



Family Parking Project

**Google Technologies for Cloud and Web Development
Workshop**

Engineering in Computer Science

La Sapienza University

Abstract

Family parking system is a new solution to solve the problem of sharing a car among members of a family. In such a case, where there is more than one member using the same car in a family, the problem of finding the last parking position where the last one who used the car parked is a real problem for all the other members sharing this car. Family parking system introduces a new solution to this problem with a set of clever features that are interesting to each family to use in their daily life activities. Using google maps, the system will flag the last position where the car was parked, and this flag will be reachable to all the other members sharing the car. At the same time, this flag will be updated once one of those members uses the car and parks it again. This modification on the flag can be done manually, or automatically using the clever detection feature of FamilyParking app that will be able to automatically detect the parking of the car in order to put a new reachable shared flag, or to detect the movement of the car in order to remove this shared flag.

Keywords: Google maps, flag, family, manual parking, automatic parking.

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1.1 Preface

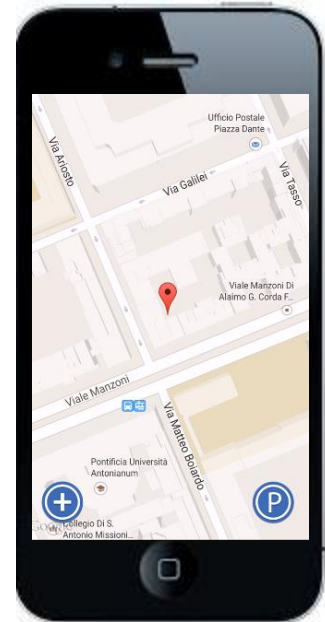
There is no doubt that the winning idea in the current era of the rapid continues development of the technology is not always the idea with the super creative features and the very exclusive properties, instead it is the one which simply solves one of the users real problems and satisfy his needs sufficiently no matter how simple it is. Thus, the importance of any new idea depends mainly on the importance of the user problem this idea solves. The evaluation of this idea, as a result, will be mainly based on how sufficiently the real application of this idea will solve this problem to the user. For example, a simple idea like "Whatsapp" with no new real invention in the idea, comparing to the previous messaging systems, to gain over than 600 million active users by October 2014^[1] means that no matter how simple the new idea is, the most important is to satisfy user needs cleverly and distinctly and to know how to add attracting features that cannot be found with the other competitors products. In this domain, family parking application is a simple application that solves one of the most important and frequent problems within the family life which is finding the position where the family shared car is parked.

1.2 What is FamilyParking System?

FamilyParking system mainly is a new solution to solve the problem of sharing a car among the members of a family. In such a case, where there is more than one member using the same car, the problem of finding the last parking position where the last one who used the car parked is a real problem for all the other members sharing this car. FamilyParking system introduces a new solution to this problem with a set of clever features that are interesting to each family to use in their daily life activities. Maybe it is the new positive member of each family having this problem, the member who will have a very accurate memory, and a very developed

monitoring system that let him always ready to answer every other member of the family when he ask “where is the shared car parked now?”. To make things more clear, we can imagine, initially, FamilyParking application as an application with a very simple interface working over Google maps application with two main buttons:

- **Parking button** which will be used by the current driver of the car once he parks the car as a way to inform the application that the current position where the parking button is pushed lately is the position that should be saved as the last place where the car was found, and this is the position that should be, in some way, published to the other members of the family who are willing to use the car in order to help them finding the car position easily.
- **Add member button** which can be determined, somehow, as non-functional part of the application since it is used just to add members to the family group to whom the last parking position should be broadcasted.



This is just for simplification, but the real implementation indeed guarantees these main functionalities in a different way. with such an application, the automatic parking detection is one of the most important and golden features that should be performed. This feature could be defined as the core part of familyParking system where it can detect automatically the action of car parking and then broadcast this position to the other members of the family sharing the car. So it is not required for the user to remember always pushing the parking button whenever he parks the car, because the application itself will try to detect that and do the parking on the application without the user interference.

