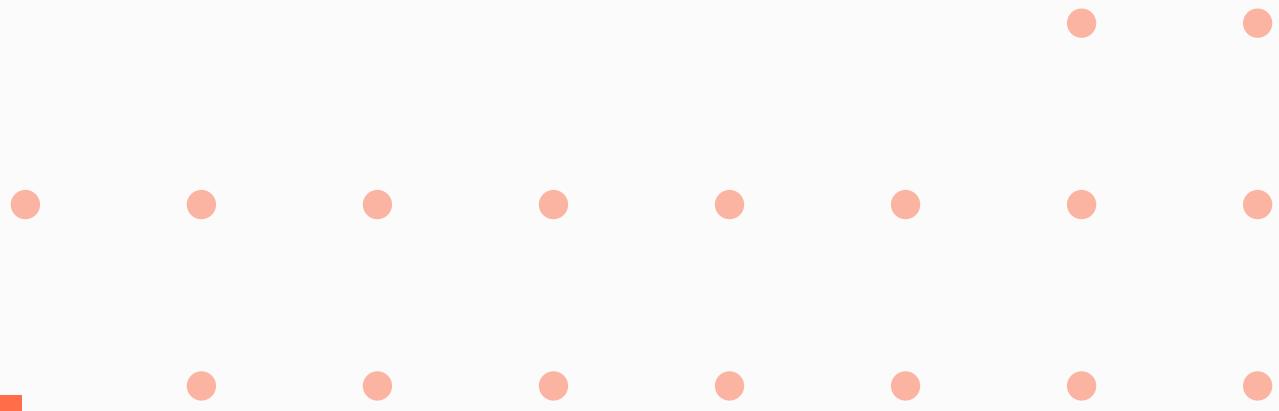
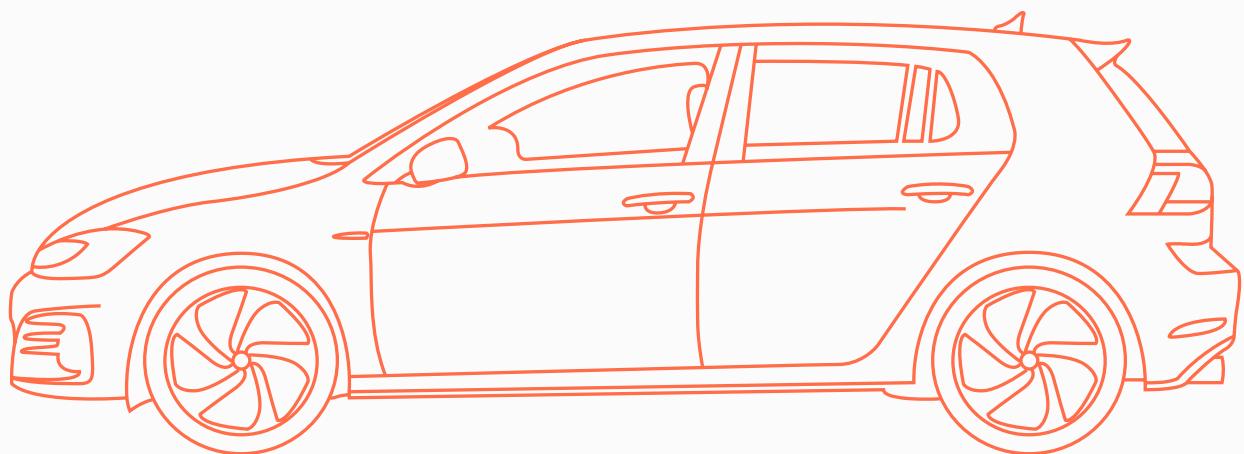
2 Cars

Status

Married

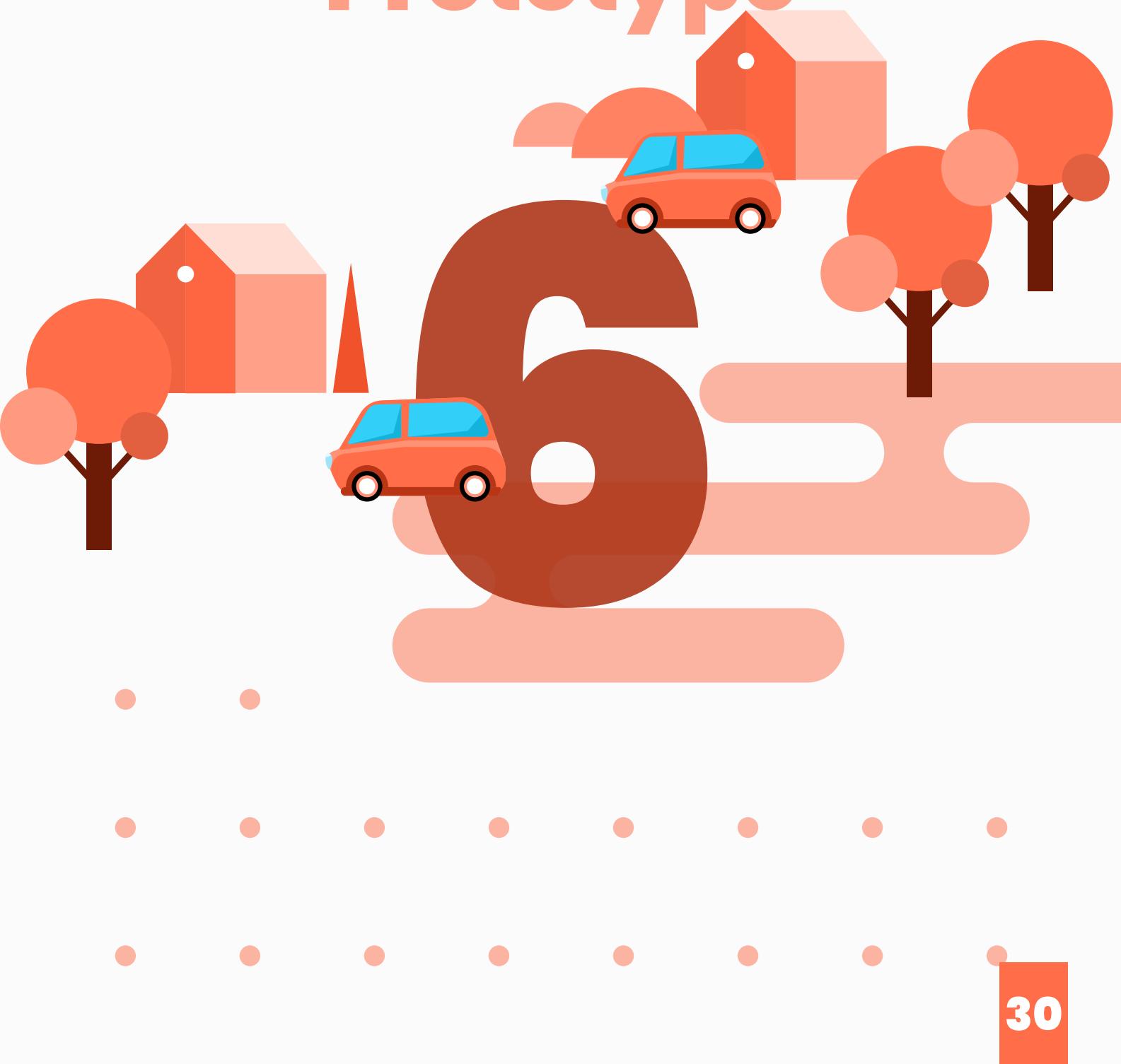
Lives with

Her husband, their son (19) and their daughter (22)



6

Low-Fidelity Prototype



Low-Fidelity Prototype

To create the first iteration of the prototype, a **Low-Fidelity prototype**, we started by defining the application's **critical tasks**.

