IoT Proposal Project – Team MaPaY

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Description of the problem :

Imagine this is the evening like 7.30 pm, you leave your work by car and you have 30 minutes on the road until you reach home. You arrive in front of your garage and you forgot the remote control which opens the door of the garage. You are stuck outside. The solution that comes to your mind are all outside of the car, like going inside your home and get the remote control or asking someone inside the house to open the door. It is very exhausting, especially after a long day at work.
But now you have our very nice solution. No remote, no second person, just you and your car. Simply approach your car in front of the garage door and the door opens by itself with a strong security.

State-of-the-art :

Currently, there are a lot of solutions when it comes to opening your garage's door. Some of them consist in reading the plate number, or using a remote control, while other use a simple pushbutton switch. In order to propose an efficient solution, we have done some researches about the already existing ones.
One solution we have found is called MyQ Garage and uses Wifi to open the door. The user has to go on his application and it will open the door once it's connected to the Wifi. He can also check from work or anywhere if the door is closed or not. This solution is sold at the price of 160$.
Another solution is Solo from 1Control, an Italian startup. This solution also uses the smartphone to control the door. The technology used is the Bluetooth 4.0, and it's compatible with Android and iOS. It will copy the remote of your garage, so it is possible to use the old remote and the 1Control Solo. The main difference with the first solution is that it doesn't use the Wifi so it has a better security since there is no Internet connection. The price of Solo is of 99€.
The third solution we have analyzed consists in an OCR software with scanner which "reads" the plate number and transforms it into a text file. Then it is compared by the controlling computer which gives the authorization or not to the vehicle. This solution is used a lot in companies because all the employees don't need to have a remote to have access to the parking.

Description of our IoT-based solution and what makes it better than other solutions :

Description:
For our project, we will try to implement two solutions for a better security.
First of all, we will use the transmitter-receiver solution to open the garage door automatically. The transmitter will be placed inside the car and the receiver on the garage door. Once the car approaches the door, the receiver will detect the presence of the transmitter and will request the Arduino board to open the garage door.

For the exit part, we will try to link the transmitter with the car. When the car is parked and stopped, the transmitter will be on "OFF". When the car will start again, the transmitter will be "ON" so it will communicate with the receiver and open the garage door.

For the second solution, basically, we are going to define a zone around the garage door. When the house owner's smartphone enters into that zone, the garage door protection will be unlocked. Only when this protection is unlocked it is possible to open the garage door through the first solution (transmitter-receiver). How do we know that the smartphone is inside the zone? We're using the GPS thanks to OwnTracks application.

What we are going to use:

· OwnTracks smartphone application which provides the GPS location

· CloudMQTT (Mosquitto based broker), we will use this one because he is well supported on Gladys and works with Owntracks. MQTT provides lightweight methods of carrying out messaging using a publish/subscribe message queueing model.

· Gladys

· Raspberry Pi

· Maybe iBeacon inside the OwnTracks app

What makes it better than other solutions:

Our solution will be better than the other ones because we will use two level of security and everything will be automatic. The garage door will open by itself automatically without the need of a human's action.

Norms and regulations :

For this project, we must ask ourselves the question of the norms and regulations we have to respect. As explained before, one of our solution uses the GPS to have the localization of the car. But this technology is controlled by laws. Indeed, with the launch of GPS and then all the GPS tracking software, there has been a need to create laws and regulations so that it won't be used to do harm.

The main law about GPS tracking says that you can place a device inside a vehicle only if you own it. If you own a company, you are allowed to place those devices in the cars of the company, although your employees disagree with this process. This will not apply to our project because we aim at selling it to particulars, but it is important to know the borders of legality concerning the technology we may use. Another law that may apply to our project is that it's forbidden to track the vehicle of people who are more than 18 years old. It is a violation of rights and it is punished by the law.