1.3 FamilyParking users

Indeed, the idea behind familyParking was found after studying of some real users' problems when they spoke about their daily sufferings and time wasting just trying to locate the position of their cars in the morning since their cars are shared with their family members. According to that, some statistics where done to expect who

are the people that will be interested this app, and is it really worthy to invest in familyParking.

1.3.1 Expected users

Since the idea was born in Rome, and planned to be launched in Rome for now initially, the following statistics were done in order to expect the number of users for such an application.

The most recent statistics done in 2014 showed that the population of Rome reached 2,869,461^[2]. Knowing that the average of family members in Italy is 4 we can assume that the number of families in Rome is roughly equal to 717.365.

Supposing that each family of those has at least only one car and not all families in Rome use the smartphone. It could be considered that the expected users for the current phase when it is launched just in Rome will be, expectedly, more than 0.5 million families.

Speaking about some worldwide statistics, since the minimum platform used in developing the project with android is 4.0.3, then 91.8% of android system users are expected users for FamilyParking app in future [3]. And since the minimum platform used in developing the project with iOS is 4.0.3, then 91.8% of iOS system users are expected users for FamilyParking app in future ^[4].

 Location in Italy Coordinates:  41°54'N 12°30'E	
Country	 Italy
Region	Lazio
Government	
• Type	Metropolitan City
• Body	Rome City Council
• Mayor	Ignazio Marino (PD)
Area	
• Total	1,285 km ² (496.3 sq mi)
Elevation	21 m (69 ft)
Population (2014)	
• Total	2,869,461 ^[1]
• Rank	1st, Italy
• Density	860.92/km ² (2,229.78/sq mi)
• Urban	3,800,000 ^[2]
• Metro	4,200,000 ^[2]
Demonym	Romano
Time zone	CET (UTC+1)
CAP code(s)	00100; 00121 to 00199
Area code(s)	06
Website	Comune di Roma 

1.3.1 Real users

1.3.2.1 First use case

Background


- 20 years old
- Bachelor student
- Doesn't have a car

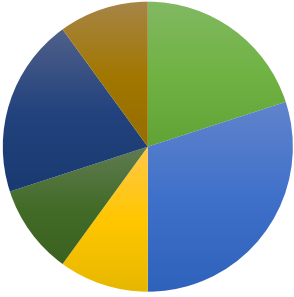
Motivations

- Being punctual all the time
- Being one of the top students
- Having a good personality

Frustrations

- Always late to his lectures
- Some problems with the family because of the shared use of the family car

Maurizio**Student**



Private life	Studying
Reading	Driving
Sport	Internet

Lifestyle

Maurizio is an Italian student in the English literature department. He usually wakes up every day at 7:00 am, takes his breakfast, do his shower quickly and then go to his University.

Maurizio is a very punctual guy, he likes to sit always in the first row in his lectures to be closer to the professors. To do that he should arrive to the university around 8:00 am, and since the transportation in Rome doesn't follow a regular schedule, he used to use his mother car.

Maurizio used to return back home in the afternoon in order to return the car back to his mother since she uses it for going to her job in a clothes store. She is working for the afternoon shift where she start her job around 3:00 PM. They always finds problems when to find the car parking where the last one used the car parked it.

1.3.2.2 Second use case

Bob has a car which is shared with his son, Michel, and yesterday was the birthday of Michel's girlfriend, so Michel spent the whole night there and returned back home quite late. Since the place where Michel used to park the car for his father was busy that night, he parked the car in a new position where the father didn't used to park his car in.



The next day, it was raining heavily and Bob, who works as a sales manager at NLTD corporate, should arrive his job very soon since there is a new contract with a new customer.

Bob checks the position where he used to find his car parked, but it is busy with another car. The son Michele is sleeping now, so the father simply picks his smartphone and opens "FamilyParking" application and try to check the parking position of the shared car. He easily found a flag fixed on a Google maps like interface, and he simply follows that flag and reached his car.