Once that was done, we built a **testable** Low-Fidelity Prototype that had enough **flexibility** to allow the users to perform those critical tasks and other tasks, to test basic app flows and their **intuitiveness**. This way, the users were able to give us **feedback**, mainly what could be improved in the project design.

The three critical tasks identified by our team, which reflected the user goals for our application were **publishing a trip**, **searching for a trip** and **matching with other users** (finding the most suitable trip).

The definition of the critical tasks helped to **guide** the overall design in the sense that such tasks should be performed easily, in an intuitive way and therefore, the actions that triggered the beginning of these tasks and the ones needed to complete them had to be **simple** but **without limiting** the app's **functionality**.

The 3 Critical Tasks

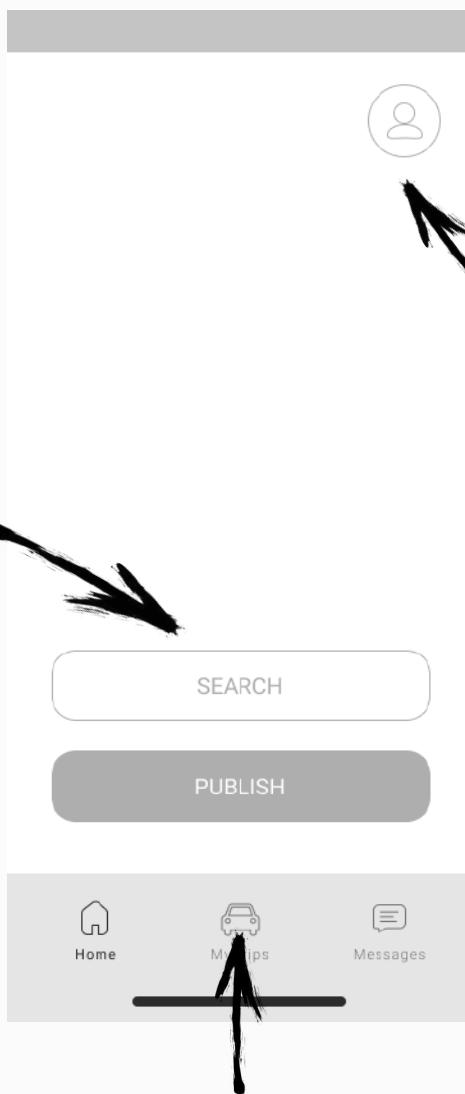


Design Choices

Home screen

Once the critical tasks were identified, we set out to define the primary items that should feature in our **home page** and **navigation bar**.

Since publishing and searching for a trip are two **similar** actions – and both **critical** for the use of the app – we decided to **add them to the home page** (which could be accessed via navigation bar if needed)



The profile is also an important feature that should be **easily accessible**. It allows the users to **manage** their **personal information** such as payment methods, vehicle or change their password or associated email.

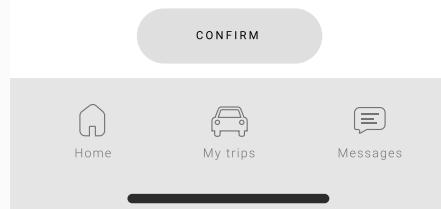
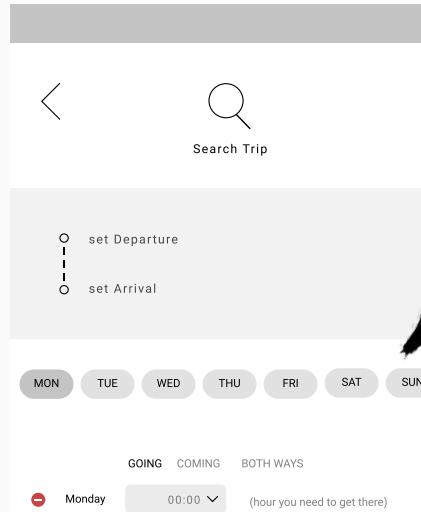
The **navigation bar** is a very important aspect of the design of an application. Therefore it was designed to provide a **quick access** to all of the **important** and **most used features** of the application.



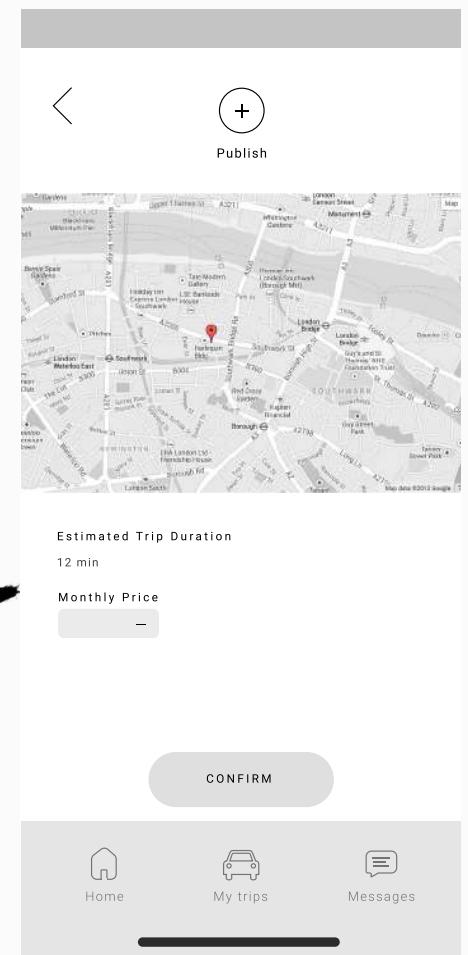
Searching and publishing

We defined the search and publish action as very similar. Hence, both actions add **3** main steps: **defining the locations** of departure and arrival, **defining the days** on which the trips are going to happen, **defining the time** of the day. In case of wanting to schedule two trips for a single day (one to commute to the school/work area and one to return home) a user has the option of selecting a two way trip, having to set the time for both commutes.

The **main challenge** regarding this screen was to create a way to have **all this information on the display** while **maintaining an easy and intuitive flow** from the user's perspective.



