IoT Technical Report – Team MaPaY

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Description of the project:

Everybody has once faced the situation where you go to a shop and you have to find a slot in the parking. But the parking is huge and you don't know where there is an aivailable slot. Thanks to our solution, this won't happen anymore! You will know how many slots are available in the parking before entering, and you will be directed to the available slots thanks to some LEDs.

State-of-the-art:

In order to propose the most adapted solution, we have studied many already existing solutions.

One of thoses solutions is proposed by TTS Parking. It consists in an interface which shows the number of places in the parking.

Accor Solutions also proposes a solution where you have a light above the available slots, which indicates to the driver where he can park.

All the other solutions are pretty similar from the ones explained above. We didin't find an exact price but it varies according to the number of slots in the parking. The bigger the parking is, the higher the price will be.

To distinguish ourselves from the existing propositions, we decided to add a light system which will show in which part of the parking are the available slots. It will avoid driving across all the parking to find a slot.

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

For our solution, we will create a smart parking. At the entrance of the parking, a digital display will be placed to inform car drivers about the remaining slots.

If the parking is full, the parking barrier will stay closed. In the other case, the LCD display at the parking entrance will show the slot number which is available and the driver will be guided by our led system.

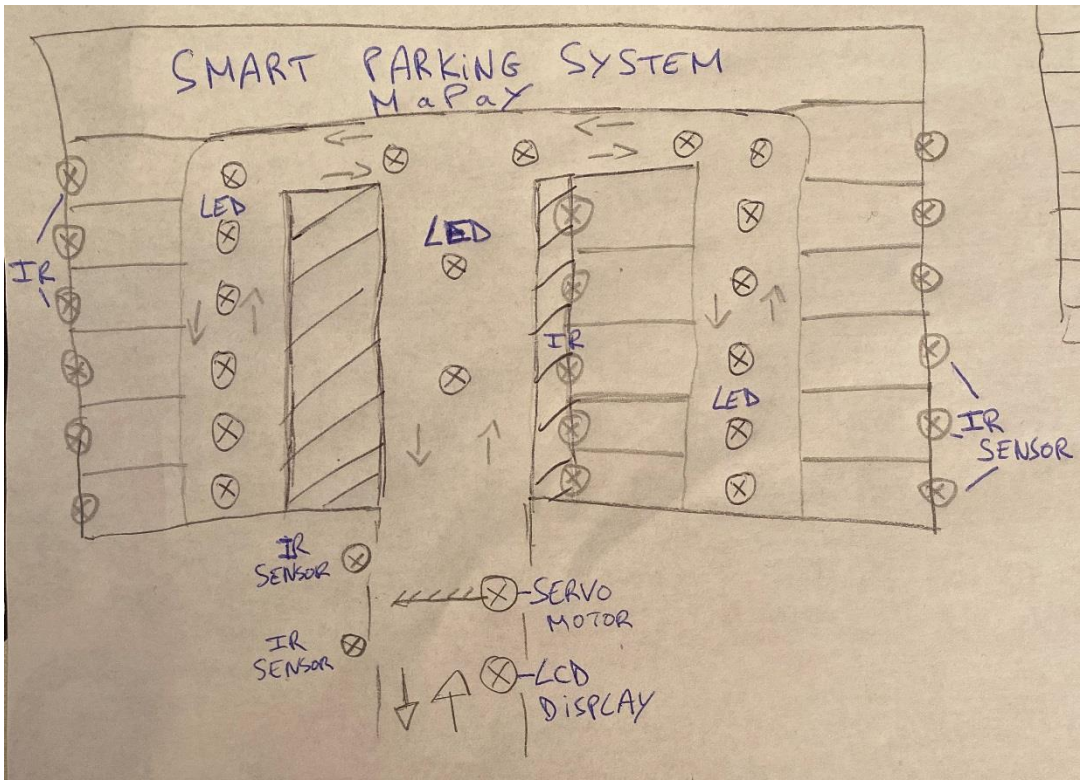
Drivers will save time because we all know big parkings where we're looking for a slot for a long time.

