Platforma za podjetja ki omogoča skupno povezovanje voženj med zaposlenimi z oddajanjem prostih parkirnih mest

Avtorji: Dea Beatovikj, Rok Mokorel, Blaž Potočnik, Nataša Zekič, Žiga Žalec

SUSTAINABLE DEVELOPMENT GOALS

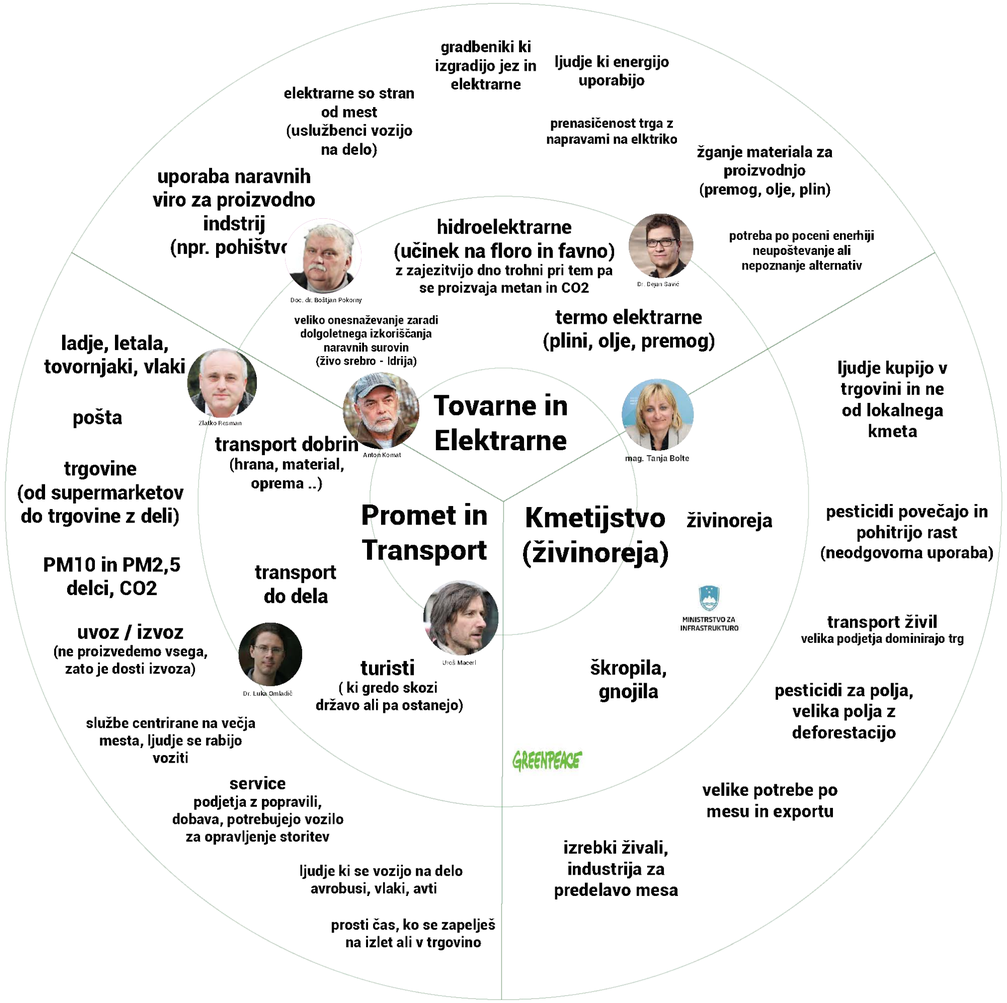
Univerza v Ljubljani
Akademija za likovno umetnost in oblikovanje

Uvod

Študentje magistrskega študija treh fakultet Univerze v Ljubljani sodelujemo na interdisciplinarnem projektu. Izhajamo iz 17 trajnostnih ciljev združenih narodov, ki ponujajo podlago za reševanje podnebnih sprememb, družbene neenakosti in dviga splošne kvalitete bivanja. V prvem semestru smo se študenti ALUO ukvarjali z raziskovanjem področja klimatskih sprememb in razvojem grobe konceptualne zasnove. Nato smo se povezali s študenti Fakultete za elektrotehniko. Tekom letnega semestra smo projekt skupaj razvijali naprej.

Načrt raziskave

Raziskave smo se lotili z iskanjem ključnih problematik na področju klimatskih sprememb. Med procesom smo izpostavili glavne krivce in se fokusirali na iskanje pomembnih aktivistov, s katerimi bi opravili intervju. Aktiviste smo želeli vključiti v našo raziskavo saj nam bi pomagali pri natančnejem razumevanju problematike.



Intervjuji

Aktiviste smo kontaktirali preko elektronske pošte in jih naprošali za kratek intervju. Na koncu tedna smo dobili 6 odgovorov. Z vsakim strokovnjakom smo opravili (približno dvourni) intervju na katerega smo se predhodno pripravili. Pri vsakem aktivistu smo raziskali kaj vse je napravil na njegovem področju in katere intervjuje je opravil pred nami, da se bi izognili ponavljanju vprašanj.

1
This country should focus on development on renewable resources for energy.
Solar collectors, wind turbines and hydro power where it is possible to build it.
Greenpeace Slovenija

2
There should be a mix of different type of renewable energy production
Greenpeace Slovenija

3
We should reduce energy use.
Greenpeace Slovenija

4
Main air polluters in Slovenia :
Transport
Energetics
Independent house heating - people burn everything.
Greenpeace Slovenija

5
People are aware of the pollution problems, but they are not aware about solutions, that they are real and possible.
Greenpeace Slovenija

6
Nuclear power plants are not safe, the waste is harmful and there are a lot of hidden costs.
Greenpeace Slovenija

7
There should be renewable resources that are smaller but widely spread. We should decentralize energy production.
Greenpeace Slovenija

8
Energy production in Slovenia is very centralized, a small number of people are responsible for it.
Greenpeace Slovenija

9
If it is invested in PR people and business owners will be informed about opportunities and available solutions.
Greenpeace Slovenija

10
We need a research about number of people on busses and trains to adjust the timetables or to offer public transport on call or a van in less crowded hours.
Ministry of infrastructure

11
People go to work by car because of commodity and not being aware that public transport is cheaper option.
Ministry of infrastructure

12
Public transport is not good enough for people to choose it instead of their cars.
Ministry of infrastructure

13
We should have rent a car on few spots in the city, just as with the bikes in order to reduce traffic.
Ministry of infrastructure

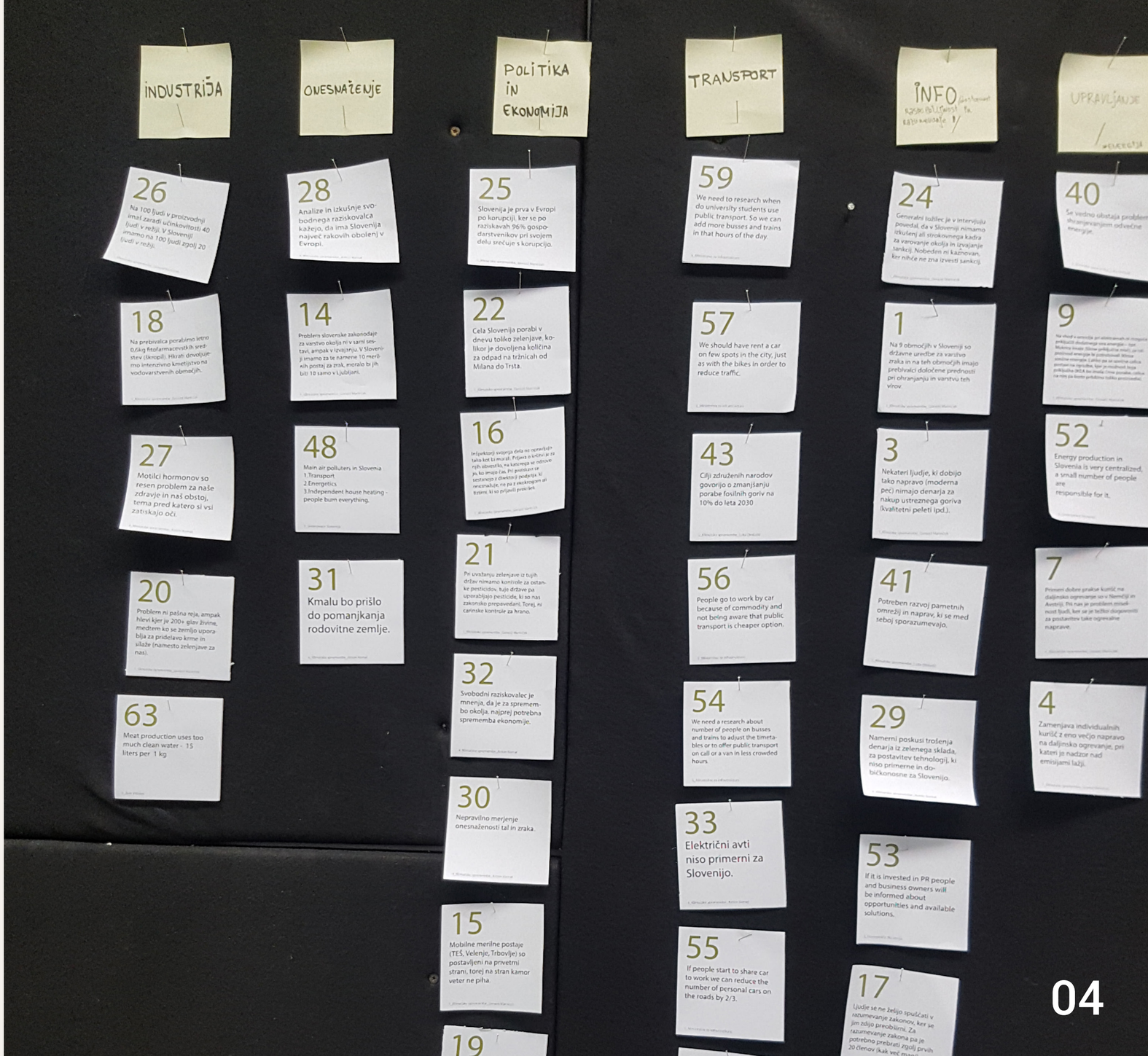
14
Building an infrastructure is a long term process.
Ministry of infrastructure