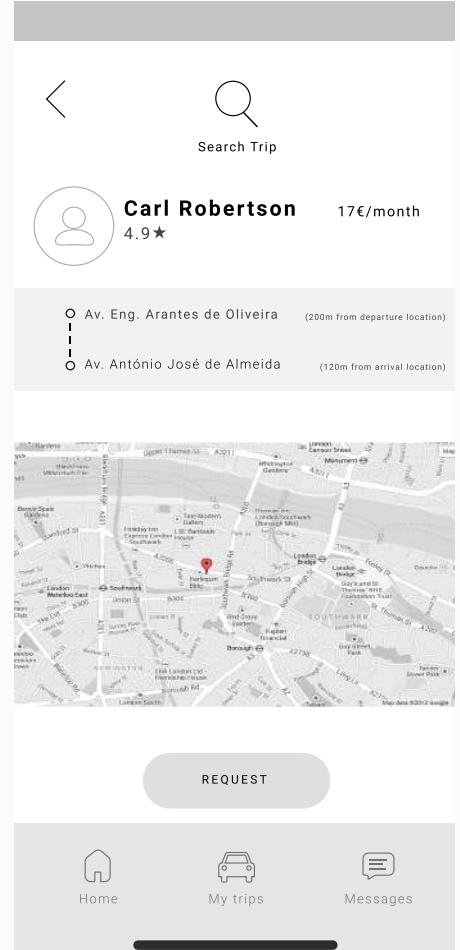
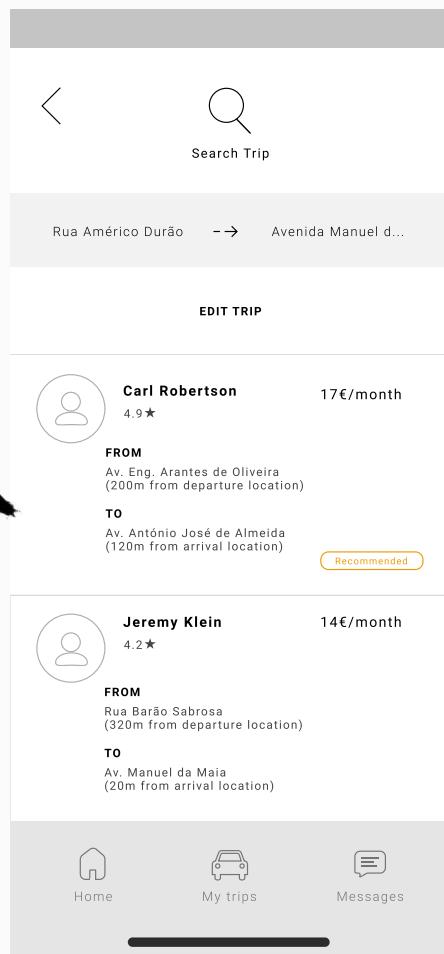
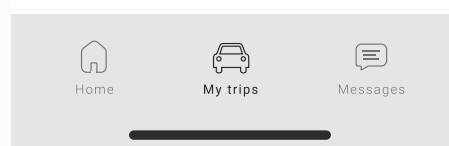
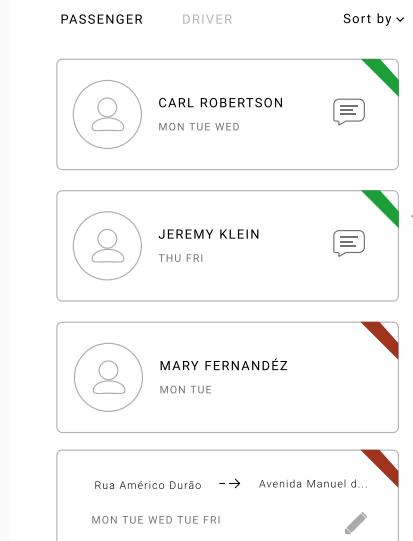
Our team decided that the days of the week should be clickable elements that when clicked would trigger an input for the hours relating that day. This way the user could simply treat **each day independently** of the others.



In case of **publishing a trip** we decided on a **map** preview for the trip he had defined in the previous screen and, with a **distance** and **time prediction** given by the map, he could decide on a **price** to charge other users, monthly (for which he would be given a **suggestion**).

When **searching for a trip**, first the users are given the **available trips**, that **match the parameters** defined in the previous screen.

A user can **preview** the trip (route, time, price and driver info) before he decides to request to take the trip.



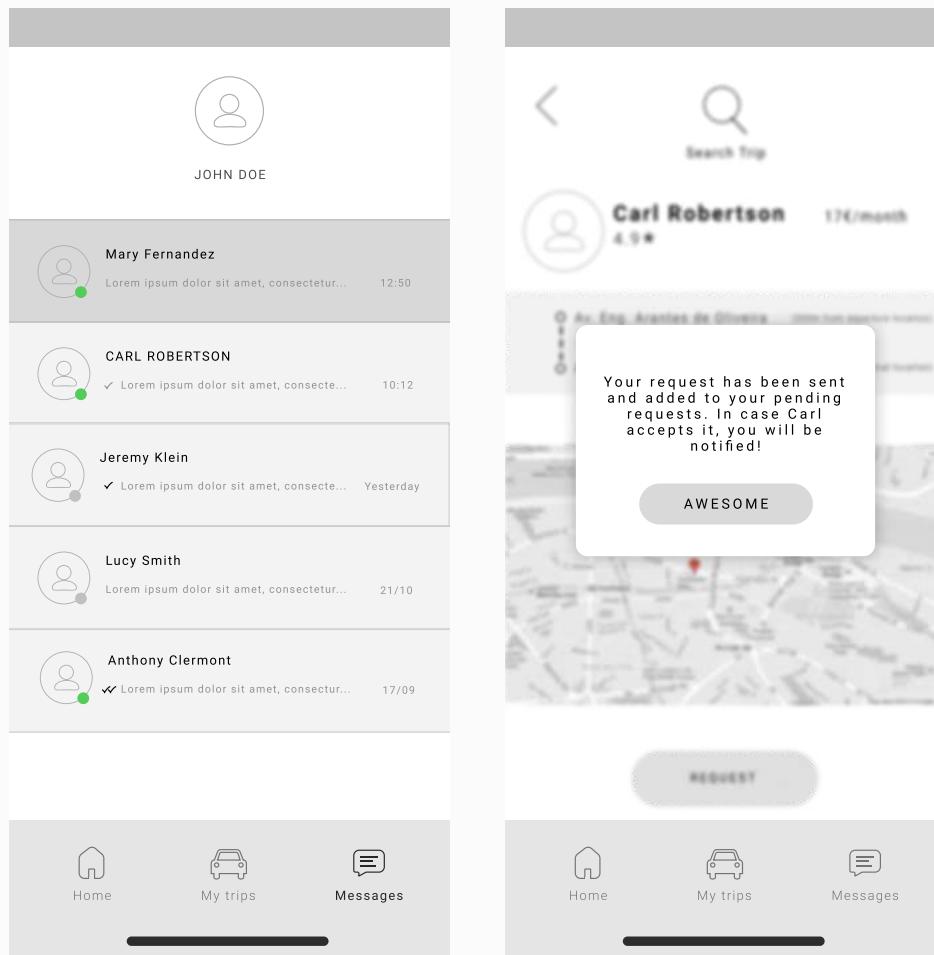
"My Trips" screen



Aside from the critical tasks' essential screens, other screens with their own **design implications** had to be developed at this stage, since their **necessary** for the app's future **functionality**. The screen "**My Trips**" is an example, where the user is presented with the option to see his current trips, the ones he posted or requested and the ones he had in previous months, as both driver and/or passenger.

The first iteration of this screen presented **colour coded tags** to represent a trip's **state, basic info** and option to easily access the **message conversation** between the user and the other person involved in the trip.

Other design choices



A **message screen** was also created, inspired in other messaging apps, and other features that constitute **essential functions** for a better interface experience were designed. These features include **confirmation screens, error handling options** (such as return arrows), **selection field highlights** and **edit field options**.