When a car approaches the entrance of the parking, an IR sensor / ultrasonic sensor will detect it. Only if some parking slots remain free, the parking barrier will open (servo motor) and let the car enter.

We will count the number of cars entering and going out of the parking. IR sensors will be placed beside each slot to know if the slot is available or not.

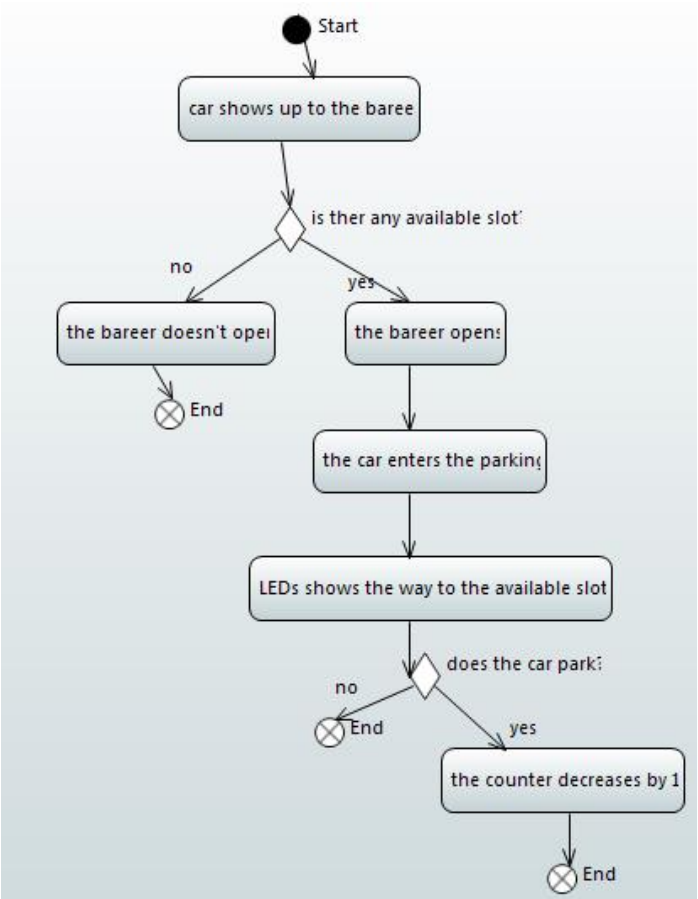
We are going to connect everything with the Arduino UNO board.

A global schema :

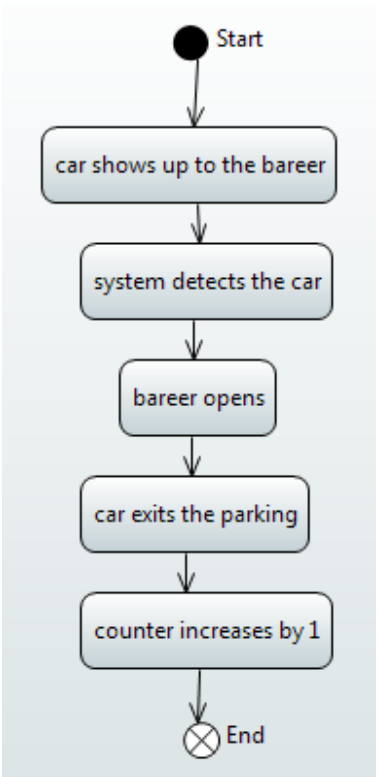


UML diagrams:

In order to help us realizing our solution and to define it precisely, we did some activity diagrams. The first one explains the scenario when a car wants to enter the parking, and the second one describes the situation where a car exits the parking.



