



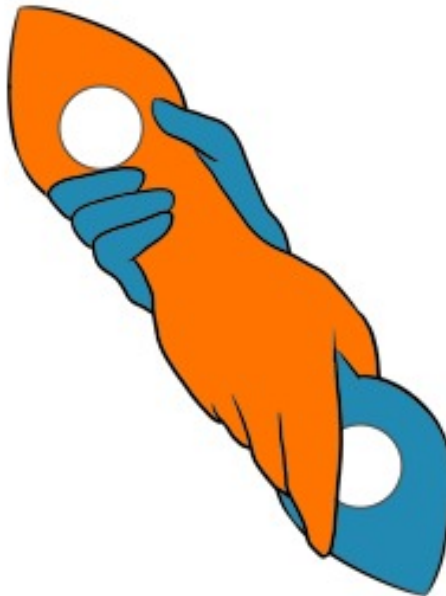
SAPIENZA
UNIVERSITÀ DI ROMA

COMPUTER SCIENCE DEPARTMENT

HUMAN COMPUTER INTERACTION ON THE WEB

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1 Introduction & Goal

Our objective was initially to develop a mobile application, in particular an Android application, which would allow the users to send and receive help requests of any kind of type (which not including the ones that require the police or 911 intervention).

The application would use a GPS positioning system for the purpose of visualizing the help requests of other users nearby.

The help requests managed by our application would be traceable to a low or middle risk and classifiable on three levels of priority: high, middle and low. To ensure the completion of the help request by another user, we thought to use the NFC technology in order to guarantee more safety on the connection.

To promote the utilization of the mobile application, we thought about a reward system, based on the own of coins to be spent by the users to ask for help and to be accumulated by them when they offer and succeed to give help to other users.

2 Competitor Analysis

Before starting the Need Finding phase to deepen the user needs according to the usage of the mobile app, we performed a careful analysis of the competitors in order to draw inspiration for our future implementation choices and to identify some errors to avoid.

We analyzed four mobile applications, every of which with the purpose of helping in some tasks people around you: *Oopz*, *Helpy Oops*, *AiutApp* and *Blablacar*.

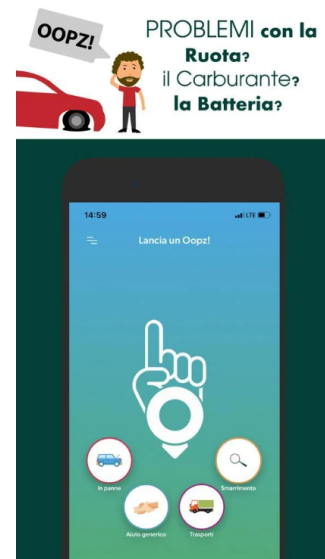
- **OOPZ:** it's an app with which you can ask for help and/or give help to someone near you in case of problems, unexpected situations or urgencies. You receive in return a reward in money, and the amount of it is decided by the user who's asking for help.

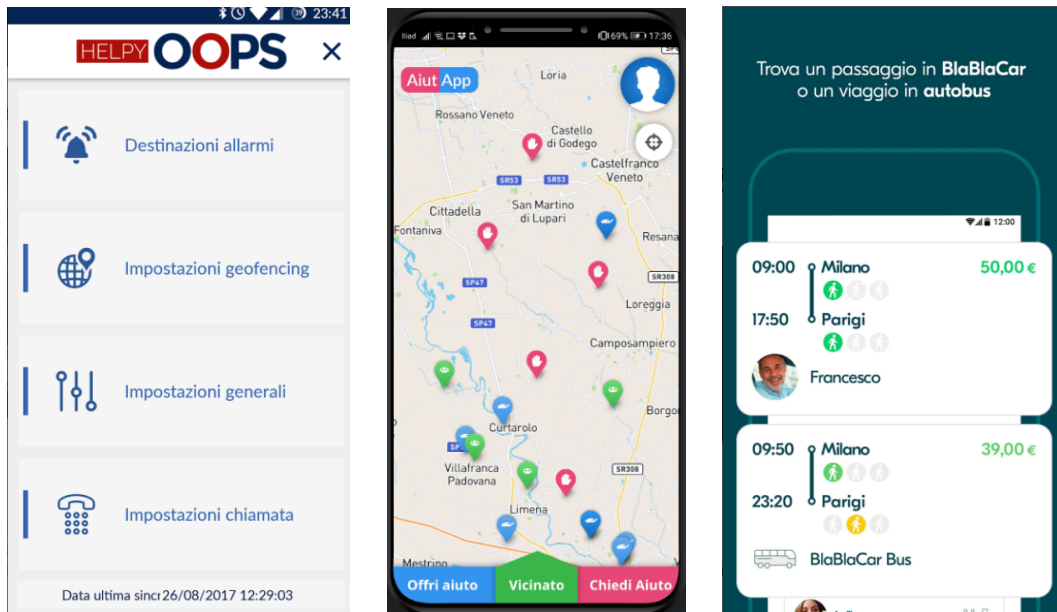
In this app, you can decide whether you want to accept the help of a user or not, looking at their profile.