15
We need to research when do university students use public transport. So we can add more busses and trains in that hours of the day.
Ministry of infrastructure

Inovativne smernice

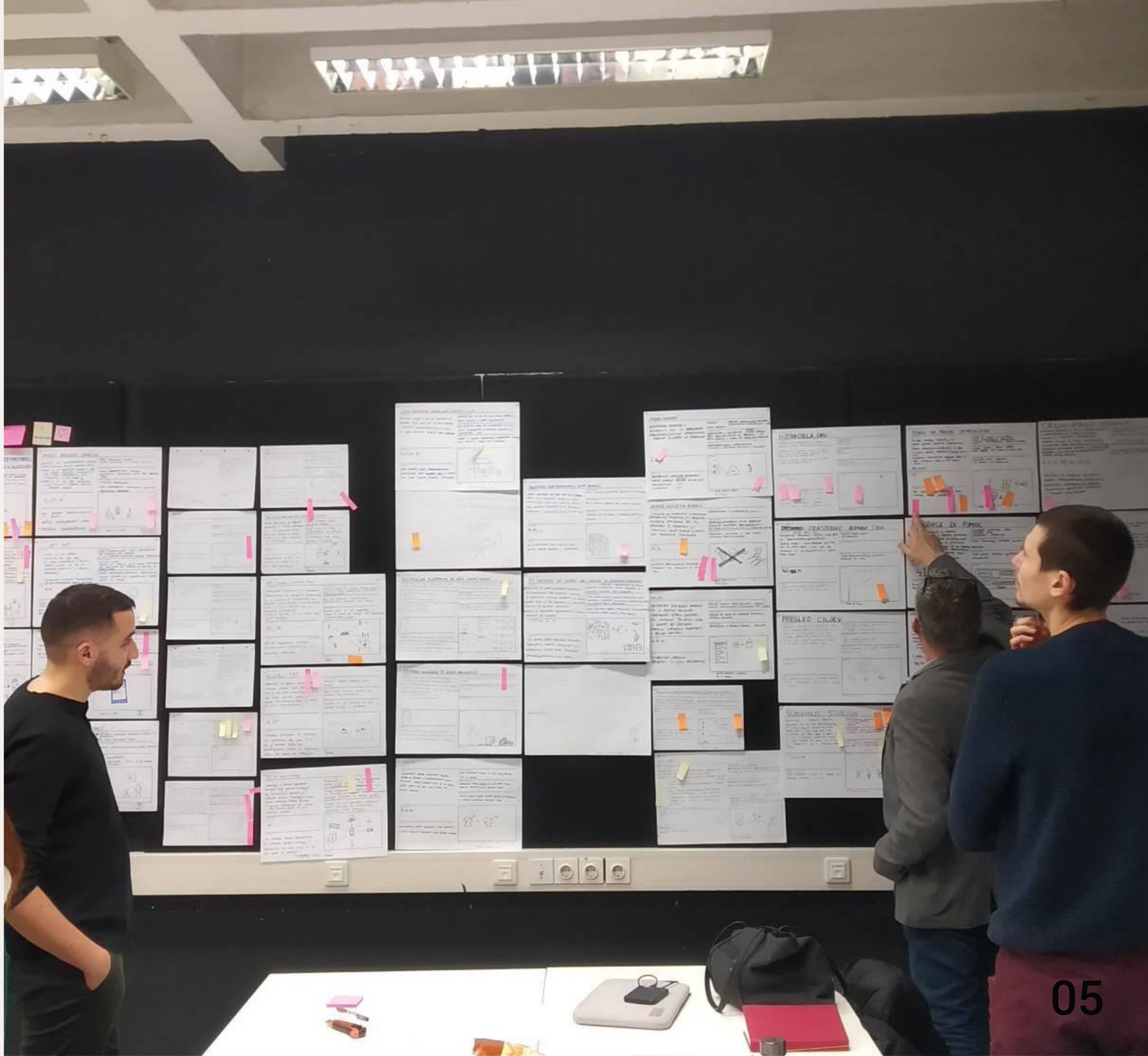
Skozi intervjuje smo napravili transkripte in v njih iskali ključne smernice, katere nam bi pomagale pri nadaljnjem razvoju in usmeritvi v projektu. Na koncu smo prišli na 63 smernic, katere smo razdelili po različnih kategorijah kot so:

-Politika in ekonomija
-Industrija
-Onesnaženje
-Transport
-Info
-Upravljanje



Priložnosti in izločanje

Skozi pridobljene smernice je naša skupina sestavila devet priložnosti, katere smo si med seboj predstavili z ostalim sošolci. Sledilo je izločanje priložnosti, kjer je vsak posameznik izbiral z listki različnih baru, listki so prestavljavi med inovativnostjo, ekonomskim in sistemskim doprinosom ter osebno preferenco. Sledil je ožji pogled v projekt s selekcioniranjem in kombiniranjem med ostalimi priložnosti.



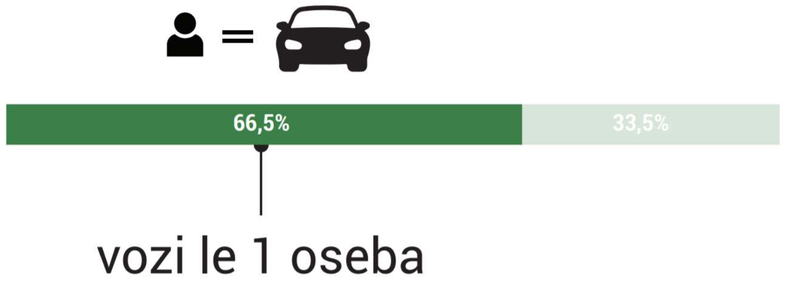
Zakaj to počnemo?

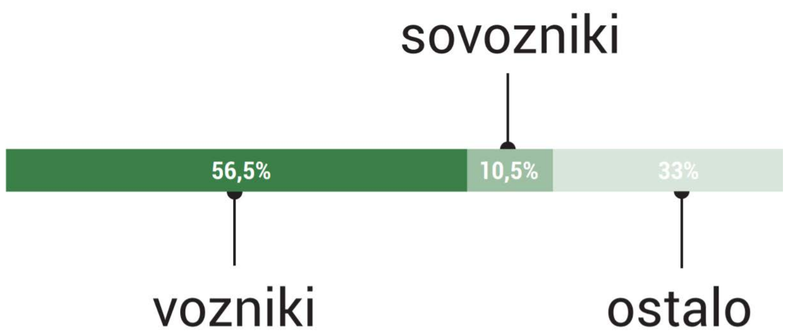
V projektu izhajamo iz naslednjih ključnih ugotovitev raziskave

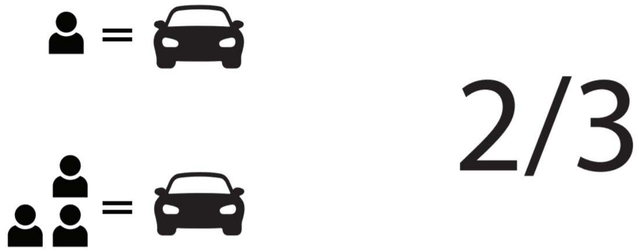
Večina ljudi se do svojega delovnega mesta pripeljejo sami s svojim osebnim vozilom;
Zaradi tega nastajajo prometni zamaški in večja onesnaženost ozračja;
V mestnem jedru težje najdemo prosto parkirno mesto;
Nekatera podjetja imajo premalo ali preveč parkirišč;