Gantt Diagramm :
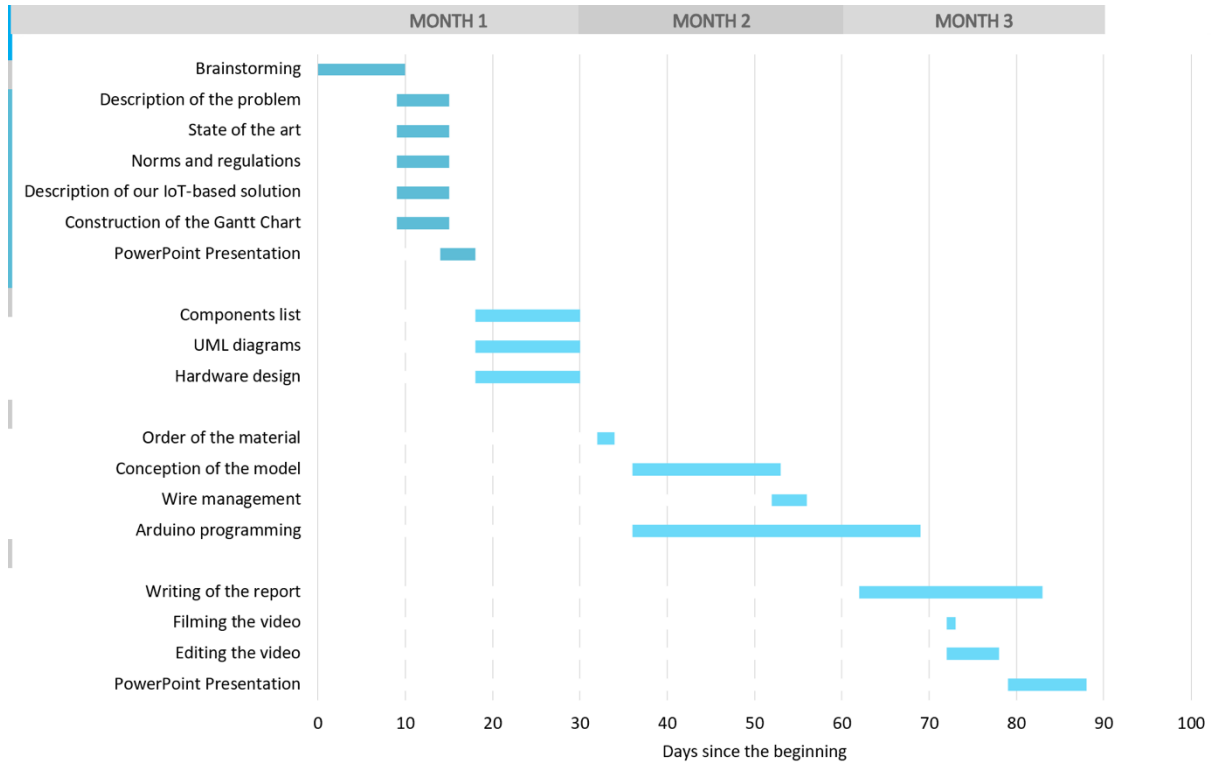
TASK NAME	START DATE	DAY OF MONTH*	END DATE	DURATION* (WORK DAYS)	DAYS COMPLETE*	DAYS REMAINING*	TEAM MEMBER	PERCENT COMPLETE
First phase								
Brainstorming	9/24	0	10/3	10	10	0	ALL	100%
Description of the problem	10/3	9	10/8	6	6	0	Aymeric	100%
State of the art	10/3	9	10/8	6	6	0	Marion	100%
Norms and regulations	10/3	9	10/8	6	6	0	Marion	100%
Description of our IoT-based solution	10/3	9	10/8	6	6	0	Pierre	100%
Construction of the Gantt Chart	10/3	9	10/8	6	6	0	Aymeric/Pierre	100%
PowerPoint Presentation	10/8	14	10/11	4	4	0	ALL	100%
Second phase								
Components list	10/12	18	10/23	12	0	12	ALL	0%
UML diagrams	10/12	18	10/23	12	0	12	ALL	0%
Hardware design	10/12	18	10/23	12	0	12	ALL	0%
Third phase								
Order of the material	10/26	32	10/27	2	0	2	ALL	0%
Conception of the model	10/30	36	11/15	17	0	17	ALL	0%
Wire management	11/15	52	11/18	4	0	4	ALL	0%
Arduino programming	10/30	36	12/1	33	0	33	ALL	0%
Fourth phase								
Writing of the report	11/25	62	12/15	21	0	21	ALL	0%
Filming the video	12/5	72	12/5	1	0	1	ALL	0%
Editing the video	12/5	72	12/10	6	0	6	ALL	0%
PowerPoint Presentation	12/12	79	12/20	9	0	9	ALL	0%