You can also give reviews to the users based on your experience with them.

Oopz asks for your Personal ID in order for you to use it, so at the registration you scan your documents and wait for the managers to verify your profile or not.

The problems we encountered using this app are the fact that you can't visualize the reviews properly and the fact that you're obliged to pay in money to receive help;





- **Helpy Oops:** it's an app which allows to monitor general danger situations, regarding mainly elders who live alone or outdoor trips;
- **AiutApp:** this is a mobile application born in Padua with the main goal of connecting who offers help to the ones who need it. It integrates the volunteering realities of our territory, it makes them visible and allows the people in need to have a quick response to their own help request, whether they are elder, lonely, disabled people or families.
- **BlaBlaCar:** it's a mobile application which offers the possibility to obtain bus trips and carpooling at very low prices. On BlaBlaCar you can find a lot of trips and destinations to choose and you can travel with someone who goes in the same direction as you.

3 Need Finding

The Need Finding phase has been performed in two different modalities: the interviews and the questionnaire. Both of them have been done with the aim of finding which were the user needs, despite the ones we wondered.

The main needs emerged from the need finding are the following:

- * the mutual trust between the user and the helper, and vice versa;
- * the motivation to help, in fact most users declared that without a compensation system they would be less inspired to respond to the help requests;
- * the appreciation of shortcuts and user gestures to ask for help;
- * the distinction of different emergency levels and codes;
- * when a connection is done, there should be the certainty that the meeting takes

place (so our users expressed the willingness to know that the helper/receiver is actually arriving or waiting for you);

- * the willingness to know in how much your helper will arrive.

3.1 Interviews

We interviewed a total of 21 people of the age between 20 and 58 years old. Every one of them had been asked the same questions, obviously shaped on their answers.

The following are the questions asked:

- (1) Can you gently tell me your name, gender and age please?.
- (2) Have you ever found yourself in a situation where you were alone and would need help from someone who was around you?
 - (a) If yes, What kind of situations?
 - (b) If no, can you imagine a kind of situation in which you would need help?
- (3) Would you trust getting help from someone you don't know?
 - (a) If no, Would you change your mind if you can see the profile of the helper?
- (4) Would you help someone close to you if you were notified?
 - (a) If no, Would you change your mind if you can see the profile of the helper?
- (5) Would you accept help from someone mainly indoors or out?
- (6) For what kind of emergencies would you ask help from a stranger?
 - (a) Would you like to be able to distinguish between emergency types?
- (7) Would you like to be able to open/use the app with user gestures? (Explain by voice why they can be useful).

Clicking on **here** you can consult all the whole interviews.

3.1.1 Summary

Nearly the totality of the persons interviewed found themselves in an emergency situation in which would appreciate an help from someone.

The mainly found situations were: the ones relative to the car context (so ride/failure/lack of fuel); the ones relative to the lack of safety perceived when the users are walking alone in the streets (this was mainly presented by women) and the ones referred to the need of meds or personal goods.

On the subject of the indoor situations, people have more need of a generic help, for example shopping, taking care of a pet or some need regarding the Covid19 quarantine. We noticed that the totality of the respondents has positively reacted to the fact of getting help from strangers, only if bound to the possibility of viewing their profile (their reviews, photo, name and surname...). Regarding giving help to other users, it was found that some users are more motivated to do it exclusively in presence of an any type of reward. In addition, beyond the reward, others expressed the need to be ensured by the user who's asking for help.

The interviews showed that people are mostly in need of help outside of home also because they appeared not inclined to share their house address to someone they don't know.