Dodatni dejavniki projekta

Podjetja ne ponujajo oddajanje praznih parkirnih mest;
Podjetja premalo razmišljajo o skupinskih prevozov za njihove zaposlene;





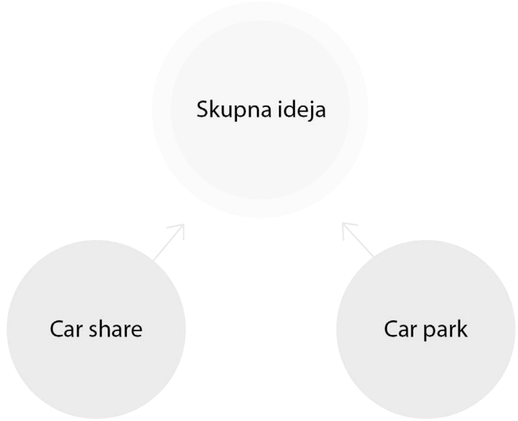


Sodelovanje

Proti koncu prvega semestra smo preko mentorja dobili priložnost nadaljevati naš projekt s Fakulteto za elektrotehniko. Naša naloga je bila, da projekt prilagodimo z njihovo stroko. Sledil je skupni brain storm z vsako skupino, kjer smo ustvarjali možnosti povezovanja projekta s FE.

Predstavitev na FE

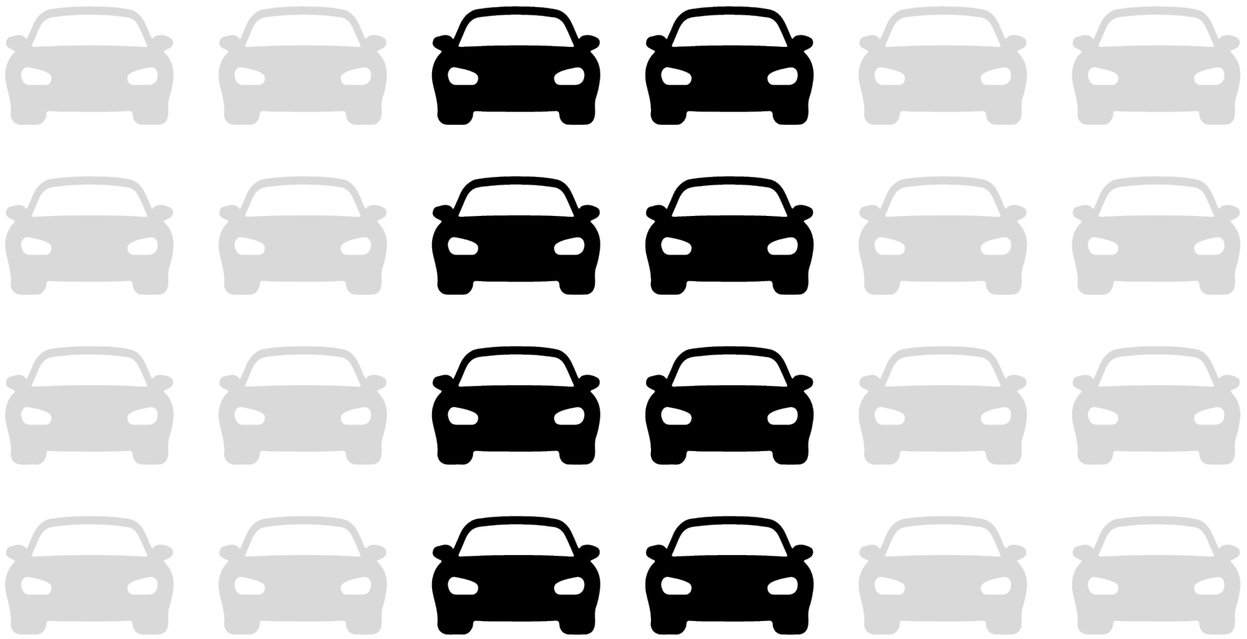
Sledila je predstavitev na FE kjer je 20 skupin iz treh različnih faksov predstavilo svoje ideje. Med skupinam smo iskali podobne interese pri katerih bi naprej razvijali na ideji ali pa jo nadgradili in jih povezali skupaj. Naši skupini se je pridružila skupina s tremi študenti FE z idejo Rbnb parking.



Projektna izhodišča

After forming the team we combined the two ideas together. Adapting them to one another we got to developing a concept for a platform and device.

Concept idea : Platform for companies that have empty parking spots giving them opportunity to rent them after work hours and creating more available spots around the city that would otherwise be empty, and in the same time the app will give employees the opportunity to share car ride to work and save transport money.



Časonvnica

Together with our team members we created a schedule of activities and tasks for everyone with weekly meetings to discuss progress and issues.

ALUO students:

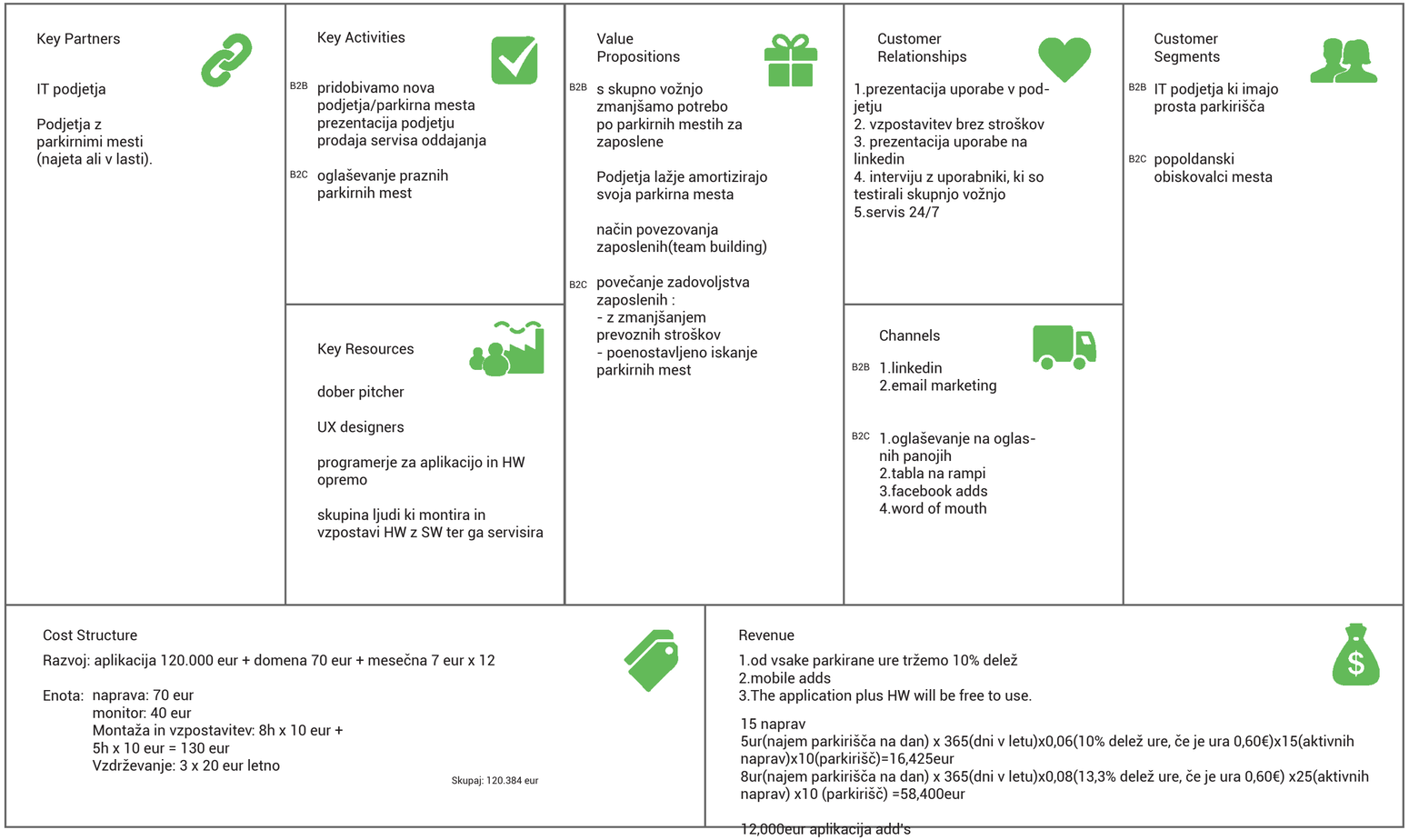
- Design research
- Design management
- Designing and improving user experience of the final product.