Think Aloud

The biggest purpose of developing this prototype was to decide on **design choices** for our application, considering its main functionality. For these to be **validated**, we needed to test this prototype using **real users**, so we can get the **best feedback** to help with some aspects that might have been overlooked in the development process.

This being said, we made a **Think Aloud** exercise to best capture **end-user's reactions** to our interface flow.

The guide for this exercise can be found on **annex 4**.

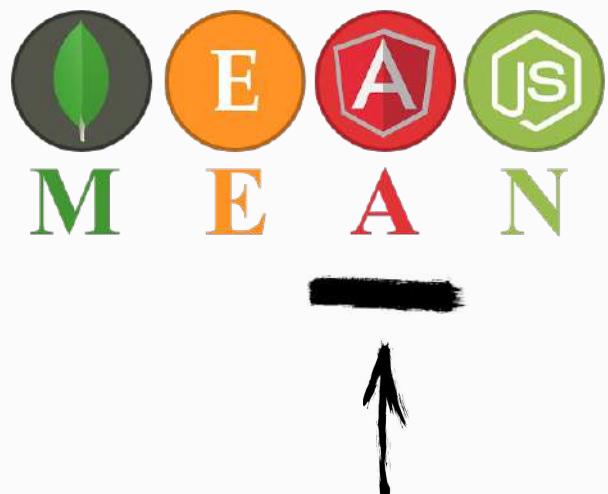
7

Functional Prototype



Functional Prototype

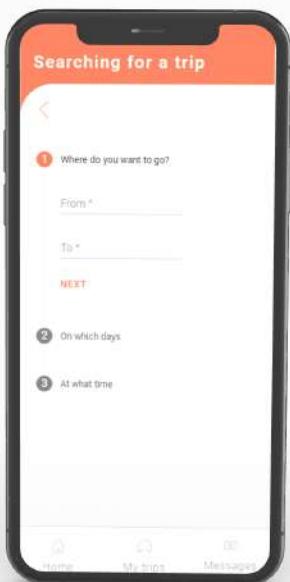
For the development of the **functional prototype**, we decided to build a single page application using the **MEAN framework**. At this stage of development, we focused on building a **simple** and **intuitive interface**, using the feedback given in the **Think Aloud** exercise with the Low-fidelity prototype. Although using MEAN was a decision that would prove **challenging**, we concluded that it would result in a **better prototype** and that it was a technology we were interested in **learning** more about.



For the first iteration of this functional prototype we focused on the **front-end** interface, working mainly with the **Angular JS framework**. By going with the code implementation in this stage, instead of developing it first in a interface design tool, we set ourselves for a **challenge** but it would mean that, for the second and final iteration of the prototype, we would have time to really **focus on refining details** given by future user testing and get everything **working properly** so that the app would be as intuitive and as functional as possible, in the time frame proposed.

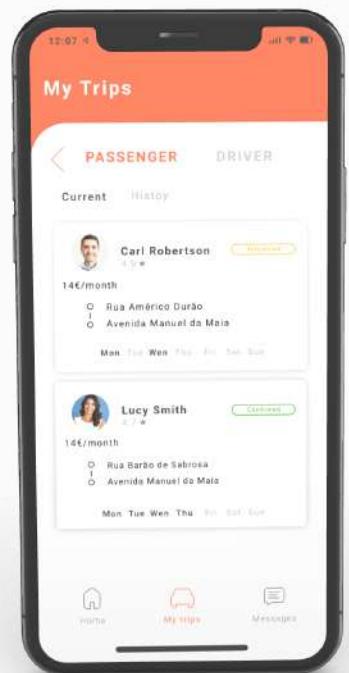
Design Implications

Aside from the interface functionality, some **design implications** were considered from the **feedback** resulting from the user testing with the **Low-Functionality prototype**.



Searching and publishing

The process of **definition** of the desired trip's **parameters** when **publishing** or **searching** for a trip was one of the **main challenges** for users with the first version of the prototype. The **solution** was making it a **step process** so it would be more intuitive for the user to fill the required fields.



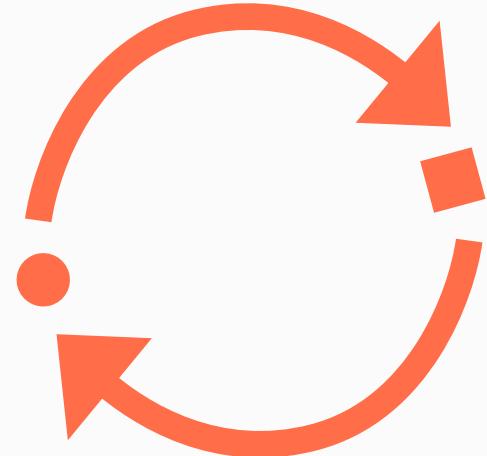
"My Trips" screen

In the **"My Trips"** menu there were a couple of **changes** from the initial design, resulting from the feedback received, changes that were tackled when coding the interface:

- The **flags** indicating trip status were made clearer;
- The **trip card** has **more important information** (such as what days of the week do they concern and the price of the trips);
- Addition of **titles** to help with functionality **understanding**;

Other design changes

The rest of the front-end interface was developed by following the design choices we had previously defined, applying functionality to it. Only a few **UI interaction details** were changed to be in accord with what we verified from the previous user testing, such as **changing colour contrasts** to make some elements more **understandable** and **appealing**, changing some elements' **font sizes**, making some **clickable elements** more **button-like** (to specify they are clickable) and making the **scrollable functionality** of some elements **more obvious**.



Participants



1 user
1 observer
1 person taking notes

User Goals



Perform 6 tasks indicated in the guideline

Observer Tasks



Take notes of verbalized thoughts
Be a facilitator

Think Aloud

One of the reasons we started the development of the app with the front-end interface was so we could get all of the pages done in time for the user research that followed it and this way we could have **feedback** for all of the application's **UI's aspects**.

This feedback came in the form of a **Think Aloud exercise**, where we took note of the **users experiences** with our application, so that we could **rectify** any existing **issues**.

The guide for this exercise can be found on **annex 5**.

8

Final Prototype



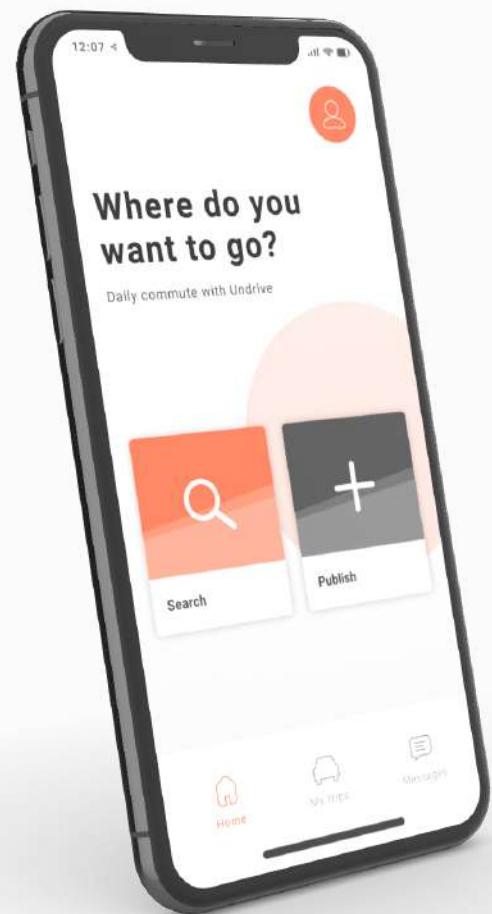
Final Prototype

During the last application development iteration, our team tried to **maintain the usability** of the system while **adding new and more complex functionalities**. These functionalities included the **complete publish** and **search** for route process as well as the **matching between routes** and a **more detailed profile page**.