Nearly the totality of the persons interviewed consider it useful to distinguish the priority levels and help categories in order to make the usage of the application easier and faster (for example the research of the help request based on its type). Except for a minority of people who would prefer a "classic" style of interaction with the application because they fear that the usage of the user gestures would be confusing, the vast majority of the respondent thinks that it's convenient to take advantage of them, in particular for emergencies in which they are unable to use the smartphone and where the speed of the submission of a help request is of prime importance.

3.2 Survey

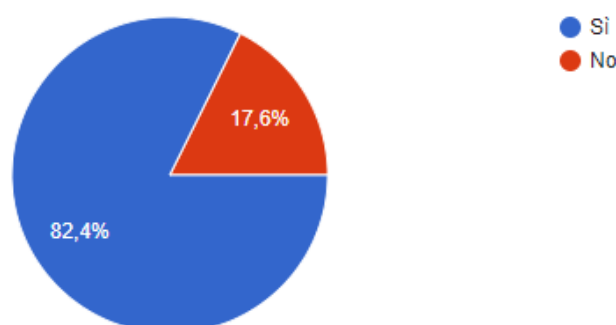
After having tested a trial questionnaire on a sample of 7 users in order to identify any possible mistake, we subjected the final form, written in both in italian and in english, with the aim of including as many users as possible.

We obtained a total of 183 responses (153 of which are in italian and 27 in english), available at this [link](#).

The following are the graphical results of the answers to the most relevant questions:

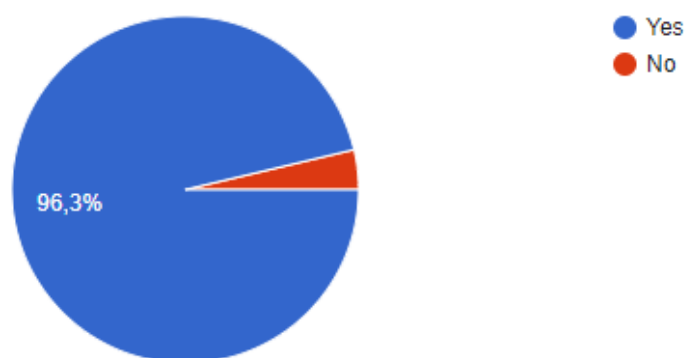
Condivideresti ad una persona il tuo indirizzo di casa se fosse necessario per ricevere un aiuto?

153 risposte



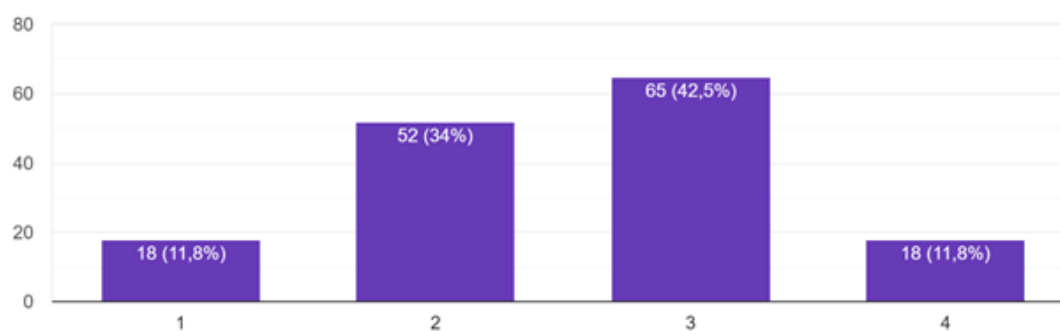
Would you share (to just one person) your house address if in need for help?

27 risposte



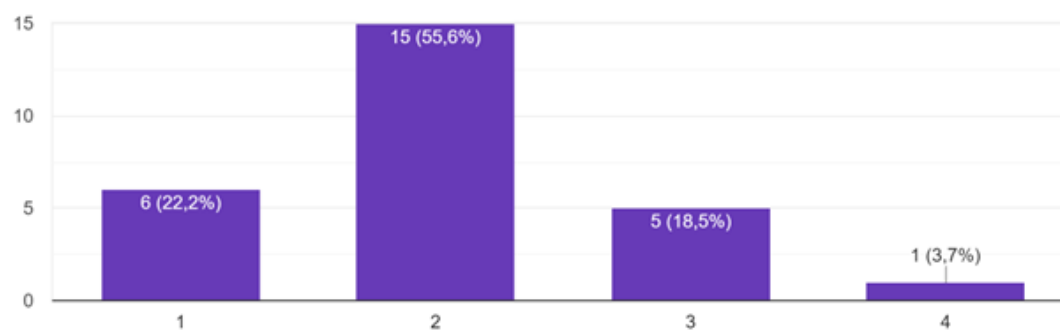
Dove trascorri la maggior parte del tuo tempo?

