The Good Boy!

Sprint 1 Review

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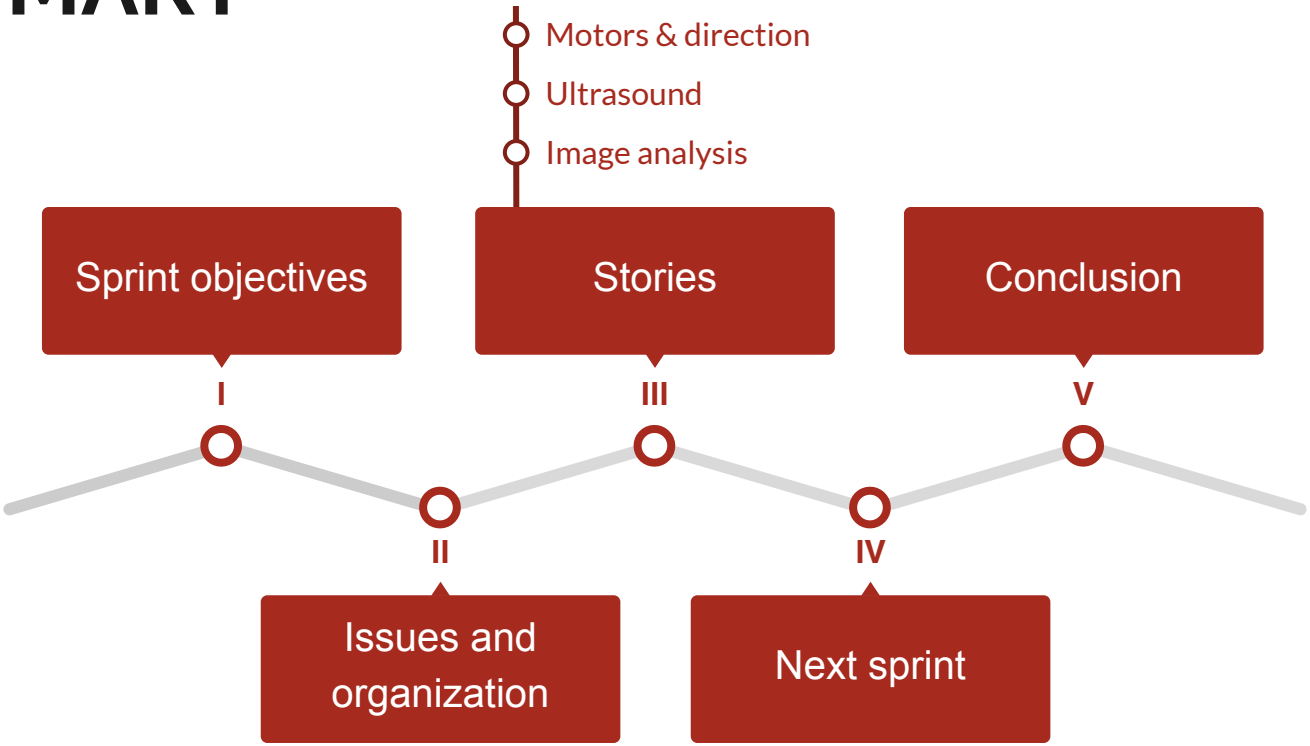
SUMMARY


Motors & direction
Ultrasound
Image analysis
Sprint objectives
Stories
Conclusion
I
III
V
II
IV
Issues and organization
Next sprint

Sprint objectives

SPRINT 1

	Expectation	VS	*Reality*
1	One direction movement		Emergency stop
2	Emergency stop		White pixels detection
3	Basic obstacle detection		One direction movement
4	Distance measure		Basic obstacle detection
5	White pixels detection		~~Distance measure~~

Sprint 1

- Issues
- Adaptation & Organization

Issues and organization

→ Issues

Raspberry PI

PROBLEM

- The Pi was not set up as it was expected

SOLUTION

- Setup done in the beginning of the sprint (**≈4 hours/person**)

→ time estimation : XL

CAN Communication

PROBLEM

- The CAN communication was not operational

SOLUTION

- Connectors changed
- Currently, the reception of CAN messages works, but the sending does not