1.4 Competitors' Analysis

Indeed, the competitors for the FamilyParking software, when they are seen as one package, are integrating each other to perform what FamilyParking is performing, and studying each one them has shown that each competitor can serve as part of the functionalities performed by FamilyParking, but none of them offer the whole package together. With an additional main feature that is performed by FamilyParking without being found before with any of the competitors which is the automatic parking detection. The following are the main competitors with a description of how FamilyParking differs from each one.

1- WhatsApp :



WhatsApp is an instant messaging app for smartphones that operates under a subscription business model. In addition to text messaging, it can be used to send images, video, and audio media messages. Locations can also be shared through the use of integrated mapping features. Using WhatsApp for sharing a car position could be a visible solution and accurate one, but in this way it is not so social and immediate since a lot of manual things should be managed.

2- Google now :



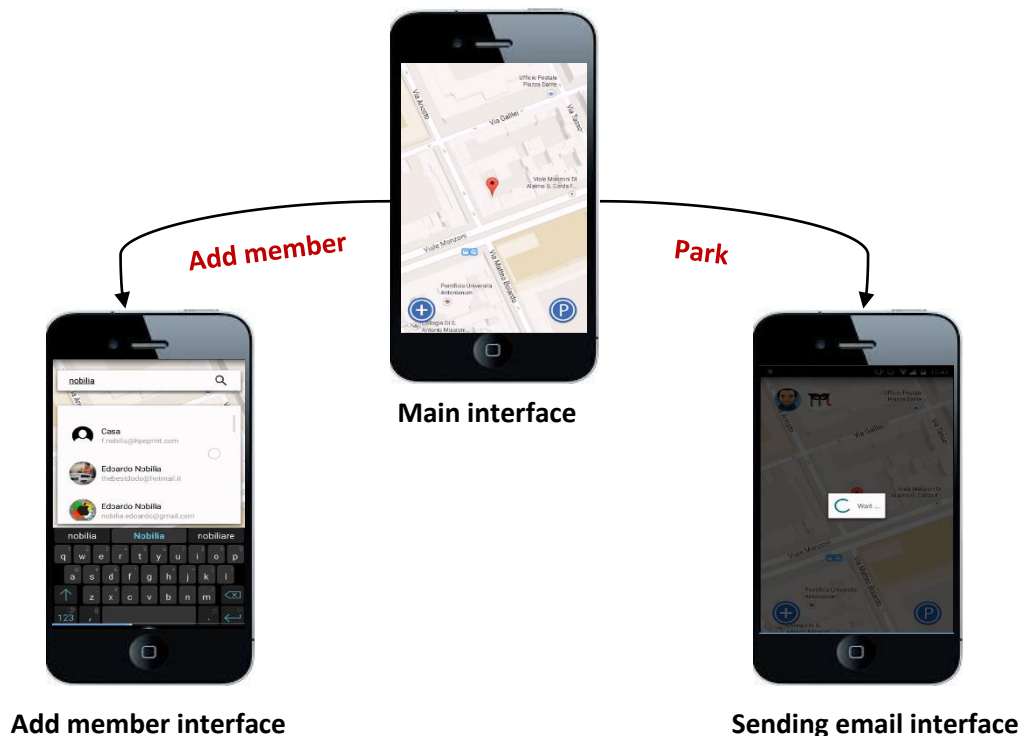
Google now an intelligent personal assistant developed by Google. It is available within the Google Search mobile application for Android, and iOS, as well as the Google Chrome web browser on personal computers. The problem with this software is that it is not accurate, and using it to do the same functionality of FamilyParking has proved low level of sociality and immediacy.

2.1 Initial version

As mentioned before, the importance of a new idea in the field of technology is evaluated by the user problem it is going to solve and the needs it going to satisfy. As much user experience is included at the beginning, as much clear and direct implementation plan is gained. Having the idea of FamilyParking at the beginning was not enough to start directly implementing the project. As a robust base for the project, a decision of building an initial prototype for testing goals has been performed with a very simple prototype implementing the basic functionalities of FamilyParking.