153 risposte



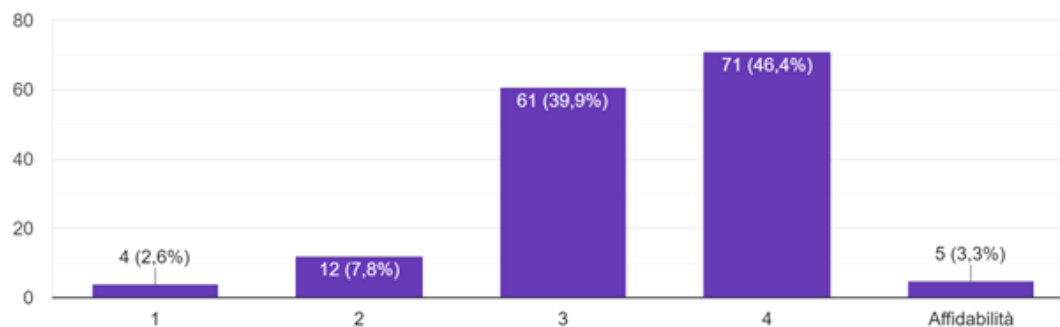
Where do you spend most of your time?

27 risposte



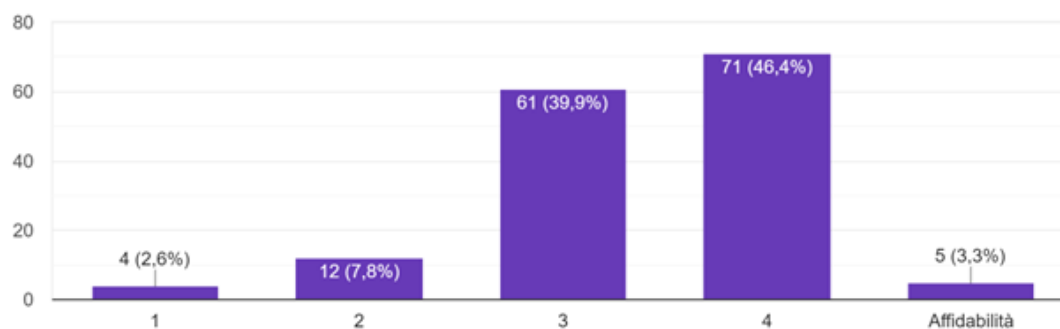
Cosa ritieni più importante, la disponibilità o l'affidabilità?

153 risposte



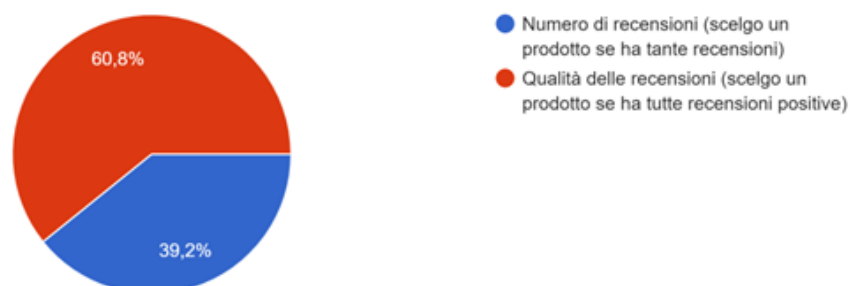
Cosa ritieni più importante, la disponibilità o l'affidabilità?

153 risposte



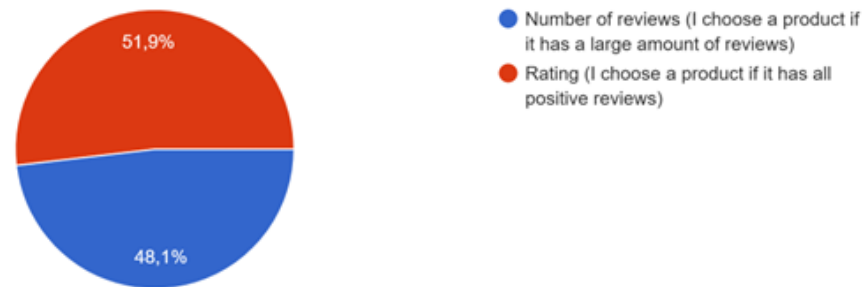
Quando devi fare una scelta online, consideri prima il numero di recensioni o la qualità delle recensioni?