→ time estimation : L

WiFi

PROBLEM

- Impossible to use the Hotspot and Wifi at the same time

SOLUTION

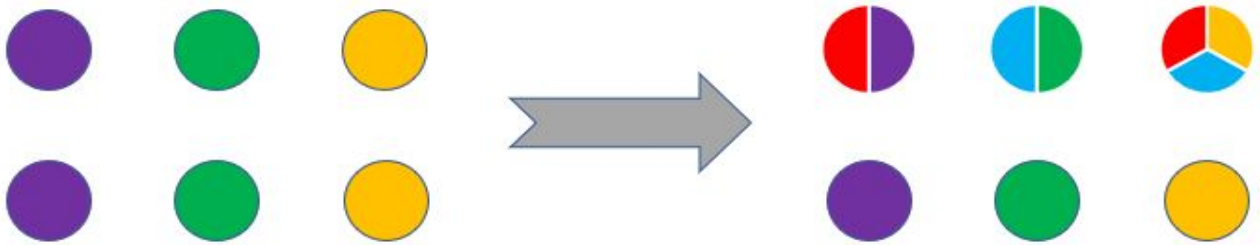
- The problem is not solved, it is still being worked on

→ time estimation : XL

Issues and organization

→ Adaptation & Organization

- **Group organization** (each dot represents a team member)



Legend

Ultrasounds + CAN
Motors + Direction
Camera
Raspberry PI setup
WiFi

- **Bypass of the Raspberry Pi** : Implementation and test of the code directly on the Nucleo devices

Stories

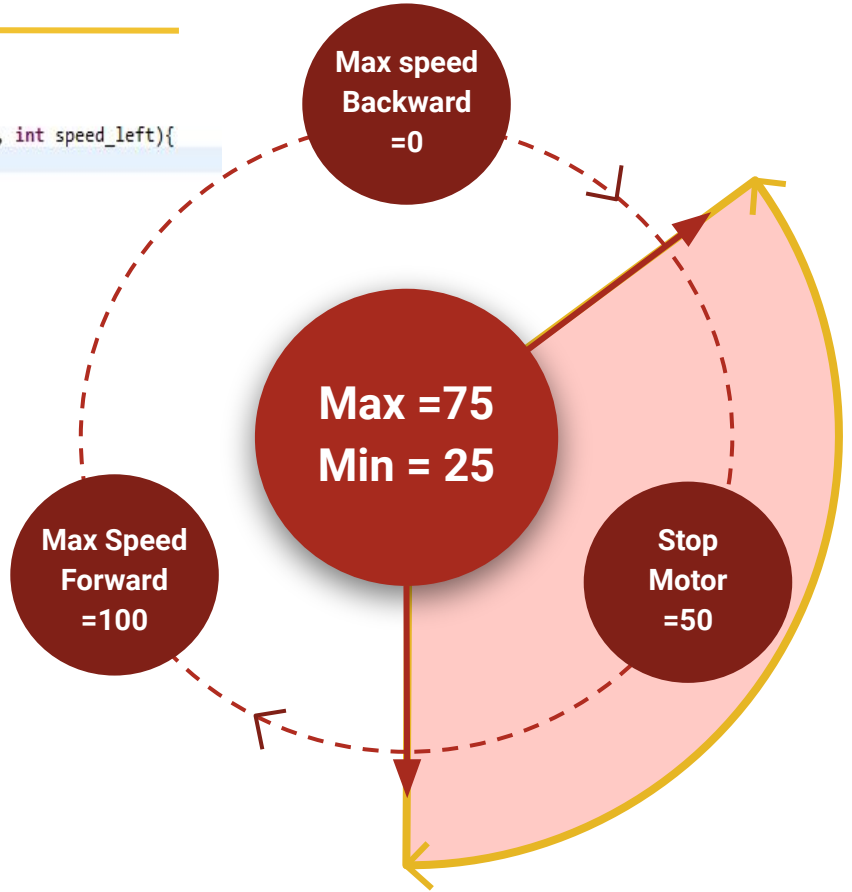
- Motors (CMC) & direction
- Ultrasound
- Image analysis