Besides this additions, some changes were made to previous pages based on **feedback received** or due to the **necessity of adding more functionality** to the page.

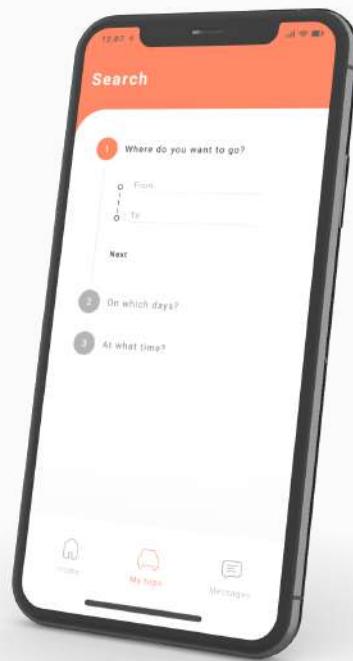
At this stage, and since we decided to define it in earlier stages of the development process, there were **no major changes** regarding the **design**. The main objective was to **maintain consistency** between the entire application and integrating a **functional backend** composed by a fully **RESTful API** and a **Mongo Database**, completing the **MAEN stack architecture** that we set ourselves to do in the previous stage of development.

At this point the **overall feedback** regarding the **navigation** in the application was **very good**. Therefore, we decided that there was no need to make changes to the navbar or other navigation items. The only **exception** to this case was the **removal of some navigation capabilities** in specific pages. This **design implication** will be explained **further**.



Search and publish process

Since the concept of **searching** and **publish** a route are very similar, the **first menu** is **very similar**. We decided to keep the **step form** because this solution allowed us to **add more steps** if needed **without compromising the navigation** between steps which was very easy, allowing the users to jump between each step and still preserving a **visual separation between the different areas**. At this point we also decided to add an **autocomplete function** by using the **Google Places API**. This way we were able to have a **better control** on the **input** and possibly **validate** that it was actually a location such as a street or an avenue.



Matching routes

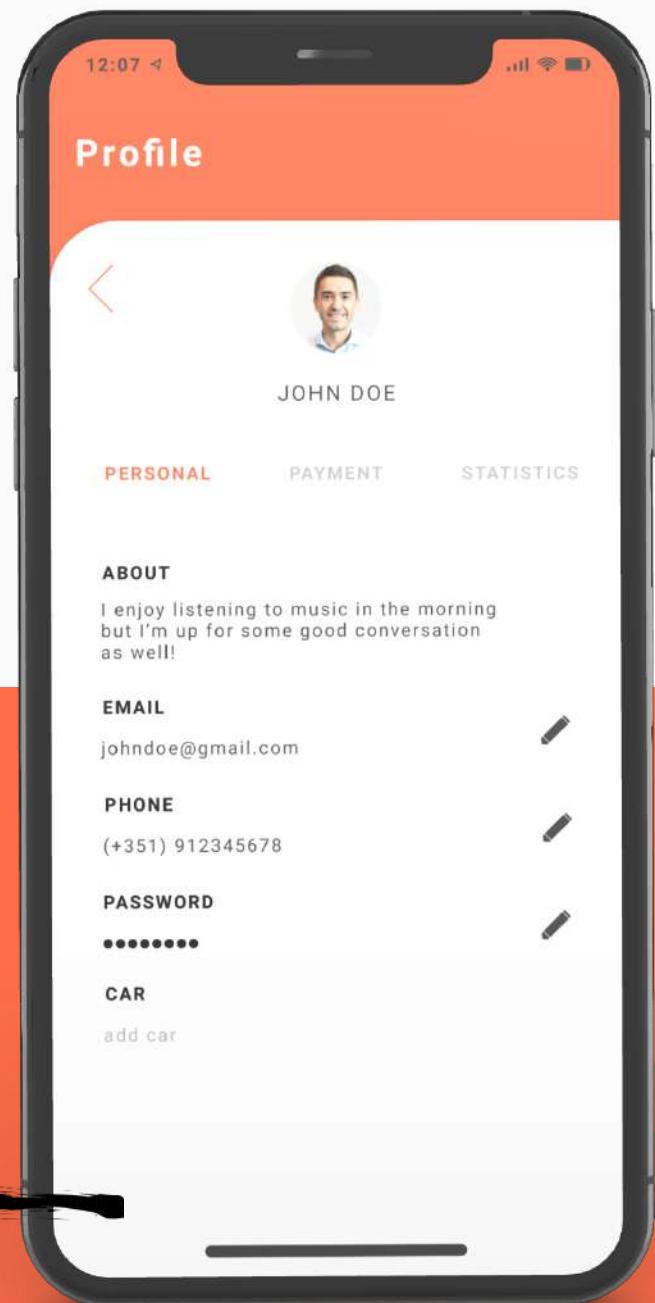
The design in this stage did not suffer great changes from what had been planned at the Low-Fidelity Prototype, as the users **did not experience any difficulties in choosing the preferred trip**. At this stage, the work was more related with the **implementation** of the **algorithm** responsible for **ranking the offers** for the user query and **recommending one**.

Profile page

The profile page was changed to include **three different sections**: one related with **personal information**, one for **payment details**, such as management (addition or removal) of payment methods, and another for **statistics and metrics** regarding the usage of the application. This way we were able to display all **important information** in only one screen **without overcrowding** the display with too many elements and keeping the **navigation simple** and **intuitive**.

Navigation Constraints

As mentioned before, some navigation constraints were added to **improve the flow between screens** of the application. In this case, as well in other pages, **the navigation bar was removed** and a **"back" arrow was added** to the left corner of the screen. This way we could control the **possible interactions** that the user could take and prevent the application flow from becoming messy.



RESTful API

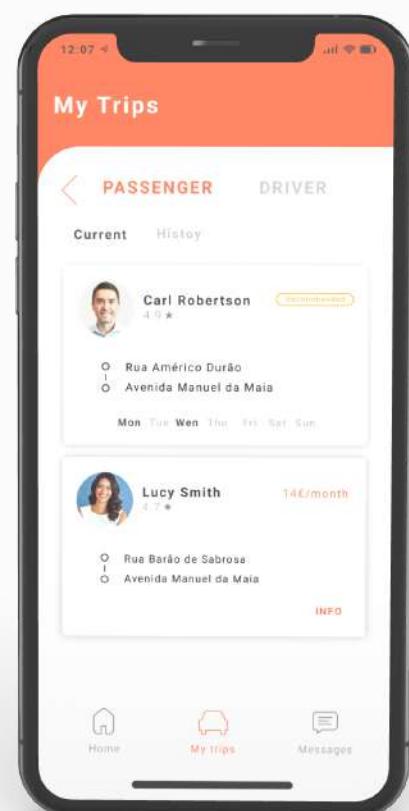
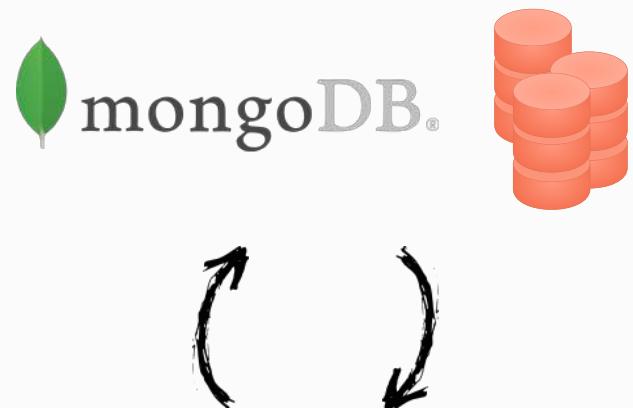
For the API, the **Express software framework** was used to create a **server-based API**, populated with **endpoints to ask and receive data** from the frontend interface, concerning **trips to post** or **search** and **user data** and **messages**.