FE students:

- technical and electrical aspects of the hardware in the device that will detect car presence in the parking space and communication between the app and the device.

Business model canvas

Using business model canvas we approached analyzing who are our target customers, tools, professionals and resources we need. Who our customers are but also how they function, think and how they prefer to be approached.



Business model canvas

S pomočjo BMC smo si lažje izbrali naša ciljna podjetja.

Izbrali smo si IT podjetja

Hoteli

\+ nahajajo se blizu mesta/centra
Veliko parkirišč(praznih zaradi trenutnega stanja)
Vgrajena rampa
Bolj vidno
Turizem bo zmanjšan v prihodnjih letih
Imajo že zaposleno osebo ki skrbi za parkirišče

\- uporaba parkirišč za ostale uporabnike in ne svoje
Predvidevamo da zaposleni ne smejo uporabljati hotelskega parkirišča
Velika uporaba platform poleg tistih katere so že pri njih v uporabi(svojo, booking, trivago..)
Težja uporaba aplikacija in zaupanje platformi

IT

\+ platformo bi lažje uporabljala podjetja, ker spada pod njihovo stroko(starost je tudi velik faktor)
Pogled na podjetje(zeleno podjetje)
Bol so povezani skupaj(druga kultura, team building)
Več se ukvarjajo z svojimi zaposlenimi(udobje, spoštovanje)
Bolj razpršena po Ljubljani
Dobiček tudi za v prihodnost
veliko IT podjetij v Ljublani, pričakujemo večji odziv

\- nimajo vsa podjetja vgrajene rampe, katera predstavlja dodaten strošek
Malo podjetij se nahaja v centru(z parkirnimi mesti)

od IT podjetji pričakujemo večjo zagretost in lažjo uporabo platfrome, saj izhajajo iz njihove stroke. Boljši izdgled za brend.

Evalvacija prototipa

Testiranje prototipa

Testing the application would require testing both technical and UX aspects:

Optimization of travel distance and pick up locations – algorithm;

Accuracy of measuring distance;

Accuracy of calculating transport cost when every parameter is included;

Testing user experience and user interface: Showing the app to people of different age and background to see how they interact with it, if they easily understand the functions. This will get us useful insights for improvements;

Indikatorji uspešnosti

Attracting few people from the same company to use the app and share a ride together;

Designing app interface that will be easy to understand for each participant (company owner, employees, user renting parking spot);

Use of company parking spots after work hours;

Saving money for transport cost - employees;

Projektna izhodišča

Funkcionalna izhodišča

Opportunity to be used by individual employees connected to the company profile;
Showing the locations of free parking spots to individual users after working hours;
The app should gather data from all users in order to calculate costs and parking payment;
The app should access locations of the users through GPS to measure the trip they made;
The app should send information to registered users about available parking;
At the end of the month the transport cost will be split on the number of people driving in the car and reduced from their monthly transport benefit;
Users renting the parking spot should be able to pay to the company for the spot per hour;

Tehnološka izhodišča

Smartphone application (Android,IOS);
Upon starting the ride they should smartly calculate a road to pick up the colleagues;
GPS in the phones will register the movement of the car;
Calculating costs for transport considering all input parameters;
Registering availability of parking spots with sensors is a small step towards a future where all parking spots will be marked and connected to autonomous cars;
App and device should be maintained regularly;

Projektna izhodišča

Estetska izhodišča

Naprava ne sme drastično poškodovati parkirišča;
Enostavna uporaba najetega parkirišča;

Emocionalna izhodišča

Fokus platforme mora biti prilagojen zaposlenim uporabnikom, ter uporabnikom ki najamejo parkirne prostore;
Sistem za oddajanje parkirišča mora biti cenovno ugoden za podjetja;
Aplikacija mora ponujati enostavno prijavo in odjavo iz parkirišča;
Nadzor nad izbiro s katerim sodelavcem se bomo skupaj vozili;
Skupna vožnja lahko gradi med odnosi med sodelavci ;

Koncept

This board will be placed on the entrance. Inside it is the hardware that gets the information from the platform about:

1.Who is the driver

2.Who should be in the car sharing the ride

3.The camera will pick up the car plate number

4.Every plate number is connected to the driver user name on the app and through GPS of the phones of those who are in the car it will determine if they are on the exact location they should be.

5.Entering inside will be enabled whitin seconds and this ends a full cycle of single car share use.

Koncept

Benefit

Knowing who shared a ride

Accurate location and number of available parking spots on the app

Online app payment for parking

Koncept

Every km matters

Calculating how much CO_2 we avoided by sharing a ride, creating expressed in number of trees and their absorbtion capacity.

Koncept

Potek skupnje vožnje

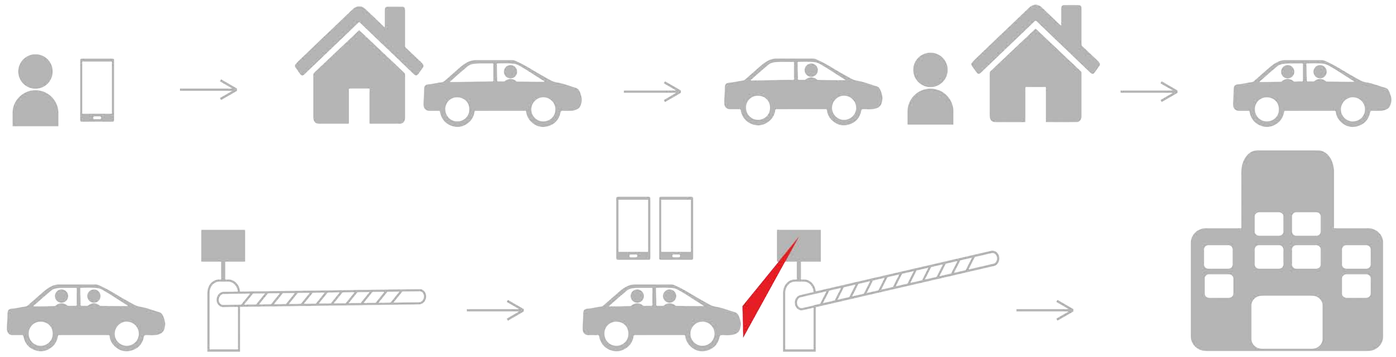
Zaposleni se prijavi na platformo, kjer vnese svoje osebne podatke, podatke vozila, registrstko tablico in podatke podjetja v katerem je zaposlen.

Voznik ki deli svojo vožnjo, vsaj en dan pred odhodom pošlje svoje povabilo preko aplikacije ostalim sodelavcem.

Pred odhodom na delo voznik zažene aplikacijo in nastavi pot do službe. App tako avtomatsko pošlje sporočilo sodelavcu in mu pove, da je voznik avta začel svojo vožnjo. Vozniku se nariše najkrajša pot do sodelavca.

Ko pride do njega se mobilni aplikaciji povežeta in ustvarita enkraten ključ kateri je namenjen za beleženje skupnje vožnje(preko GPS) in odpiranje dvižne rampe.

Ko se pripeljeta do rampe pred podjetjem, aplikacija pošlje svoje podatke, tabla na rampi skenira registrsko tablico in ju spusti notri.