Control Motor Command (CMC)

```
void wheels_set_speed(GPIO_PinState en_right, GPIO_PinState en_left, int speed_right, int speed_left){

        if (speed_left < MIN_SPEED_WHEEL){
            speed_left = MIN_SPEED_WHEEL;
        } else if (speed_left > MAX_SPEED_WHEEL){
            speed_left = MAX_SPEED_WHEEL;
        }
        if (speed_right < MIN_SPEED_WHEEL){
            speed_right = MIN_SPEED_WHEEL;
        } else if (speed_right > MAX_SPEED_WHEEL){
            speed_right = MAX_SPEED_WHEEL;
        }

        HAL_GPIO_WritePin( GPIOC, GPIO_PIN_10, en_left); //PC10  AR_G
        HAL_GPIO_WritePin( GPIOC, GPIO_PIN_11, en_right); //PC11  AR_D
}
```



Time estimation spend on this task: XL

Control Motor Command (CMC)

Demonstration

Demo - Move backward & forward: https://youtu.be/DINi1tFDJ18

Motor - Direction (right & left)

Front

Back

- Front motor → controls the direction
- Two control buttons: L & R

➔ *Use of part of an already existing code*

Time estimation spent on this task: M

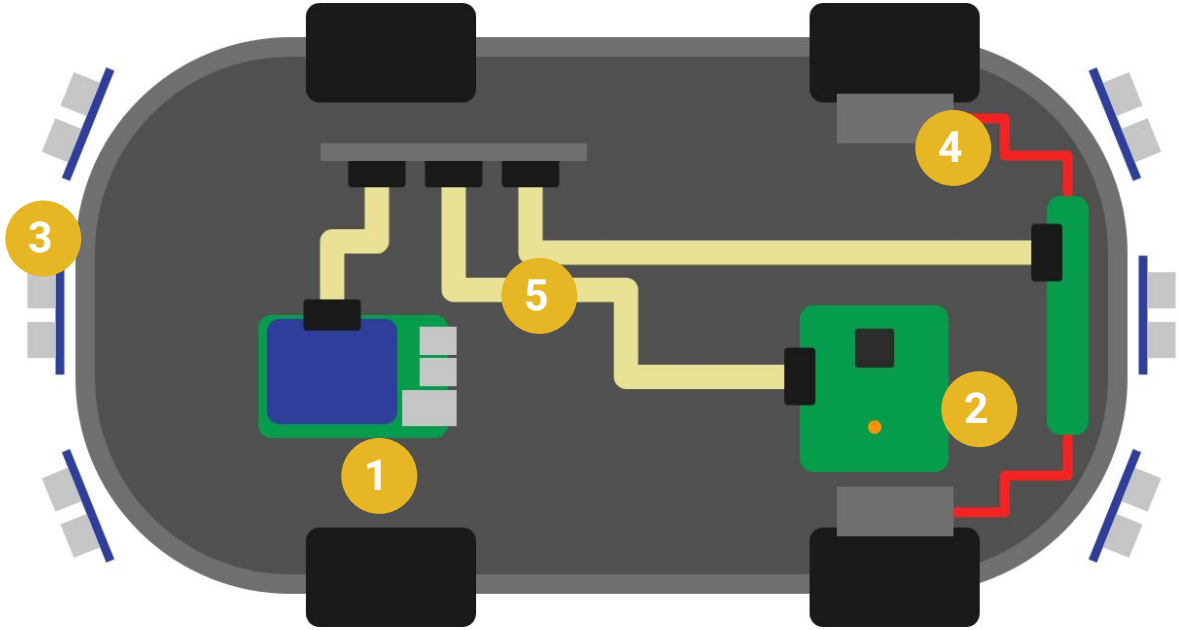
Motor - Direction (right & left)