153 risposte

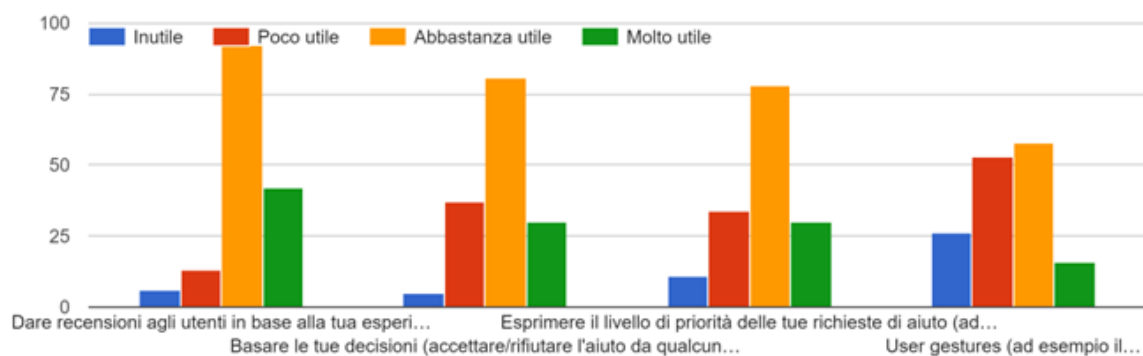


While choosing something online, do you consider more important the number of reviews or their rating?

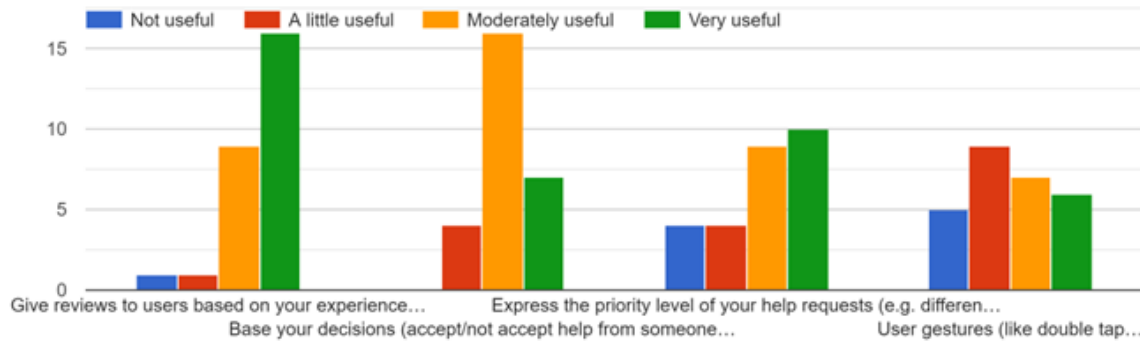
27 risposte



Di seguito sono elencate diverse features che potresti trovare in un'applicazione in cui gli utenti possono ricevere/dare aiuto ad altri utenti. Assegna u... riterresti utili per la tua esperienza della stessa.



Reading the features below, evaluate them according to how much you would find them useful in an application in which you can give/receive help from other users.



3.2.1 Summary

The survey revealed that the vast majority of people spends their time outside. This aspect reflects what has been already noticed in the interviews, in which the users expressed mainly their need of help in outdoors situations, rather than at home.

Some of the questions in the survey were aimed to identify possible implementation choices in the mobile application: for example the default for the most common requests.

Peolpe think that the possibility to give and receive reviews is quite important, along with the expression of the priority level of the help requests. Regarding the usage of the mobile application with the user gestures, from the form it has been seen that they have been considered of minor importance.

Thanks to the interviews, giving the respondents more explanations on their mechanism and utilization, it has indeed been revealed that they represent one of the most appreciated functionality.

4 Tasks

After the Need Finding phase, we elaborated seven main tasks (with their possible sub-tasks) which represent the instructions to be built in our implementation and to be experienced in our application.