Koncept

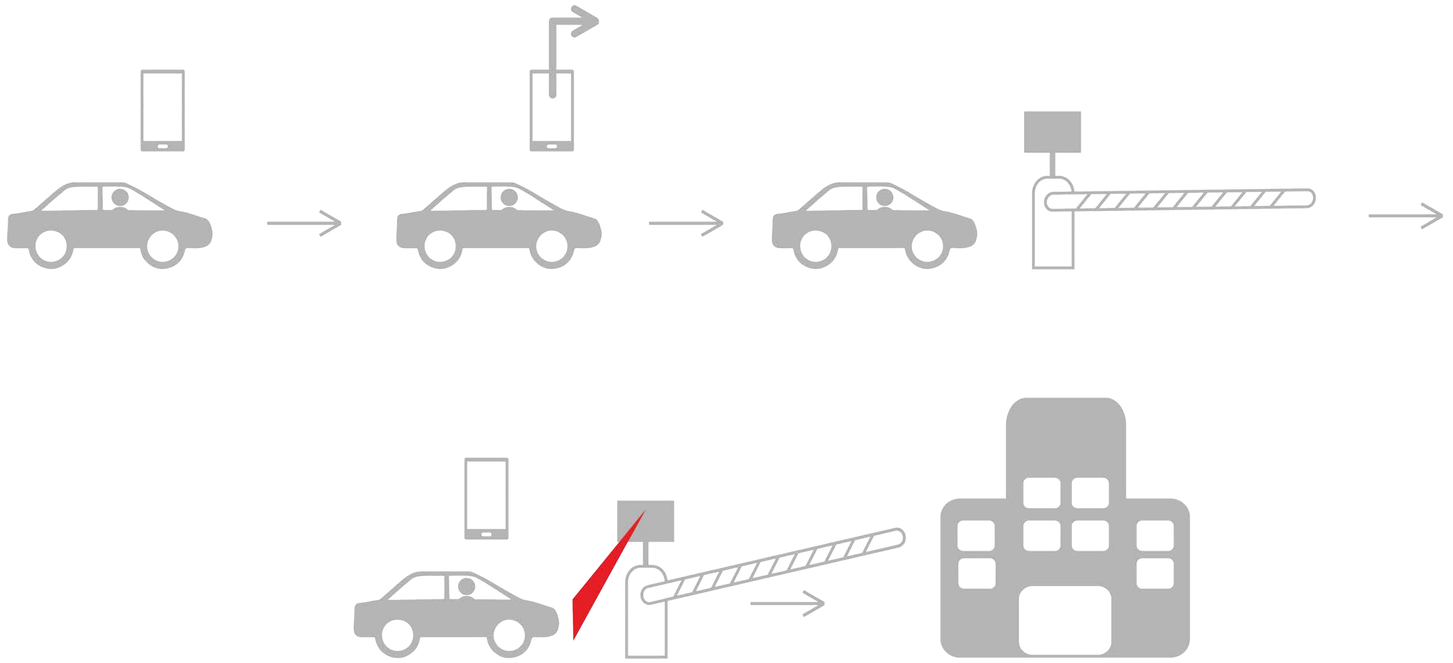
Potek parkiranja

Uporabik car parkinga naredi enak postopek prijave kot ostali uporabniki(le da spusti vpis podatkov podjetja).

Aplikacija mu na zemlevidu omogoča enostaven vpogled na prosta parkirna mesta, katera ponujajo podjetja. Z klikom na parkirno mesto uporabnik rezervira za določeni čas svoj prostor(to mu je omogočeno če je dovolj blizu parkirišča).

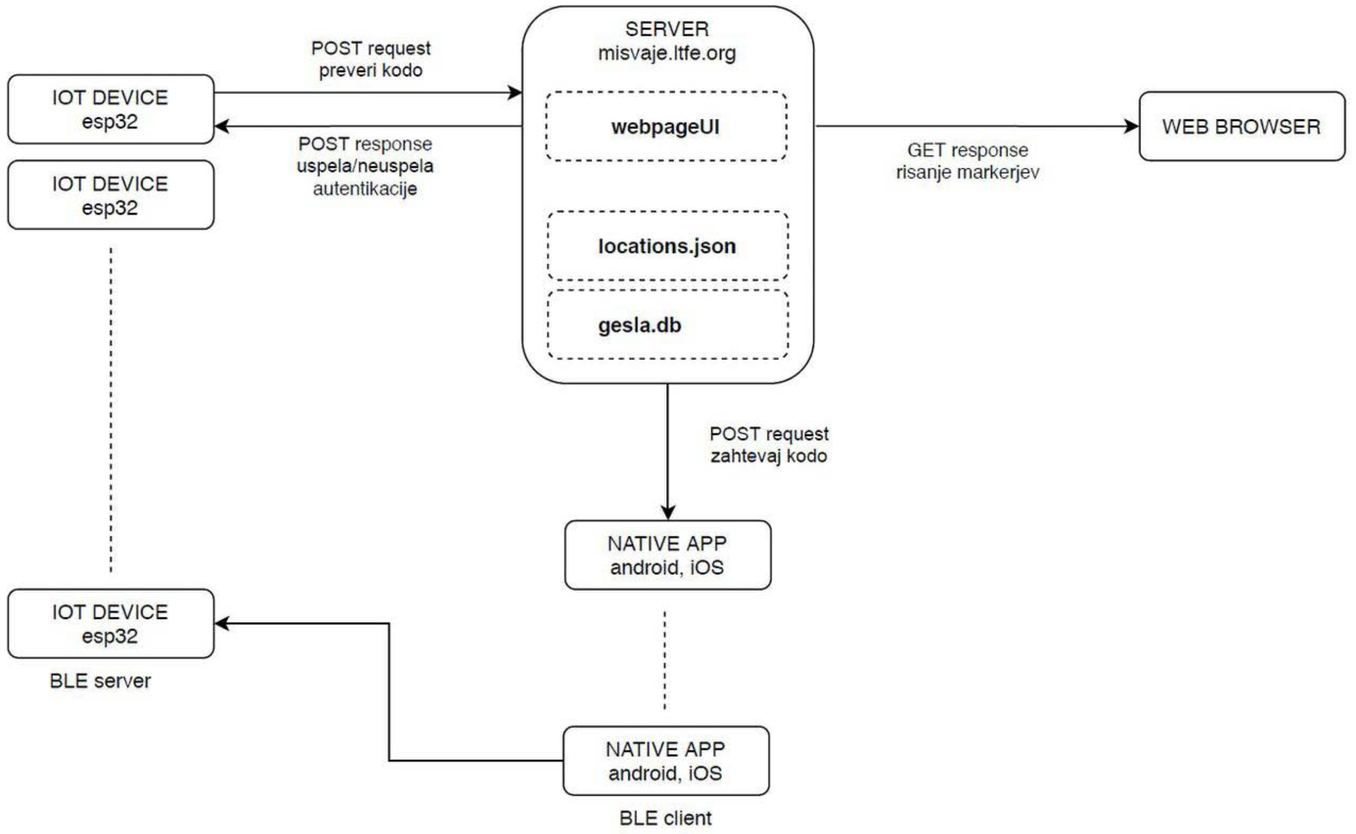
Ko pride do rampe, kamera skernira njegovo registrsko tablico katera je povezana z njegovim profilom, uporabnik parkira in aplikacija začne beležiti čas parkirnine.

Ko zapusti parkirišče tabla zopet skenira registrsko tablico in mu brez stično zaračuna parkirnino preko aplikacije.



Hardware

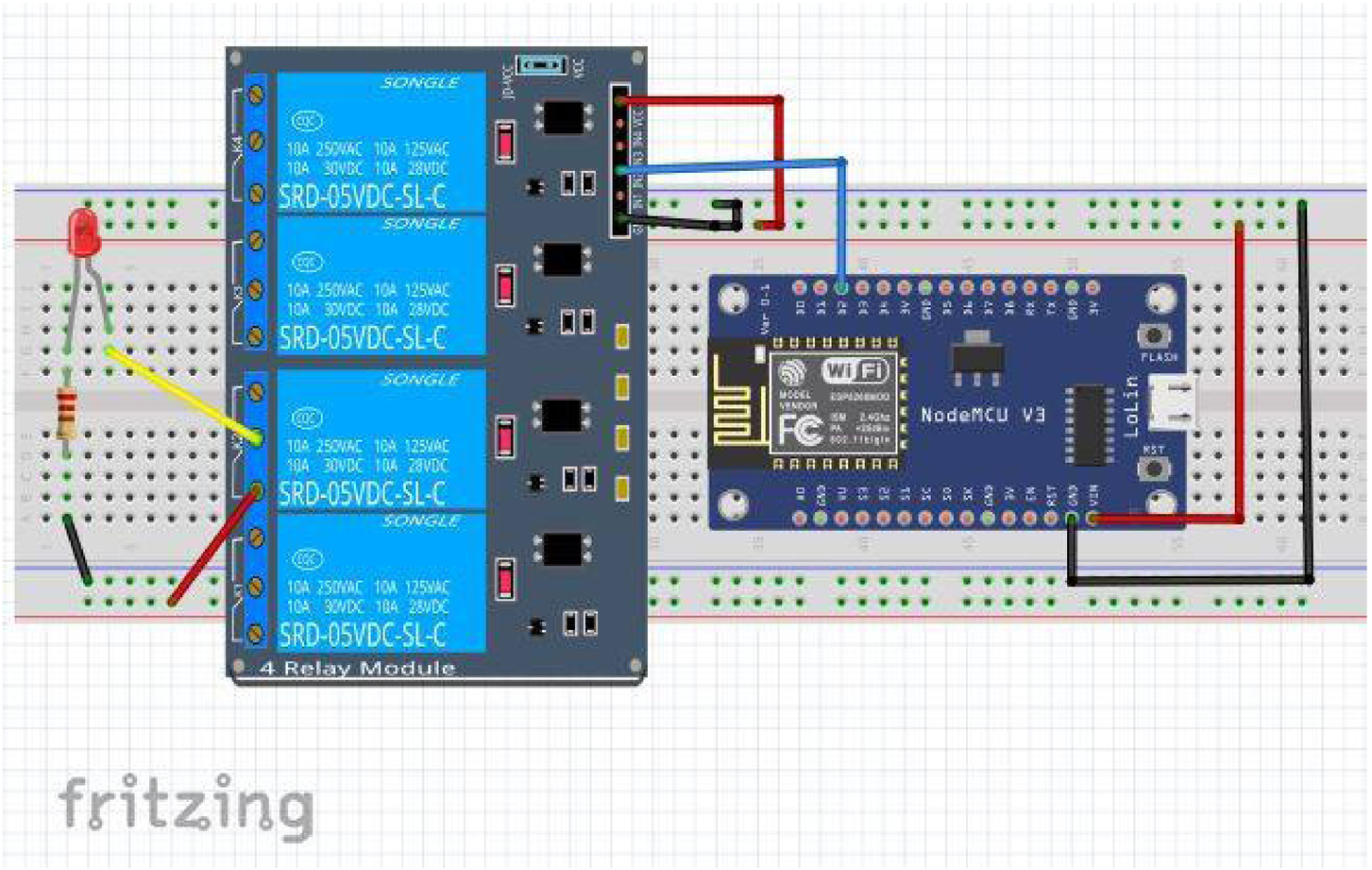
Our team members worked on the hardware which is consisted of an IOT platform that is able to communicate through WiFi and bluetooth to exchange info for cars entering/exiting the parking lot and detection of car sharing usage.