Also, the API is responsible for the requests to the database that are made to put or retrieve data whenever it is needed.

The **matching process**, when **searching** for a trip, is also done in the Express server, so it can send, through an endpoint to the frontend interface, the **trips that match the search parameters**.

Mongo Database

The database software used was **Mongo DB**, a **flexible** and **scalable document-based database**, giving the ability to **map** data filled documents to **objects** in our application code. This database is used to **store data** such as Trip information, so that users can **access trips** or **post** some themselves, and **user information** and **messages**, so that each application user can see and store their information to be used in **trip creation** and **user matching**.

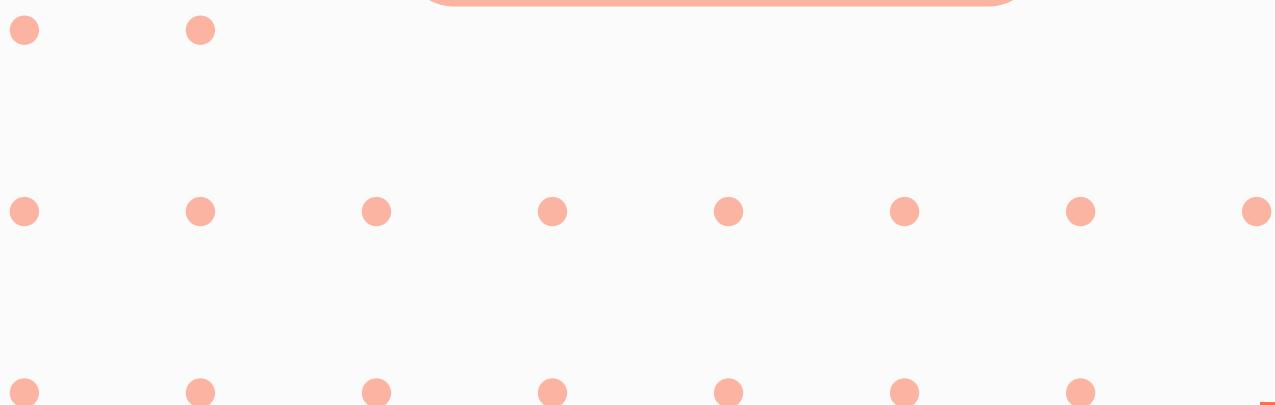


Final Prototype



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Conclusion and Summary



Conclusion and Summary

With such an important mission in hand, to help solve a problem that commuters have to face every day, our app was created with a vision of a future where coming in and out of Lisbon can be **stress free**, by reducing the number of empty seats and thus **reducing traffic**.

The decision to create a **smartphone application** as our solution came from the desire not only to provide a solution that would already be **familiar** to the target users, but also to provide a platform able to keep up with the **future**, capable of **adapting** and **incorporating new functionalities** based on users' needs.

Through our user studies, we found out not only what the users **want**, but most importantly what our users **need**. This is where our functionalities came from, which will not only improve

the experience of daily commuting, but also make carpooling much more **appealing** and **easier** to adopt.

Although with our solution cars are not being completely taken out of the equation, since we feel that for many people it would be too much of a drastic change, we believe that over time, our solution could change the **people's behaviour** regarding their commuting habits.

A look at our work

When the Undrive team started this project, we were faced with the challenge of improving mobility in Lisbon. Our project is not only able to deliver in this aspect but also helps making Lisbon - **and possibly other metropolis** - into a **greener** and more **habitable** city. Our primary concern was solving a problem that existed and that affected a **large portion** of the population and finding a solution that could be **scalable** and easily implemented in any city.

This project was very enriching in the sense that showed us the **importance of working with users** and how we could improve based on our **client's needs**. Many times throughout the creation and development processes, some of our ideas had to be abandoned so we could take into account what the users actually **wanted** and felt they **needed**. This work methodology was one of the leading factors that guided our design towards a more **user friendly** and **intuitive**

interface - an aspect regarded as very positive by most people.

We also had the opportunity to work with **new technologies** and develop our portfolio as future professionals.

Acknowledgements

This project could not have been made possible without the help of our **teachers** and **mentors**: Professor Nuno Nunes and Professor Rafael Belchior who gave **valuable insights** and **guided** us throughout the process of making this application. We also want to thank Pedro Oliveira, Cláudia Silva and João Ferreira by their advice, time and expertise they shared with us.

Finally we also want to thank all of our **end users** that gave us **precious** feedback and insights about what we could **improve**. The Undrive team could not be more **grateful** to everyone who was part of this and **made it possible**.

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(Annex 1)

UNDRIVE

GROUP 7

QUESTIONNAIRE

FORMATIVE USER STUDY

Mobility Questionnaire [User Centered Design]

This questionnaire was made for academical purposes, specifically for the User Centered Design course at Instituto Superior Técnico.

Answering this questionnaire will take no more than 5 minutes and will not "test" you or your ability. Rather, it will help getting an idea of the mobility reality in Portugal and the usual preferences and costumes of the everyday student/worker in their home to study/workplace commute.

In this questionnaire your information and answers will be treated anonymously and confidentially.

Thank you for your time.

[Seguinte](#)

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Google Formulários



Mobility Questionnaire [User Centered Design]

Personal Information

This segment regards some of your personal information for user segmentation purposes.

What is your gender?

- Female
- Male
- Other
- Prefer not to say

How old are you?

- <18
- 18-25
- 26-40
- 41-65
- >65



What's your occupation?

- Student
- Working
- Student-Worker
- Unemployed
- Retired
- Outra:

Where are you from?

- Portugal
- Other European Country
- Non European Country

[Anterior](#)

[Seguinte](#)

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Google Formulários



Mobility Questionnaire [User Centered Design]

Mobility

This segment regards your daily commute to study/workplace.

Where do you live? (county in Portugal)

A sua resposta

Do you study/work in the same county of your residence?

- Yes
- No

How do you go to work/school?

- Bike/Scooter
- Car
- Motorcycle
- Public Transports (Bus, Metro, Train, Boat)
- Taxi/Uber/Bolt/Other similar services
- Walking
- Outra:



Your daily transport vehicle is:

- Private
- Rented (e.g. GIRA, LIME, DriveNow, etc.)
- Non Applicable

How much time in average do you spend going to study/workplace?

- Less than 5m
- Between 5m and 15m
- Between 15m and 30m
- Between 30m and 1h
- Between 1h and 1h30m
- More than 1h30m



How important are the following factors when choosing your way of transportation?