These below are the tasks resulted:

- (I) **Sign In:** the name, surname, phone number, a photo to be taken at that moment, the gender and date of birth will be required.
The user profile would be verified through the upload of the personal ID (duplex photo). Every profile which have been verified will receive the verified profile icon.
- (II) **Login In:** the user will log in the application with his phone number and an automatic OTP.
- (III) **Request help:** the task will be to create an help request to be seen in the section by users around you. In particular, the sub-tasks of this one are:
 - Delete the user's help requests;
 - Express the priority level of the user's help requests;
 - Express the duration of the help request;
- (IV) **Visualize the help requests:** the user will be able to visualize the help requests by other users near them. They will be able to:
 - Choose the help request to take charge of;
 - Visualize the reviews of the user asking for help;
 - Visualize how far is the user approximately in meters;
 - Visualize the message sent by the user asking for help;
- (V) **Give help:**
 - Visualize the position of the user asking for help/giving help and their profile;
 - Three phase handshake between the two users;
 - When the two users meet, they will confirm the help with the NFC or, alternatively, with a QR code.
- (VI) **Reviews:**
 - Give a user a review based on my experience with them;
 - Receive a review;
- (VII) **User Gestures:** the user will be able to shake their phone to create an emergency generic help request with high priority.

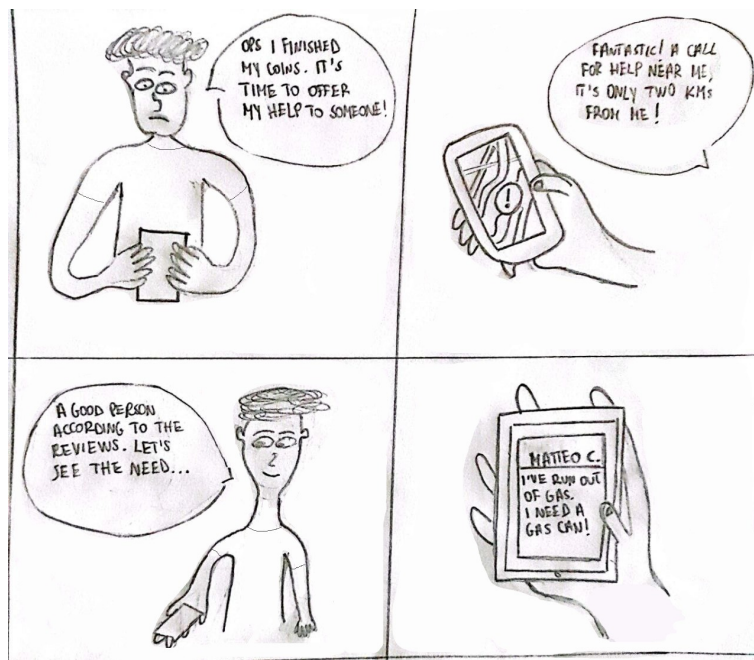
5 Storyboard

We have created the storyboards for the main tasks.

