# 00_Home

Welcome to the Robot_Project_IFX wiki!

This is the page where you will find all the information necessary to understand how the Robot Project is structured, and to use the existing code. Here you will mostly understand about how the robot works and which source files and header files are related to the described features. Every specific information needed to understand the code should be in the comments of the code.

Here is an overview of the final complete structure of the project. Depending on the mode of functioning of the robot, not all modules are used at the same time. In order to learn about the specificities of each mode, you can look at the README files of the C projects where they are implemented.
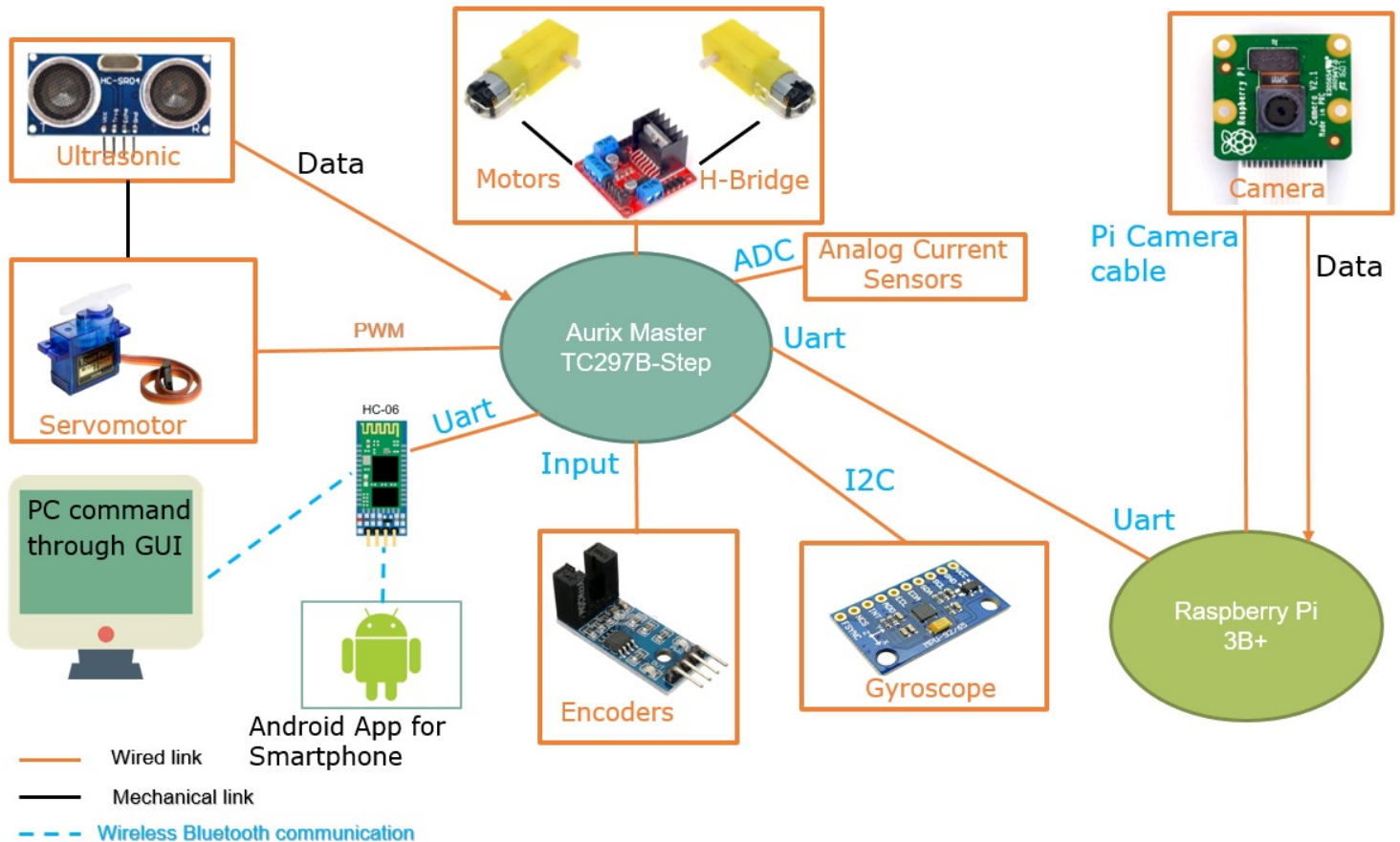
Modules Summary:

1. H-Bridge and Motors Control:

- Motors - functions dedicated to enabling and disabling the H-Bridge which supplies the wheels' motors
- PWM_config - functions dedicated to the configuration of the PWM signal to control the speed of each wheel
- Encoders_config - functions dedicated to the configuration of an external interrupt processing the output of the wheels' encoders
- Enslavement for Mode 1 and Mode 2 - for these modes the goal was to make the robot have a straight trajectory while going Forward and Backward. Also be able to turn right and left.
- Enslavement for Mode 3 - a more advanced control algorithm is implemented to make the robot move to precise locations. The CNN sends the position of a symbol on the floor, and the robot can go to that position

2. Obstacle detection:

- Ultrasonic_sensor - functions dedicated to using the ultrasonic sensor and fetch the information about the nearest obstacle detected

3. Bluetooth connection:

- Hardware setup - Dedicated to the hardware setup of the connection between the HC-05 Bluetooth module to the AURIX™ TC29xB board through UART.
- Software setup - functions dedicated to using the HC-05 Bluetooth module and send in a bidirectional mode information such as commands from the user and feedback from the robot

4. CNN - Camera Detection:

- This part is for the third mode of the robot. The robot will detect letters S = 'START', E = 'END' and digits from 1 to 5. The robot will evolve on a course, when a digit/letter is detected, it will continue for finding the following digit. > Order of detection : S -> 1 -> 2 -> 3 -> 4 -> 5 -> E

5. Servomotor control:

6. GUI:

Python script for a computer GUI. Supports mode 1 and mode 2. * How the script works * How to generate an executable

You can find the script of the GUI in the Embedded World archive. Read carefully the README

7. Android App:

- Explanations on how the Android App works and how to install it on an android device

8. Angular Position with I2C communication:

- See how we managed to get the angular position of the robot:
- I2C communication
- Data processing (Calibration,Madgwick Filter)

9. Current Sensors:

- We have designed 2 hardware current sensors for having a real time information of the consumption of the Robot.