	Not Important	Slightly Important	Important	Very Important	Extremely Important
Price	<input type="radio"/>				
Security	<input type="radio"/>				
Comfort	<input type="radio"/>				
Time	<input type="radio"/>				
Reliability	<input type="radio"/>				
Environmental Impact	<input type="radio"/>				

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Google Formulários



Mobility Questionnaire [User Centered Design]

Carpooling

Carpooling is the sharing of car journeys and costs involved so that more than one person travels in the same car.

Some service providers such as BlaBlaCar, Via Verde Boleias, Thumbeo and Boleia.net that you might be familiar with are already available in Portugal.

Were you familiar with the concept of carpooling?

- Yes
- No

Have you ever used a carpooling service?

- Yes
- No

Would you consider (re)using a carpooling service in the future?

- As a passenger
- As a driver
- Both
- No
- Don't know



How comfortable are you /would you be sharing a car with new people?

1 2 3 4 5

Very uncomfortable Very comfortable

How important are the following factors when considering using a carpooling service?

	Not Important	Slightly Important	Important	Very Important	Extremely Important
Similar interests with the driver/passenger(s)	<input type="radio"/>				
Flexibility with routes	<input type="radio"/>				
Automatic payment method	<input type="radio"/>				
Traveling with the same group of people daily	<input type="radio"/>				
Driver/passenger rating	<input type="radio"/>				
Type of car	<input type="radio"/>				
Comfort/seat space	<input type="radio"/>				
Trunk space	<input type="radio"/>				



If provided a safe and reliable platform for matching people with similar routes, how interested would you be in using a carpooling service?

1 2 3 4 5

Not Interested

Extremely Interested

[Anterior](#)

[Seguinte](#)

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Mobility Questionnaire [User Centered Design]

Application Interaction

This segment regards how you interact with mobile applications on your daily life.

How important are the following factors when using a service provider mobile application?

	Not Important	Slightly Important	Important	Very Important	Extremely Important
Intuitiveness	<input type="radio"/>				
Performance	<input type="radio"/>				
Automation	<input type="radio"/>				
Price	<input type="radio"/>				
Discounts/Prizes	<input type="radio"/>				
No ads	<input type="radio"/>				



Which of the following means to contribute to application developers do you find appropriate? (you can select several or none)

- Commission on provided service
- Premium services
- Paid Application
- Donations
- Advertisement
- Sponsors Discounts/Prizes

How do you prefer to pay services that you use regularly?

- Pay per Service
- Pay Weekly
- Pay Monthly
- Pay Yearly

[Anterior](#)

[Seguinte](#)

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Mobility Questionnaire [User Centered Design]

Thank you for participating!

Your time is greatly appreciated! Our team is much obliged to you for your help in this process.

[Anterior](#)

[Submeter](#)

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Google Formulários



(Annex 2)

UNDRIVE

GROUP 7



THINK ALOUD

USER RESEARCH

Think Aloud Exercise

This study was developed for academical purposes, specifically for the User Centered Design course at Instituto Superior Técnico.

This exercise will be preformed in a controlled environment were the participant will have access to a device with a competitor carpooling application installed (*blab la car*, *thumbeo* or *via verde boleias*), an internet connection and sufficient funds.

In this format of study, user under examination is asked to verbalize their thoughts throughout the entire duration of the exercise.

Participants:

- 1 User;
- 1 Observer;
- 1 Driver;

User Goal:

Use a carpooling application to catch a ride from Instituto Superior Técnico's Alameda campus to Instituto Superior Técnico's Taguspark campus.

Description:

The user will use the application to book and take a trip, previously created by the driver, where he will report his/hers thoughts to the observer, who will also be taking the ride. The user will receive the instructions before he/she is handed the device and be questioned about his/hers experience at the end, upon returning the device.

Observer Tasks:

Pre-experiment:

- Identify the user (age group, gender, etc.);
- Explain and instruct the user;
- Hand user the device;

During the experiment:

- Take notes of user's verbalized thoughts;

Post-experiment:

- Retrieve device;
- Question user about experiment;

Post-experiment Questionnaire:

- Did you feel like there were unnecessary steps in the booking of the trip?
- What challenges did you feel you had during the experiment?
- What would you change in the application process?
- What would you change in the trip?
- What did you like about the application?
- What did you like about the experiment?

User Compensation:

He/She gets a beer.

(Annex 3)

UNDRIVE

GROUP 7

CONTEXTUAL INQUIRY

USER RESEARCH

Contextual Inquiry

This study was developed for academical purposes, specifically for the User Centered Design course at Instituto Superior Técnico.

This exercise will be performed in a controlled environment were 3 participants, who don't know each other will carpool and be questioned before, during and after the trip, whilst in a natural car sharing environment.

Participants:

- 3 User;
- 1 Observer;
- 1 Driver;

User Goal:

Carpool from Instituto Superior Técnico's Alameda campus to Almada.

Description:

The users will catch a ride to Ericeira, while interacting with each other. The users will receive instructions before catching the ride and will be questioned in the various stages of the experiment.

Observer tasks:

Pre-experiment:

- Identify the users (age group, gender, etc.);
- Explain and instruct the users;
- Question the users about their knowledge/experience of carpooling;

During the experiment:

- Take notes of users behaviour;
- Question users about experiment;

Post-experiment:

- Question user about experiment;

Pre-experiment Questionnaire:

- What's your experience with carpooling?
- Are you usually comfortable with sharing a ride with new people?
- What are your expectations for this trip?

Post-experiment Questionnaire:

- How comfortable were you in the trip?
- How was the interaction with the other participants?
- Did this experience change your opinion of carpooling?
- What benefits do you see carpooling regularly having, in people's lives?
- Do you see yourself carpooling more often in the future?

User Compensation:

They all get a beer.

(Annex 4)

UNDRIVE

GROUP 7



THINK ALOUD

FORMATIVE USER STUDY

Introduction

Undrive is a project regarding mobility in metropolitan cities, such as Lisbon. The idea behind this project is to solve the problems that the excessive amount of cars that enter and leave cities on a daily rate cause. To solve this issue, we created Undrive, a mobile platform for *carpooling* that provides a matching system between users with similar routes on their daily commutes so that they can share their car.

This is a study to validate ideas regarding the design of user interface. Therefore, users will be asked to perform certain tasks described on the next section.

The experiment will be recorded for further analysis.

Formative User Study

Think Aloud

For this study our users will help us by trying the low-fidelity prototype. We are looking to find places where the application might be difficult or unintuitive to use. If any problem arises, it should be the product's fault, not the user's. That is exactly what we are looking for, so we encourage users to find such weak spots. We are testing our product not the users.