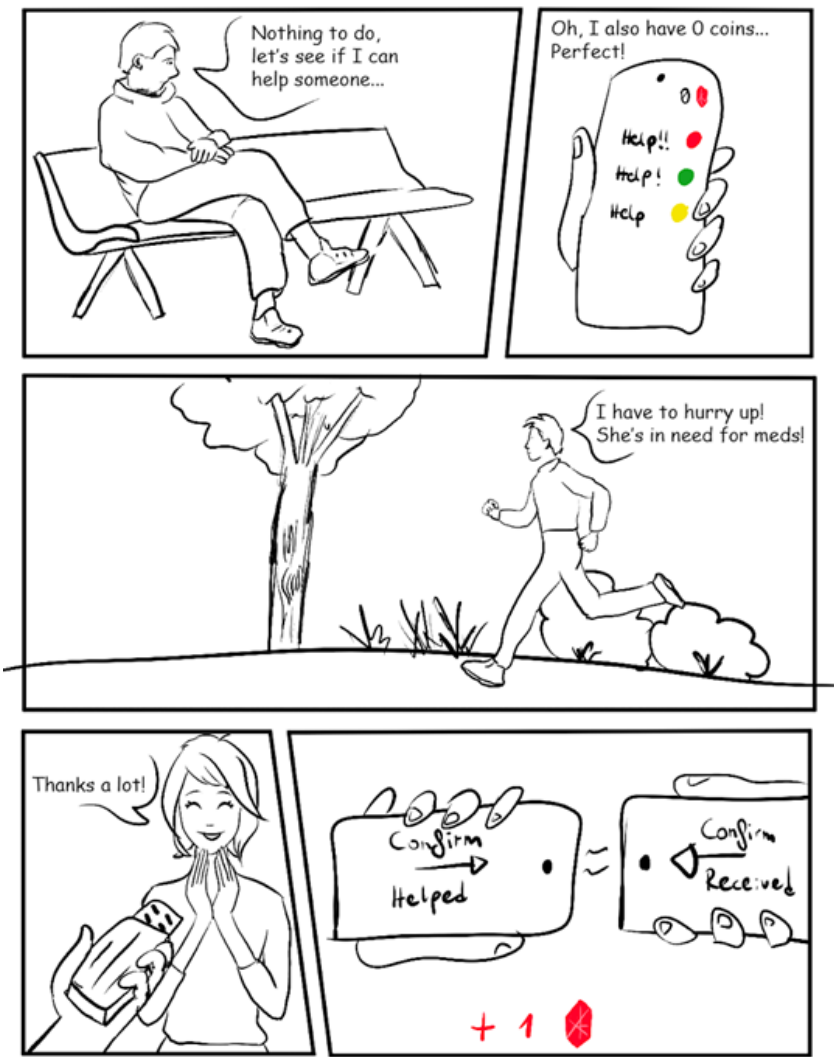
5.1 Request help



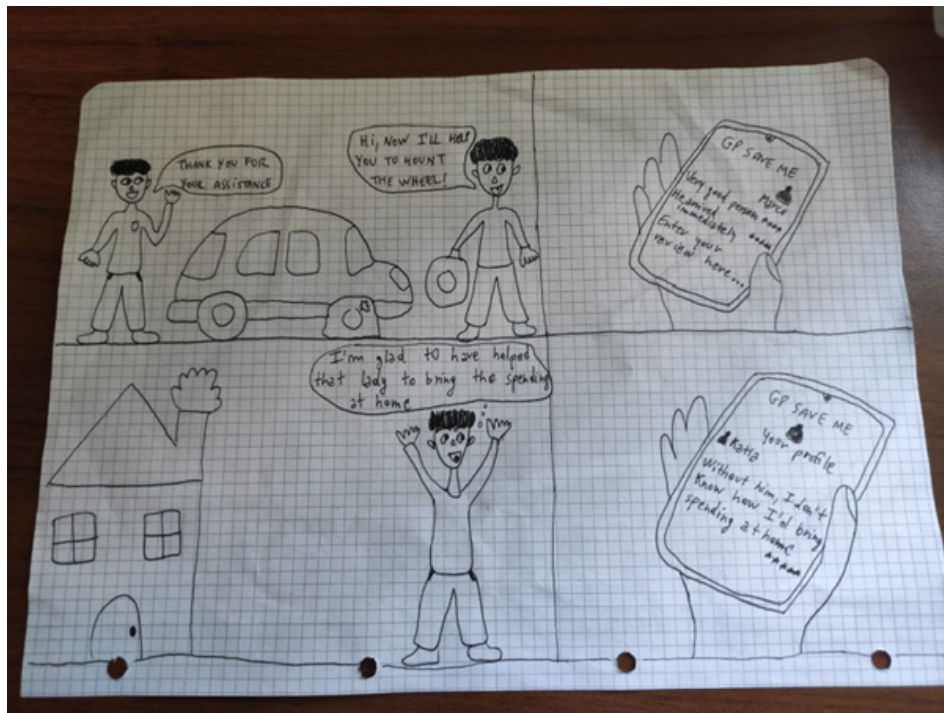
5.2 Visualize the help requests



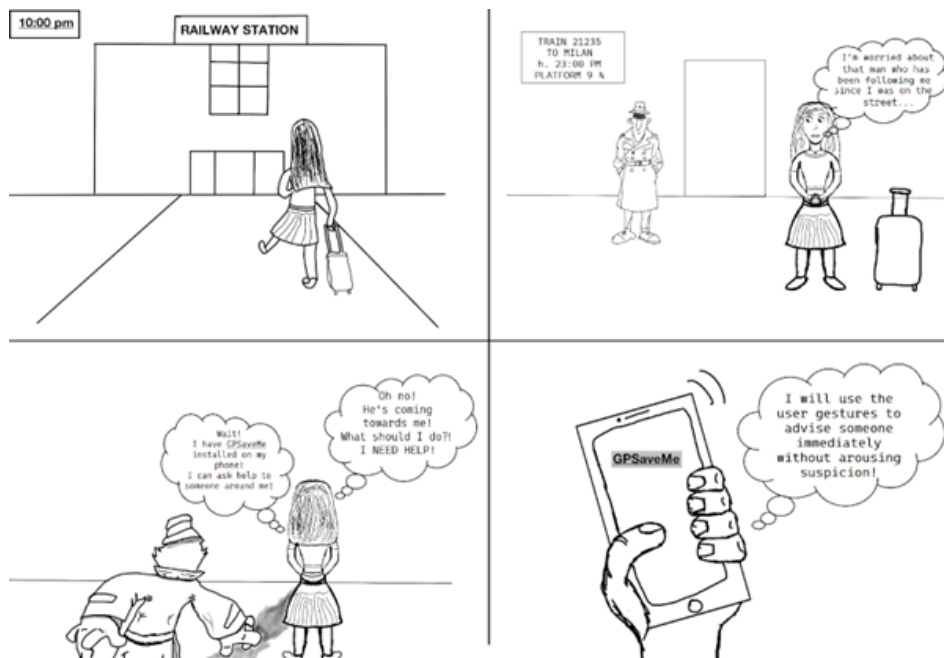
5.3 Give help



5.4 Reviews



5.5 User Gestures



6 Prototyping

For the design of the various interfaces and application usage flows was used the Figma Prototyping User Tool. The development of the prototype and the subsequent final application followed the agile paradigm through which changes and improvements have been made iteratively. The tests were performed on a group of 6 people using the *administrator-observer* technique.

6.1 Iteration 0

In this iteration we tested the initial prototype on a group of 6 people. **Here** the link of prototype.

6.2 Iteration 1

As a result of iteration 0 we made some changes to the initial prototype. We added the following functionalities:

- added the possibility to specify request duration;
- added a bounding box to the request priority;
- fixed Chiesa-Marge reviews;
- fixed document button;
- removed link between Marge reviews and Mario Rossi reviews;
- fixed NFC timer;
- fixed helper QR-Code;
- added the possibility to delete help request carried out.

In this iteration we tested the resulting prototype on a group of 4 people. Here the link of prototype.

6.3 Iteration 2

As a result of iteration 1 we made some changes to the prototype. We added the following functionality:

- added a confirmation button if you want to delete help request.

In this iteration we tested the resulting prototype on a group of 3 people. Here the link of prototype.

7 Flutter