Hardware

Za izdelavo HW protipa smo uporabili NodeMCU in LED.

Za pripravo produkta primernega za trg bi potrebovali kamero, domeno, PCB, napajalnik, SQL bazo. Prav bi nam prišli strokovnjaki iz naslednjih področji: mobile app developer, SQL, ML, spletna varnost

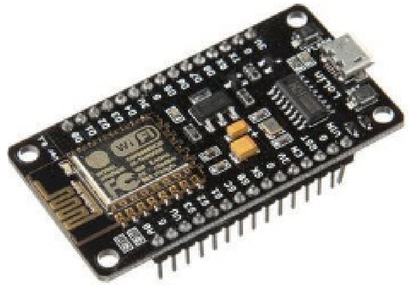


Hardware components


NodeMCU ESP8266 Breakout Board


LED (generic)

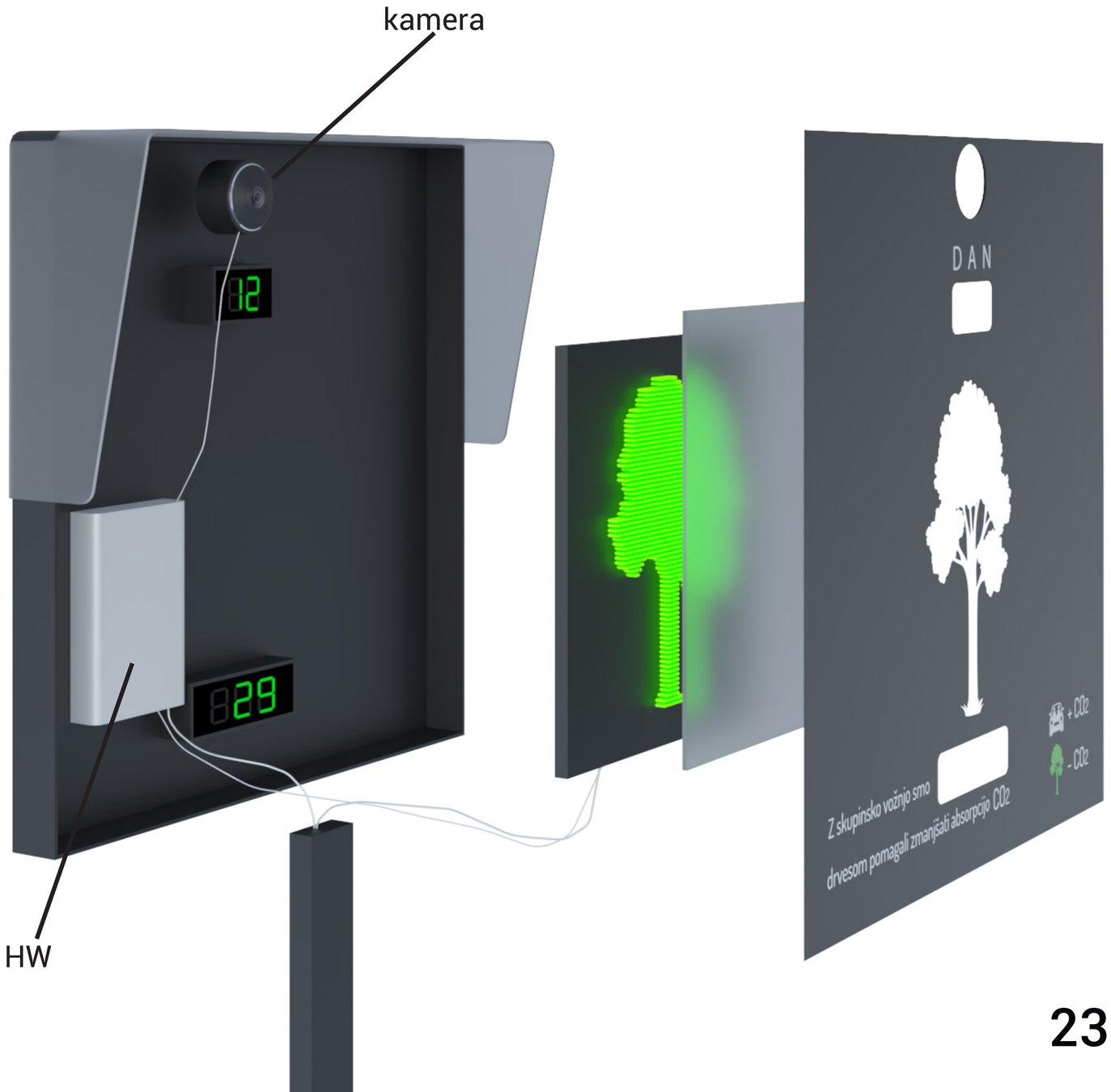

ControlEverything.com 4-CHANNEL RELAY CONTROLLER FOR I2C



Tehnična zasnova

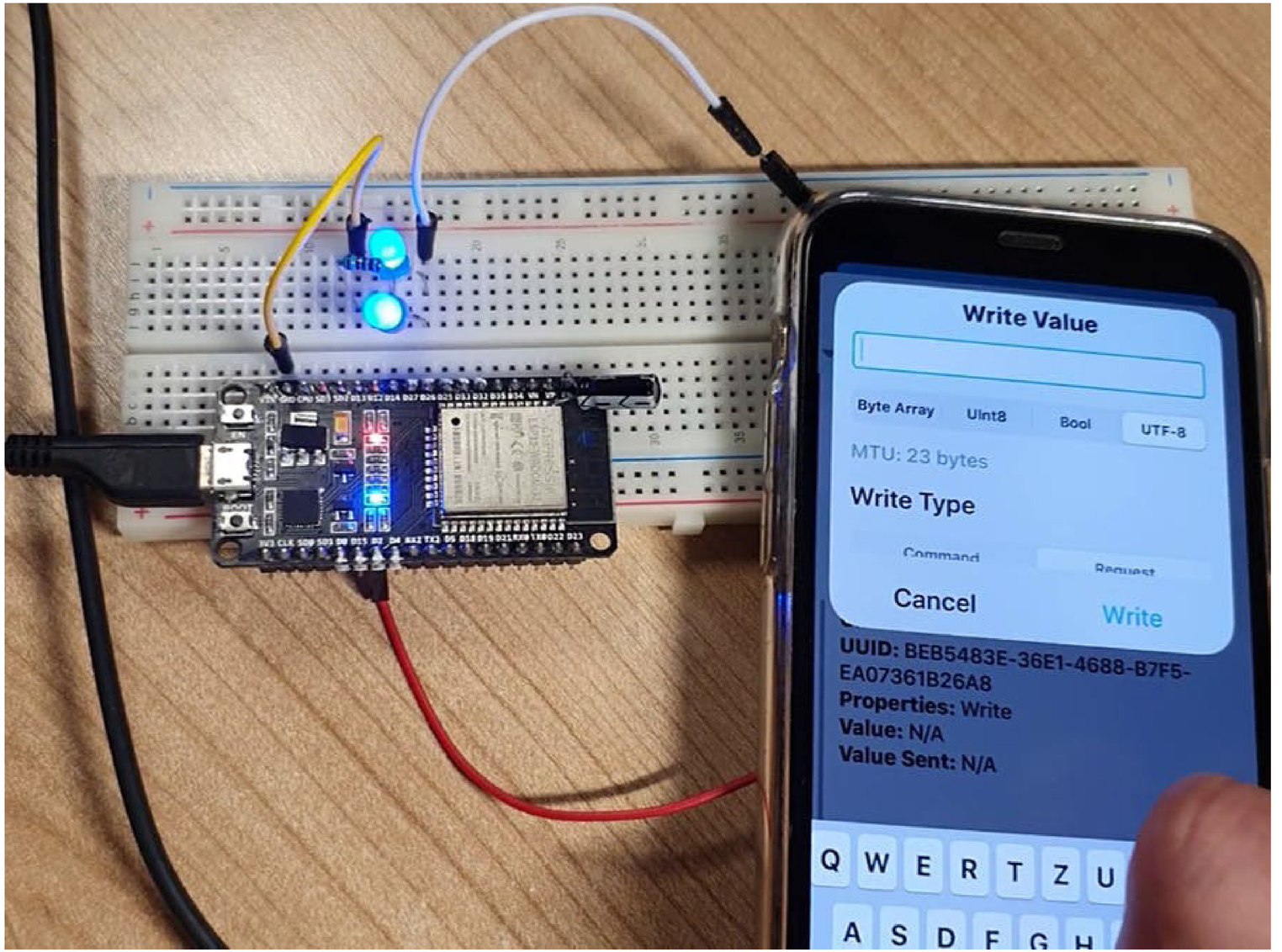
Za izdelavo HW protipa smo uporabili NodeMCU in LED.