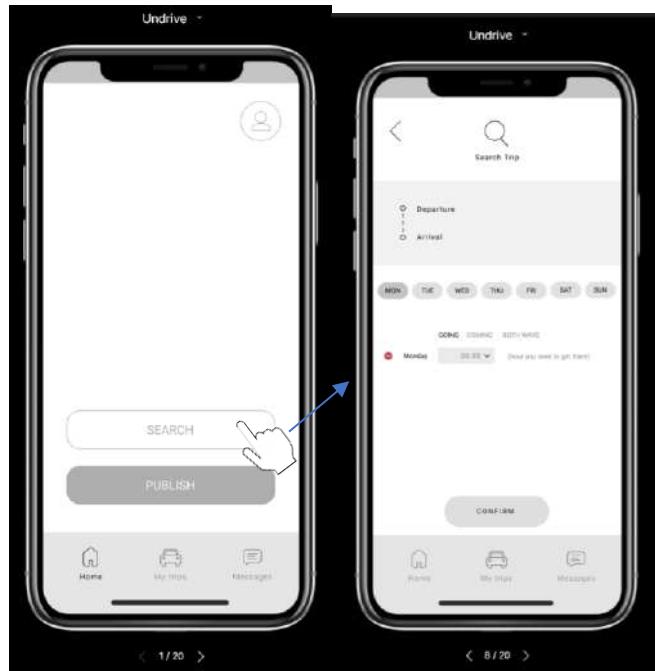
The users under examination will be asked to verbalize their thoughts throughout the entire duration of the exercise.

Participants

The study will be conducted to **ten** target-users. In each iteration, the experiment will be performed by **one** user, it will be monitored by **one** observer, and will be registered by **one** person who will take notes.

Explaining the design

In order to perform this study, users will use Figma – an interface design tool – that enables a presentation mode that allows users to navigate through the pages in the same way that they would do in a smartphone. Mouse clicks will simulate exactly taps on the phone screen.



Exercise

To perform the experiment, each user will be prompted to complete the following exercise:

"We have found that we get a great deal of information from these formative tests if we ask people to think aloud as they work through the exercises. It may be a bit awkward at first, but it's really very easy once you get used to it. All you have to do is speak your thoughts as you work. If you forget to think aloud, I'll remind you to keep talking. Anytime that an input in the application is required, by clicking the fields you will simulate such input."

You have the following tasks to perform:

1. Add a car to your profile, a Toyota Yaris from 2017, with the car plate 00-XX-25;
2. Publish a two-way trip going from Av. Eng. Arantes de Oliveira to Av. António José de Almeida, on Mondays, arriving at the destination at 8:30 am and returning at 7 pm, setting the price for it;
3. Search for a trip from Rua Américo Durão to Avenida Manuel da Maia, on Mondays, arriving at the destination at 9 am;
4. Choose and request the recommended trip;
5. Open chat to talk to the driver who published that trip;
6. Check your currently scheduled trips;
7. Add a bio to your profile in the "About you" section;
8. Return to the Home screen.

UI Validation

After finishing the exercise, users will be asked to answer the following questions:

1. What were the main challenges?
2. What was the easiest task to perform?
3. What did you like the most?

(Annex 5)

UNDRIVE

GROUP 7



THINK ALOUD

USABILITY TESTING

Introduction

Undrive is a project regarding mobility in metropolitan cities, such as Lisbon. The idea behind this project is to solve the problems that the excessive amount of cars that enter and leave cities on a daily rate cause. To solve this issue, we created Undrive, a mobile platform for *carpooling* that provides a matching system between users with similar routes on their daily commutes so that they can share their car.

This is a study to validate ideas regarding the design and functionality of a basic version of the prototype. Therefore, users will be asked to perform certain tasks described on the next section.

The experiment will be recorded for further analysis.

User Testing

Think Aloud

For this study our users will help us by trying the low-functionality prototype. We are looking to find places where the application might be difficult or unintuitive to use, or presents any detectable errors/bug that were not accounted for before. If any problem arises, it should be the product's fault, not the user's. That is exactly what we are looking for, so we encourage users to find such weak spots. We are testing our product not the users.

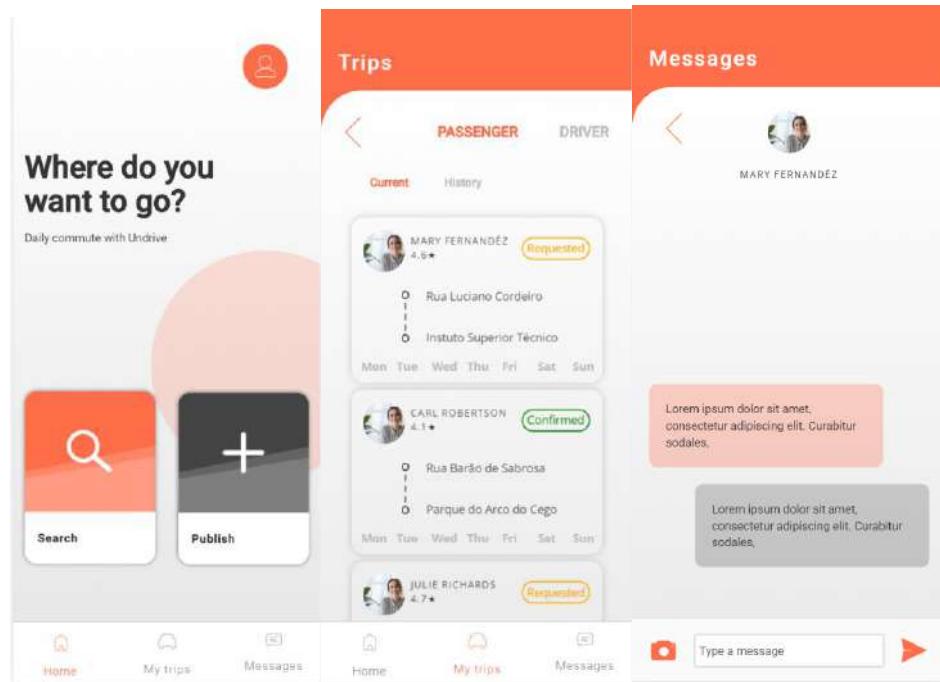
The users under examination will be asked to verbalize their thoughts throughout the entire duration of the exercise.

Participants

The study will be conducted to **10 - 14 users**. In each iteration, the experiment will be performed by **one** user, it will be monitored by **one** observer, and will be registered by **one** person who will take notes.

Explaining the design

In order to perform this study, users will use a deployed version of the prototype, using the Heroku framework - a **container-based cloud Platform as a Service (PaaS framework used to deploy, manage, and scale apps)** – that enables the users to navigate through the app, in the same way that they would do in a smartphone. Mouse clicks will simulate exactly taps on the phone screen.



Exercise

To perform the experiment, each user will be prompted to complete the following exercise:

"We have found that we get a great deal of information from these usability tests if we ask people to think aloud as they work through the exercises. It may be a bit awkward at first, but it's really very easy once you get used to it. All you have to do is speak your thoughts as you work. If you forget to think aloud, I'll remind you to keep talking. All the data that you will see on the application, regarding existing trips or users is mocked and do not represent real people or trips."

You have the following tasks to perform:

1. Publish a two-way trip going from Rua Luciano Cordeiro to Instituto Superior Técnico, on Mondays, at 08h30 and returning at 19h00, setting the price for it at 20€/Month;
2. Go to your messages and open one of the chats;
3. Search for a trip from Rua Américo Durão to Avenida Manuel da Maia, on Mondays, at 09h00;
4. Choose and request the recommended trip;
5. Check your currently scheduled trips;
6. Return to the Home screen.

UI Validation

After finishing the exercise, users will be asked to answer the following questions:

1. What were the main challenges?
2. What was the easiest task to perform?
3. What did you like the most?
4. Did you notice any bugs that were not mentioned?

The person who is taking notes will also record the times and clicks needed to complete each task.