MOBILE ROBOTS Case Studies 9

Prof. Francesco Mondada

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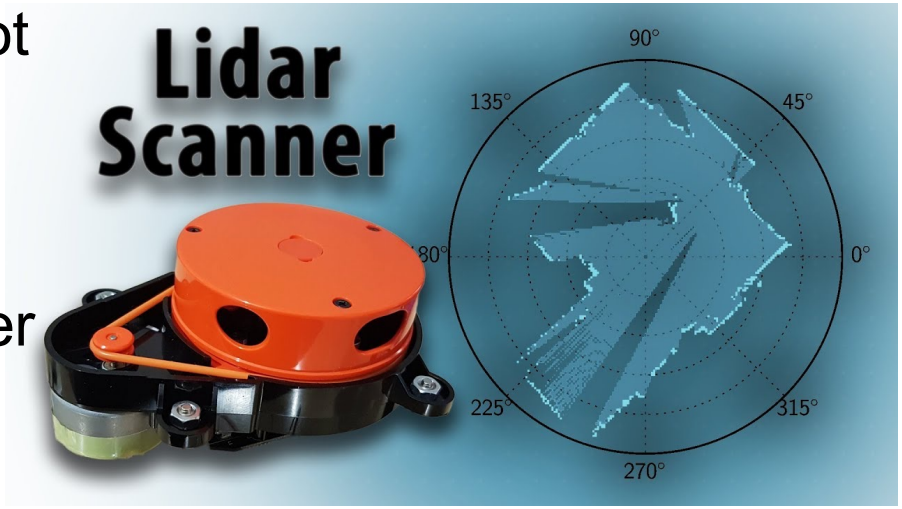
Choice of proprioceptive sensor

You need to design a very cheap mobile robot performing SLAM to create maps of empty houses. As you need to create a metric map, you equip the robot with a rotating laser TOF sensor, with a distance of measurement larger than the larger distance you can find on the field. Which proprioceptive sensor(s) do you put on the robot to model motion:



xiaomi lidar

A. Wheel encoder
B. Motor speed sensor
C. IMU (acc, gyro, compass)
D. None

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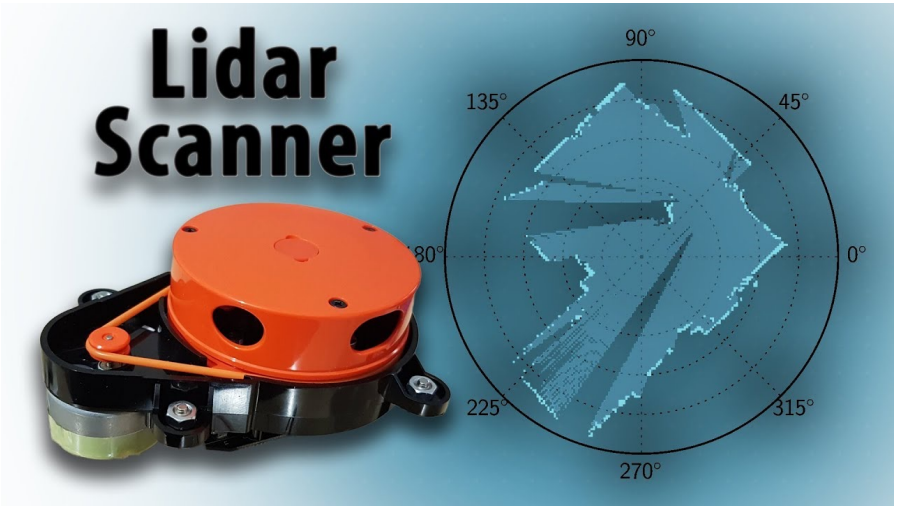
Choice of proprioceptive sensor

Why adding a proprioceptive sensor when the system can perfectly work without it?



xiaomi lidar

A. **Wheel encoder**
B. **Motor speed sensor**
C. **IMU (acc, gyro, compass)**
D. **None**

SLAM on Thymio

Why it is hard to make SLAM on the Thymio robot?

A. **Because the odometry is bad (bad sensor and unprecise wheels)**
B. **Because the range of the sensors is not large enough**
C. **Because sensors are not sufficiently linear**
D. **Because the processing power is not sufficient to run SLAM algorithms**

SLAM on Thymio

SLAM builds on the known map to build the unknown, this requires large-range sensors

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Robot for pipe inspection

You have to design a small robot for semi-autonomous pipe inspection, able to detect (supervision of a human expert by remote camera, image preprocessed on the robot) and map the problems on a network of tubes, to allow intervention from outside. The robot should be autonomous in energy and have the smallest possible processor. The pipes have regular bifurcations and you have a plan with some key positions of the network. Which map do you choose for your robot.

A. **Occupancy-grid map**
B. **Topological map**
C. **Metric map**
D. **A mix of them**
E. **None of them**

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Compactness is a feature of topological maps, but here we need metric information for the task, a mix could take advantage of both properties.