Demonstration

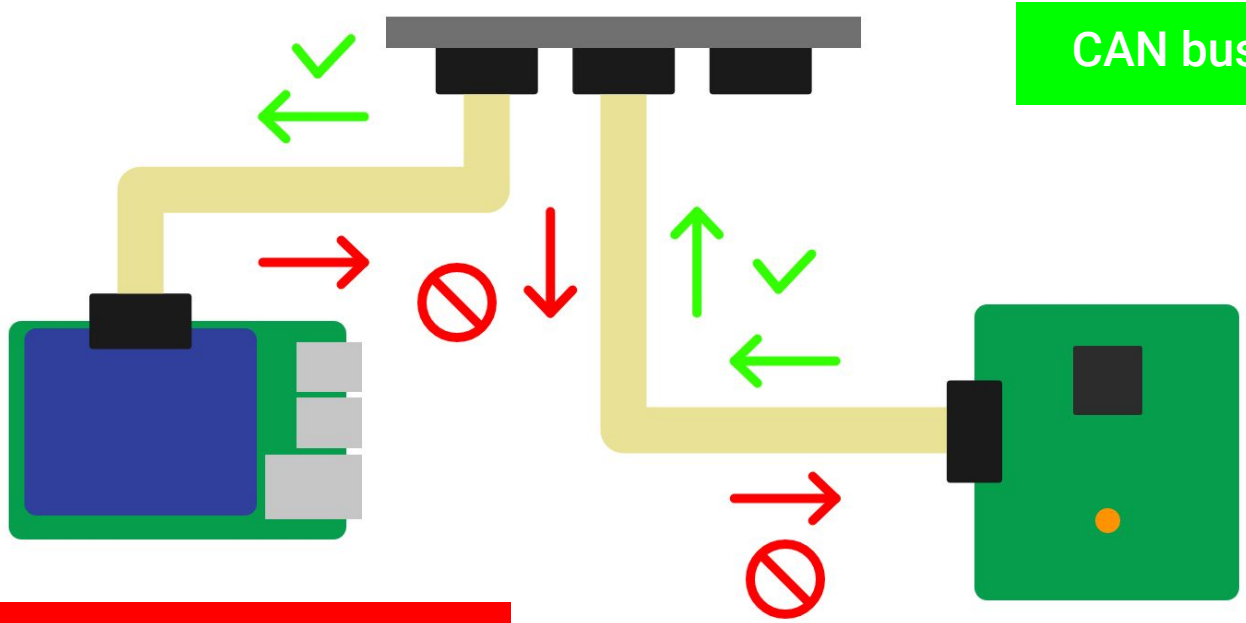
Demo - Move Right & Left: https://youtu.be/l6jVj6rVawM

Ultrasonic (US) transceivers & CAN bus

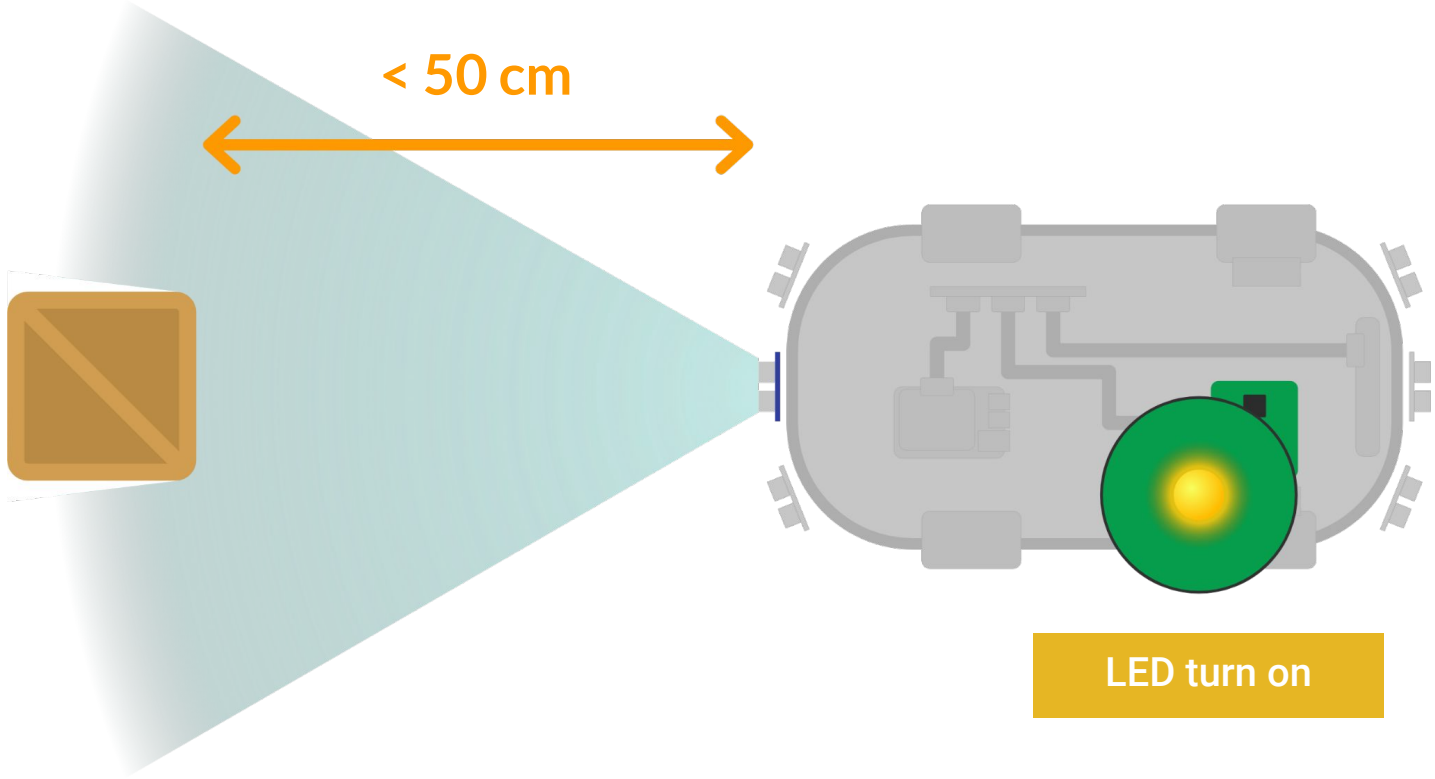
1	Raspberry Pi
Discovery	2
3	US transceivers
Motors	4
5	CAN bus



