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1. Sonar

The sonar is a node to process the raw sonar information to the sonar topic.

1.1. Repository

Windesheim-Willy/sonar

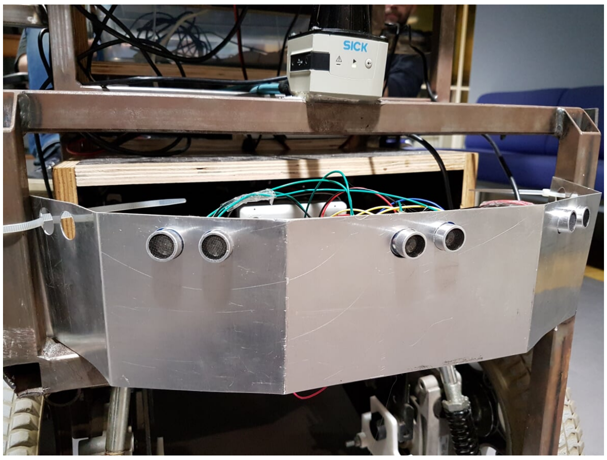
1.2. How to run?

The sonars will start automatic when the PI is running. The sonar node can be started manually by going into the root of the sonar repo:

```
./START start
```

1.3. Background information

To prevent collisions, ultrasonic sensors are used. These sensors measure distance by using sound. This is made possible by sending out bursts of high frequency noise, and then waiting for a reflection of that sound using the HC-SR04 ultrasonic sensor.



By using this data Willy is be able to decide if he is able to drive any further in a certain direction. In the event of Willy being not able to drive any further, he will decide if there is a direction where he is able to drive further. This way Willy will be able to drive around autonomously without collisions. How Willy reacts to objects in his navigation is researched by a previous group. (Navigation design v0.1, 2017)

The datasheet [1] for the HC-SR04 is included in the sources at the bottom of this document.

The sensors all use 5V as can be seen in the schematic:

[image]

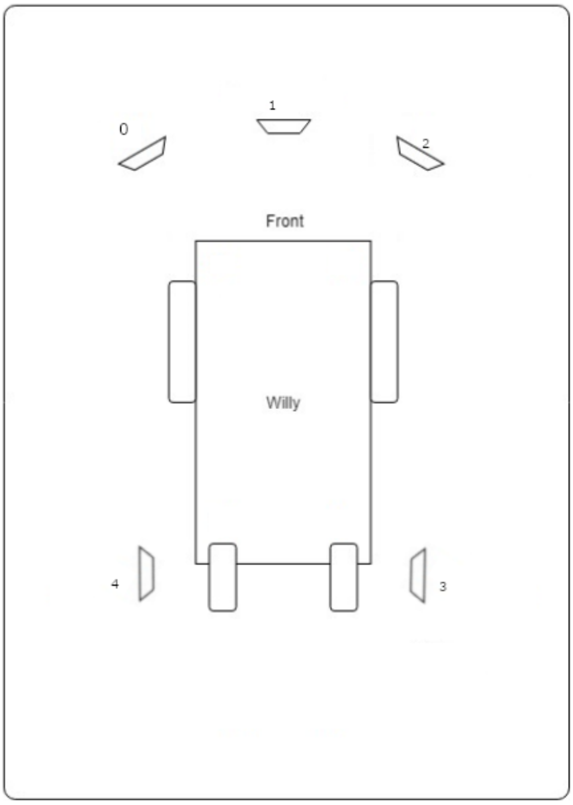
As shown in the schematic above, all the 3 sensors are connected to the Arduino.

The sensors are connected in the following order:

Arduino Digital Pin Number	Sonar Sensor Number
3	Trigger Sensor 3
4	Echo Sensor 3
5	Trigger Sensor 0
6	Echo Sensor 0

Arduino Digital Pin Number	Sonar Sensor Number
7	Trigger Sensor 1
8	Echo Sensor 1
9	Trigger Sensor 2
10	Echo Sensor 2
11	Trigger Sensor 4
12	Echo Sensor 4

The sensors are placed as follows:



It should be noted that not all the sensor are read at the same time. The front sensors are read in a sequence. Only the lowest value is publisched on the topic. The side sensors are published on the same topic, but have a different ID. Therefore move_base is able to handle the data in the correct way.