Activity diagram for the situation where a car enters the parking



Activity diagram for the situation where a car exits the parking

Components list:

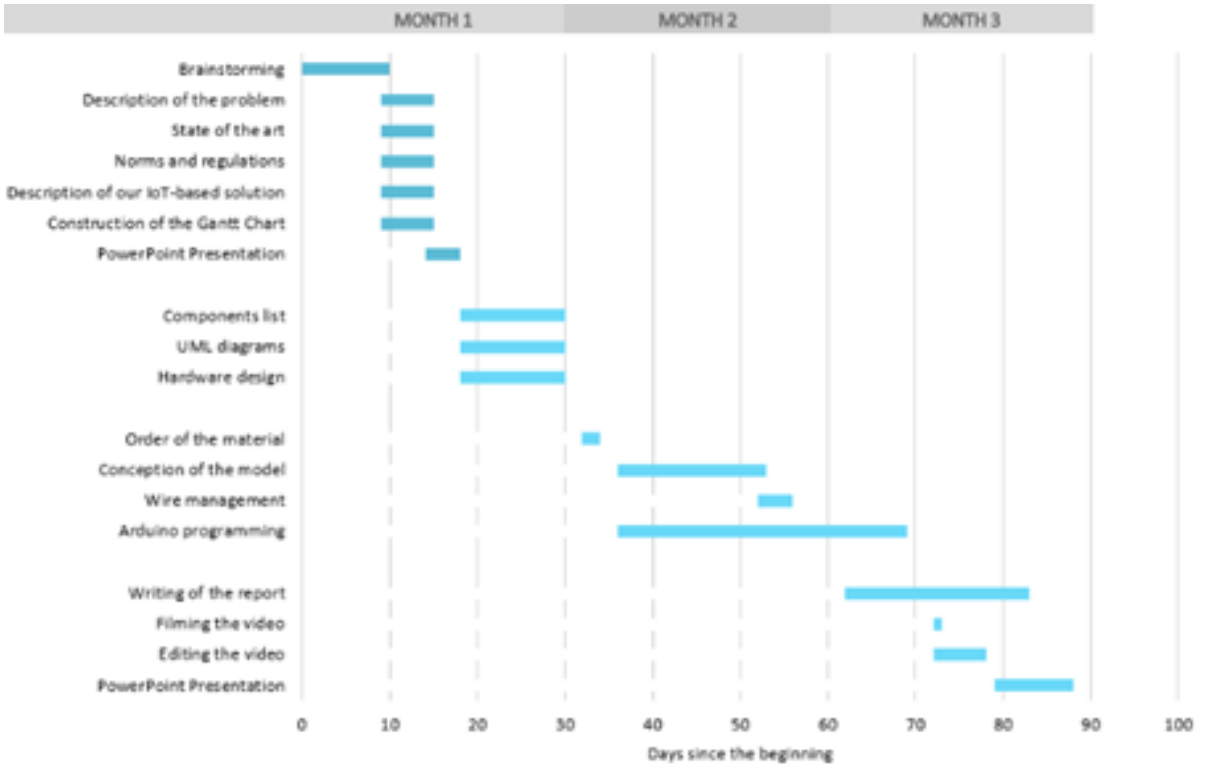
- Arduino UNO board use to link all the component together. Provided in the Arduino box
- IR/ultrasonic/proximity sensors use to detect cars on each slots of the parking.

https://www.cdiscount.com/juniors/r-capteur+infrarouge+arduino.html#_his_

https://www.cdiscount.com/bricolage/electricite/xcsource-ir-infrarouge-obstacle-prevention-module/f-1661416-xcs4894479459614.html#mpos=0|mp

- LED use to indicate the way where there are free slots. Provided in the Arduino box.
- Resistors use with the led and the servo motor. Provided in the Arduino box.
- Breadboard use to connect all the element easily. Provided in the Arduino box.
- Servo Motor use to open the fense on the enter or exit of the parking. Provided in the Arduino box.
- LCD display use to display the number of remaining places in the parking. Pierre en a un.
- For the maquette we will use some paper or wood or cardboard to make the fense and the slots.

Gantt diagram:



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%