US transceivers & CAN bus



US transceivers & CAN bus



LED turn on

Ultrasonic transceivers & CAN bus

Demonstration

DEMO - Ultrasound: https://youtu.be/aZi_UDek7S0

Image analysis

- Find white parts of a picture
- Find the biggest white part of a picture
- Follow a specific white part among others

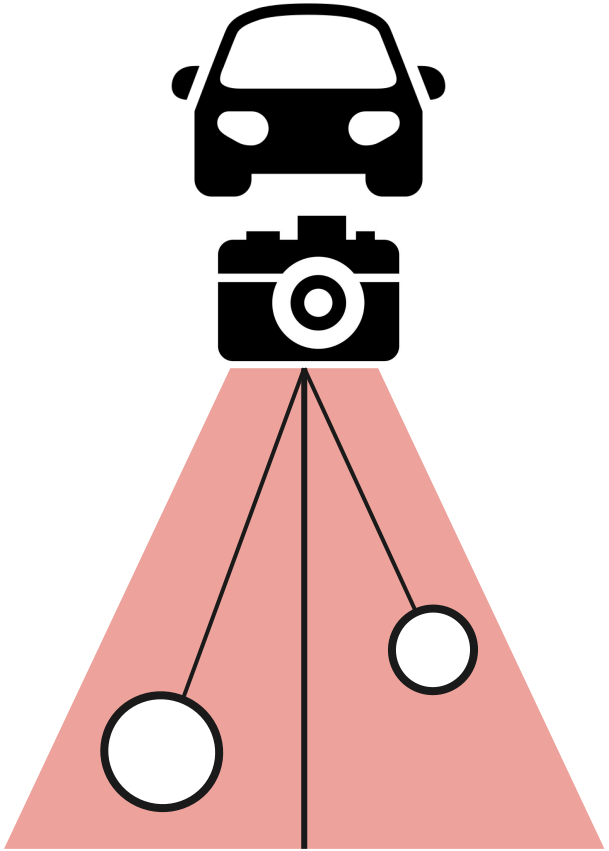
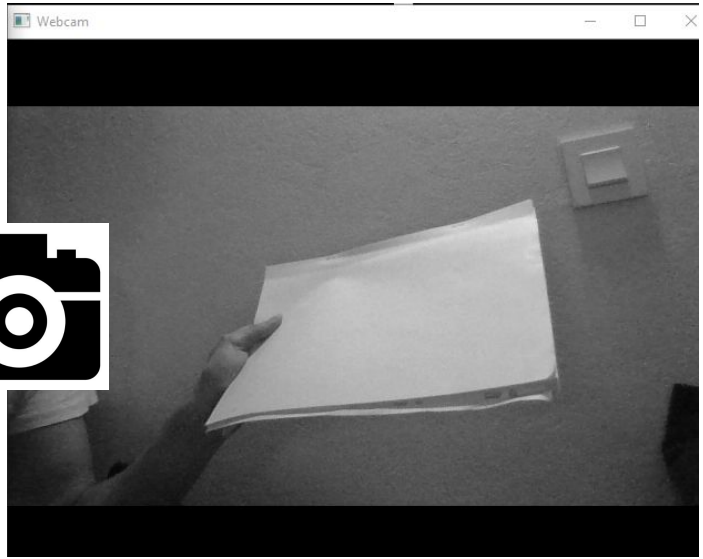