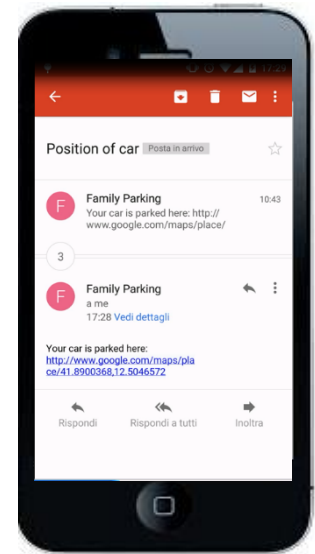
2.1.1 Application overview

Since there are two types of users for the application from the implementation point of view, parker and car seeker. The first prototype was a very simple interface to be used by the parker in order to perform the parking manually. The following figure describe the main functionalities performed by the parker side



In the car seeker side, all he needs to do is just to check his email when he wants to reach the car. A Google maps link of the last position of the car will be mentioned in the email, and the user can use it to reach the car position.

By clicking on the car position link mentioned in this email, the user will be redirected, intuitively, to the Google maps interface where he can choose to walk towards the car position



Sending email interface

2.1.2 Initial testing results

Indeed the main goal of the prototype phase was to get a preliminary idea about the following issues in order to have a user driven product once the implementation phase starts. The following main questions aimed to have a clear answer in this phase:

- 1- Are the users interested to have such an application like FamilyParking on their smartphones?
- 2- Did the users remember always to push the parking button when they parked their car?
- 3- Did the users remember always that they can check their email to reach the car?
- 4- How many users believe that WhatsApp application is enough to perform that functionality without the need of FamilyParking?

Indeed, answering the previous questions in this test was vital to take two important decisions:

- Is it really worthy to invest in such an idea and to implement it?
- If it is, what are the properties that should be added to FamilyParking that make it preferable to the user comparing with other applications that are in the same domain?

The following testing sheet shows the initial testing results done in this phase:

Initial testing sheet for the first prototype of FamilyParking application		
Sample volume:	10 persons.	
Sample age average:	19-25 years.	
Sample community:	friends families / Italy	
Test date:	Between 1 st Jan /2015 – 6 th Jan / 2015	
Questions	Yes	No
Is it interesting for the user to download FamilyParking?	70%	30%
Did the parker remember to push the parking button always?	40%	60%
Did the car seeker remember to check his email when he want to find the car position?	50%	50%
How many users thinks that WhatsApp is enough to perform the same functionalities?	30%	70%

2.1.3 The feedback-based plan for the next phase

The plan for the next phase was done according to the last testing results. The following points planned to be considered to go on for the next phase:

- 1- The test showed that 70% of users are interested to have this application on their phones so the idea of FamilyParking is worthy to be implemented.
- 2- The manual configuration for the car position is not enough to solve the user problem because in most cases he could forget to do it. Some solution that could implement some automatic configuration should be implemented in its beta version for the next phase.
- 3- Using the email for reaching the car position by the car seeker is not an effective way to notify the user for the last position of the car. The car seeker should be enrolled as well as the car parker in the same interface.

2.2 Second version

Taking as an input the feedback-based plan of the previous phase, FamilyParking started to be a real application in this phase, not just a prototype that is built for testing goals. The functionality of automatic parking was performed using the Bluetooth technology. The user can add many cars to be shared within the family group. When the user add a new car, he can define the Bluetooth device of that car, so whenever the application detect that device, it will know that an “unparking” operation about to be done, so the “unparking” will be done automatically without the need of user interference. Equivalently, when the application loses the connection with the car Bluetooth device, the application will deduce that there is a “parking” operation about to be done, so the application will do the “parking” automatically without the user interference.

2.2.1 Application overview

In this version, the following functionalities have been added to the application:

- **Signing in:**

If it is the first time the user opens this application, the user is asked to insert his email **(1)**, then he will receive a confirmation code in his email **(2)**, and by copying this confirmation code to the current application interface **(3)**, the user will be redirected to the main interface and will be authorized to use the full functionalities of the application.

2.2.2 Thinking aloud with users

2.2.3 The feedback-based plan for the next phase

2.3 Third version

2.3.1 Application overview

2.3.2 Querying users

2.3.3 The feedback-based plan for the next phase

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