To develop the Android mobile application it was decided to use the Flutter open-source framework, which is based on the Dart language. The final application presents, in addition to the frontend part, a backend part, essential for the correct functioning of the implemented services and for the storage of the analyzed data. For this part, Firebase was used, a serverless and open-source platform for the development of mobile applications, which uses the Google infrastructure to provide various services, such as the aforementioned ones.

Furthermore, the proposed functionalities have been implemented, fundamental for the correct functioning of the application, among which:

- **Shake**: user gesture that allows you to send a generic help request quickly in case of impediment in using the application;
- **NFC**: allows you to confirm the help in a smart way;
- **GPS**: allows you to track the location of users and the correct functioning of Google Maps;
- **QR-Code**: allows you to confirm help as an alternative way to NFC technology, not always supported.

The libraries used for the development are shown below.

```
dependencies:
  location: ^4.4.0
  permission_handler: ^10.0.0
  flutter:
    sdk: flutter

# The following adds the Cupertino Icons font to your app
# Use with the CupertinoIcons class for iOS style icons.
cupertino_icons: ^1.0.2
image_picker: ^0.8.5+3
file_picker: ^4.6.1
path_provider: ^2.0.11
phone_form_field: ^6.1.0
flutter_otp: ^0.3.2
googleapis: any
google_sign_in: any
firebase_storage: ^10.2.17
firebase_core : ^1.17.1
flutter_sms: ^2.3.3
carousel_slider: ^4.1.1
qr_flutter: ^4.0.0
nfc_manager: ^3.1.1
shake: ^0.1.0
google_maps_flutter: ^2.0.4
qr_code_scanner:
  git:
    url: https://github.com/X-SLAYER/qr_code_scanner.git
    ref: flutter-beta
```


7.1 Testing phase

Being the android application very similiar to the prototype, we were very glad that all the users that tested the application were able to find all the functionalities.

The last tests were aimed to find some bugs we didn't realize the app had at the time of the development.