Image analysis

Convert image to grayscale → Apply a threshold → Analyse the picture



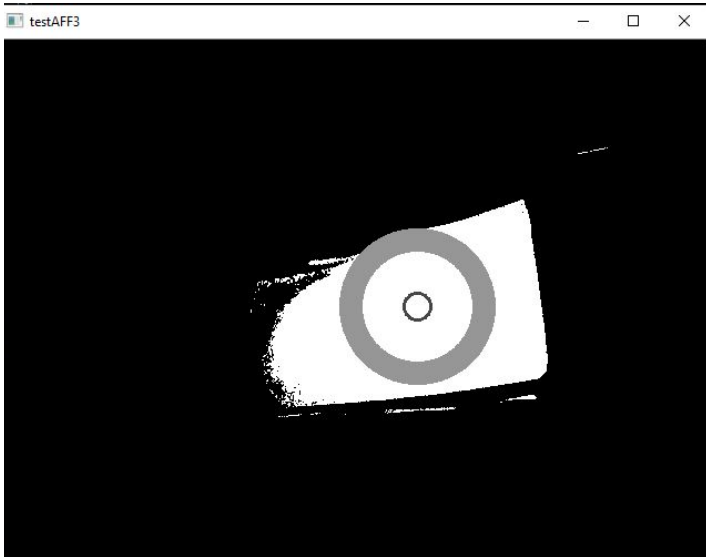


Image analysis

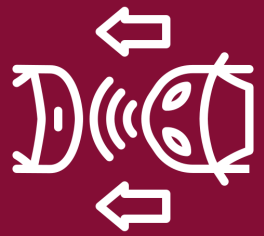
Demonstration

Sprint 1 → Sprint 2

Next Sprint

User-oriented objectives

Postponed from last sprint



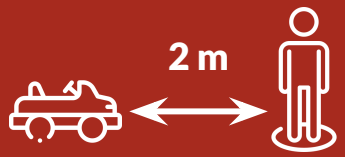
Obstacle detection

Placed in a open area (no objects nearby), **the robot stops** when an **obstacle** is detected at a distance of **50 cm or less**.

Next Sprint

User-oriented objectives

New in this sprint

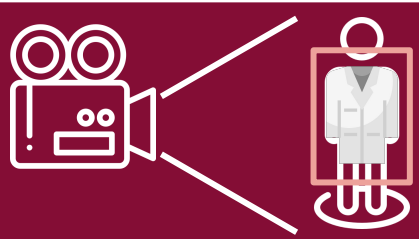


One direction follow-up

Placed in an open area, the robot **follows a person in front of it** at a distance of **two meters**, in a **straight line**.

Detection of people dressed in white

The robot is able to detect a person **dressed in white** on the camera, and to **differentiate it** from another white object.



Conclusion

- A lot of time spent on configuration, not anticipated
- Several technical issues, but also unexpected progress
- New technical skills acquired to fix problems

- Use progress made in this sprint in next one
- Gain experience from problem we faced to better anticipate issues in next sprint

Sources

- Icones8.fr:
  - p.10: car
  - p.10 and 12: camera
- Flaticon.com:
  - p.20: https://www.flaticon.com/authors/berkahicon
  - p.1, 4, 7, 19, 21: https://www.flaticon.com/authors/freepik
  - p.21: https://www.flaticon.com/authors/surang