Za pripravo produkta primernega za trg bi potrebovali kamero, domeno, PCB, napajalnik, SQL bazo. Prav bi nam prišli strokovnjaki iz naslednjih področji: mobile app developer, SQL, ML, spletna varnost



Hardware

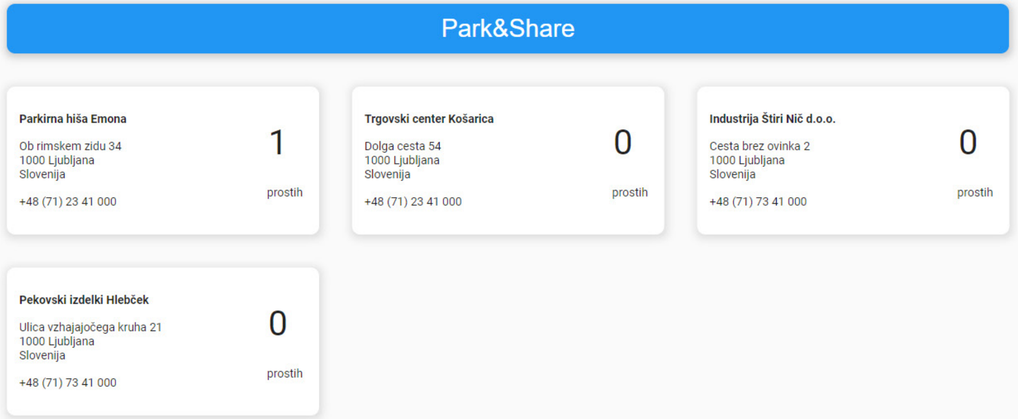
testiranje naprave

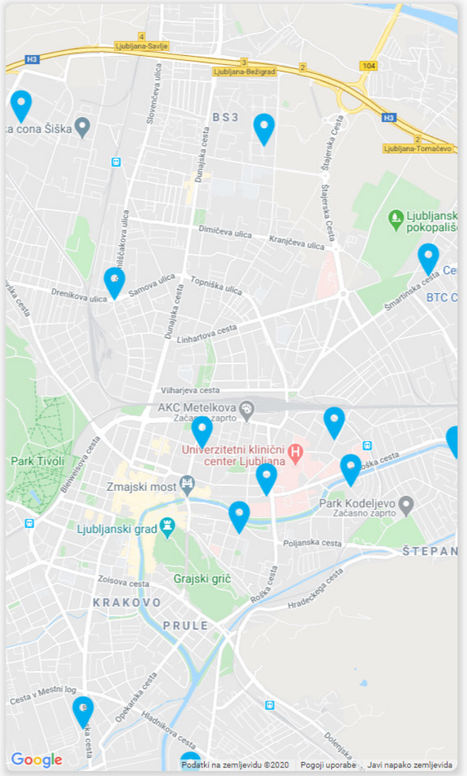


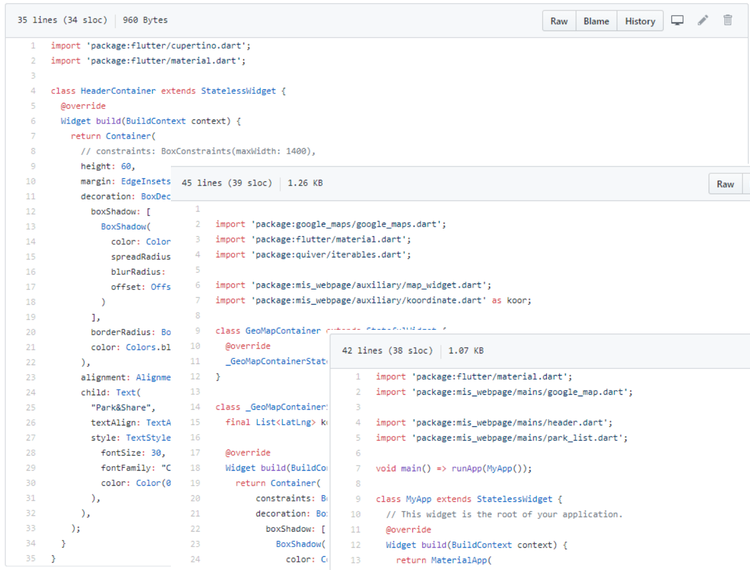
Software

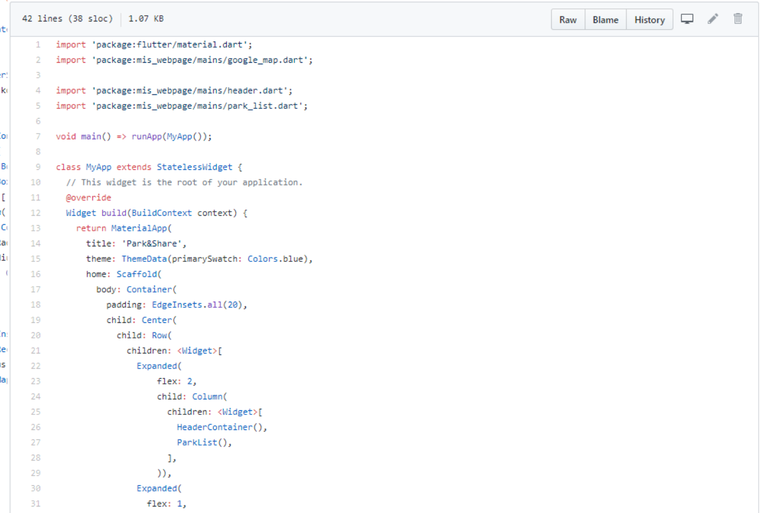
Tekom projekta nam je uspelo sprogramirati del aplikacije kjer preko spletne strani vidimo mapo na kateri so razpoložljiva parkirna mesta, katera ponujajo podjetja, z opisom lokacije in število prostih mest.

Za izdelavo internetne strani smo uporabili Flutter.









Software

NodeMCU software:

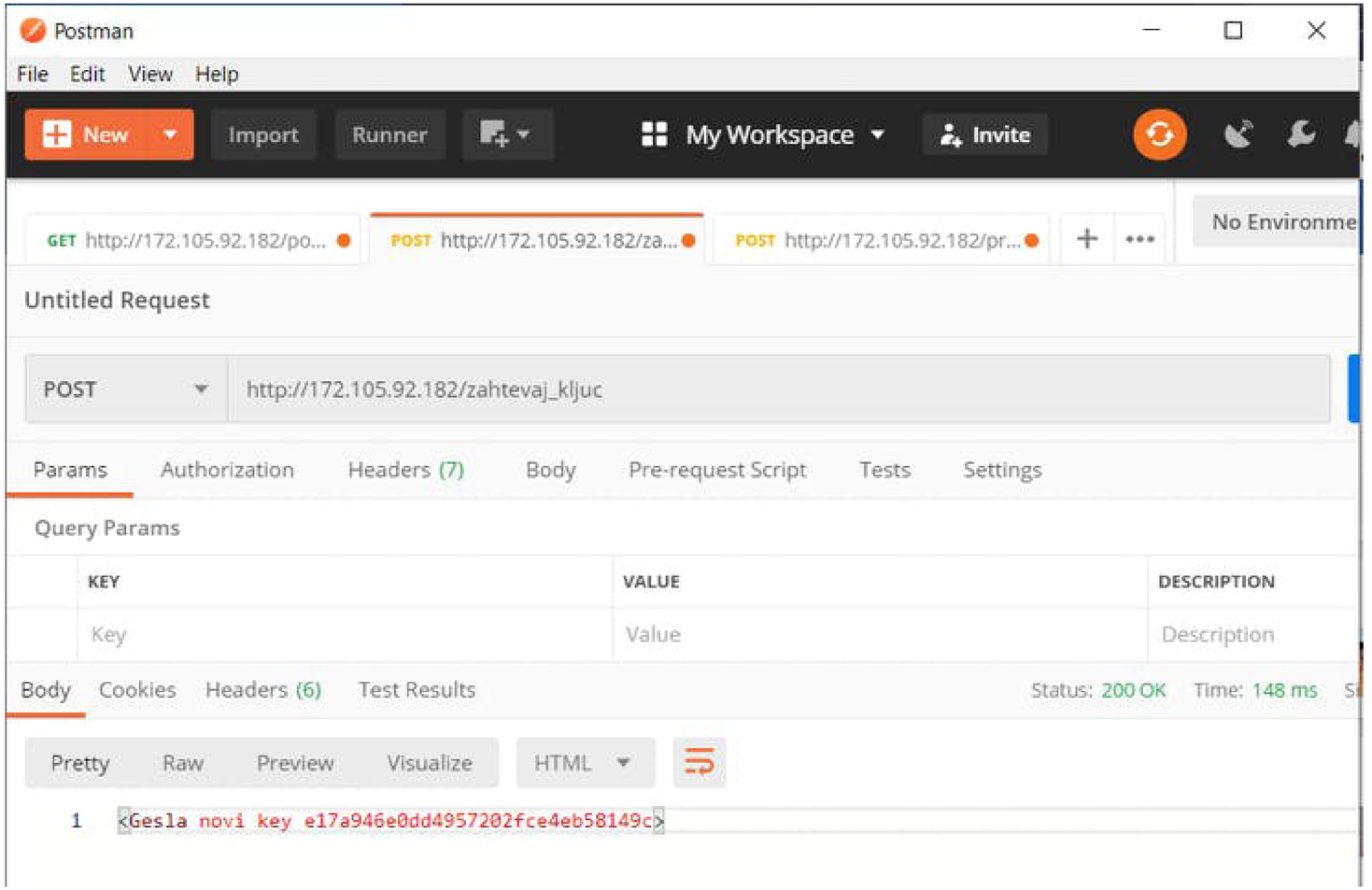
NodeMCU software was written in Arduino development environment. It uses the existing code to connect NodeMCU via Bluetooth with added part to turn LED light on and off depending of the status in nRF application.

Software

API:

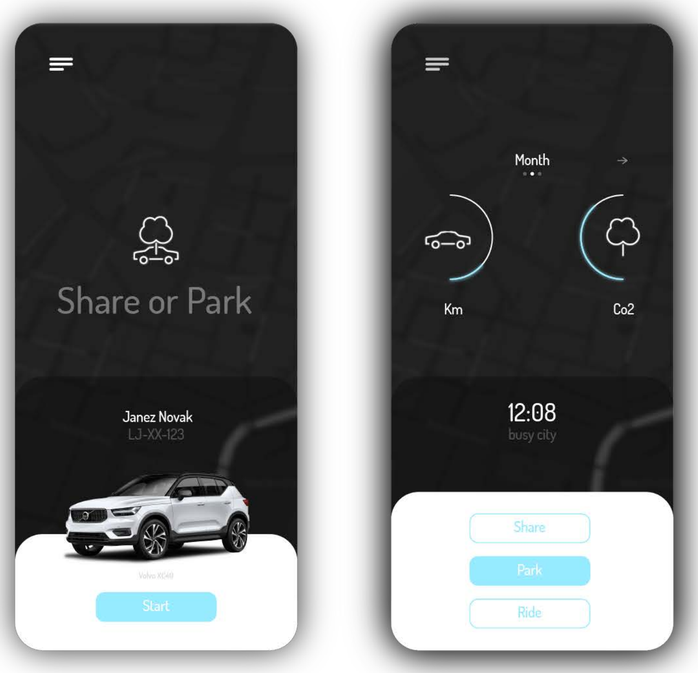
Idea of this API made in flask is to be pa part of final product where it would serve as user verification. It works by comparing the key that is saved at the server and the key that is generated within the app and is then sent to the server to be checked. If both keys match then instruction to open ramp is sent.

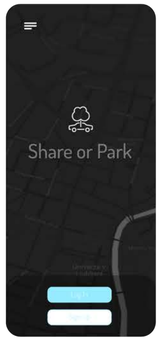
Za izdelavo protipa SW smo uporabili - Android Studio, VisualStudio, Arduino, Flutter in obstoječo aplikacijo nRF CONNECT za BLE povezavo.

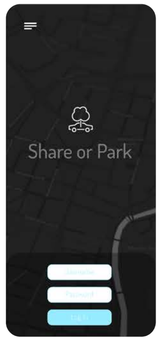


Aplikacija

Lotili smo se tudi UX oblikovanja aplikacije, štiri različne vrste uporabnikov smo razdelili na: podjetja ki vidijo znesek pridoblejn iz oddajanja parkirnih mest, zaposleni ki prevaža svoje sodelavce, sodelaci ki se vozijo in uporabniki parkirišč. Cilj je bil ustvariti aplikacijo hitro in prijazno za uporabo.




Share or Park

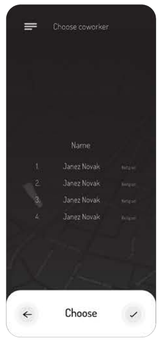

Share or Park


Car info

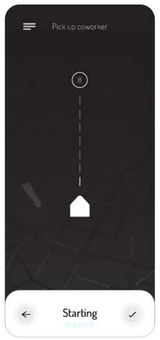

Address nad card info

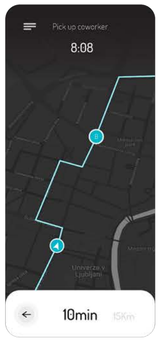

Company info

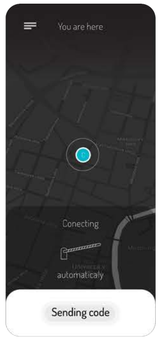

Share
Company name
To Adecco
Choose

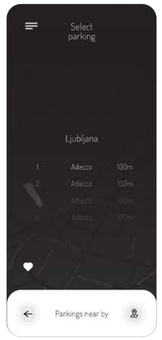

Choose coworker
Name
Choose

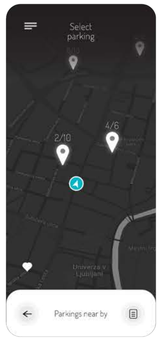

Send time and place to coworker
00:00
Tomorrow
Send info

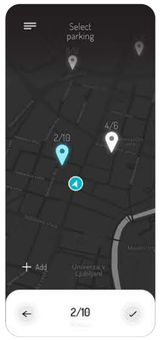

Pick up coworker
Starting

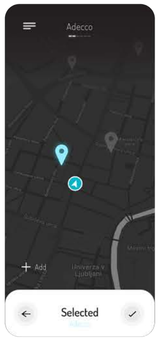

Pick up coworker
8:08
10min

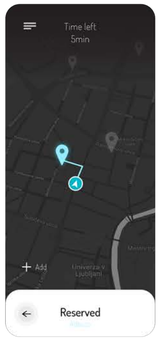

You are here
Conecting
automaticaly
Sending code

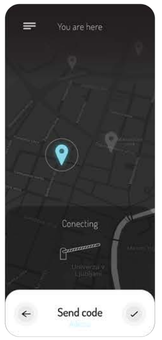

Select parking
Ljubljana
Parkings near by


Select parking
2/10
4/6
Parkings near by

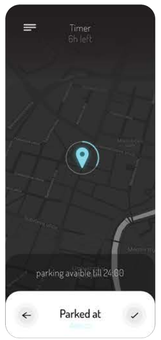

Select parking
2/10
4/6
2/10

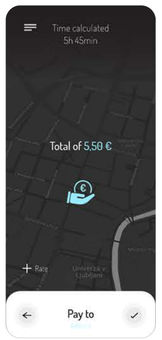

Adecco
Selected


Time left
5min
Reserved


You are here
Conecting
Send code


Favorite parking's
Parkings near by


Timer
5h left
parking avaible till 24:00
Parked at


Time calculated
5h 45min
Total of 5,50 €
Pay to


Ride
See available


From coworker
Invitation for tomorrow
From
Janez Novak
Pick up
at 7:30
Accept

Zaključek

At this point we believe that the success of our project in future is in how well we manage to adjust the approach of initial contact and promotion of the app to every profile of user we have. We have companies with their employees on one side and this wider group of people who will use the app to rent parking spot on the other.
It is crucial to understand our users, how they think and to make the process of using this platform more intuitive for everyone.

As designers working on this interdisciplinary project made us see the incredible potential of combining design with technology to bring innovative solutions closer to the public.