

MOBILE ROBOTS Case Studies 9

Prof. Francesco Mondada

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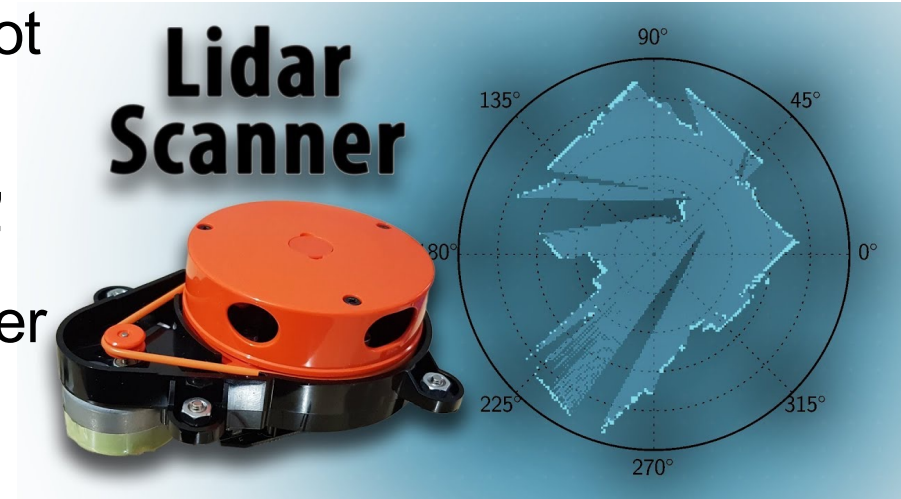
EPFL

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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:

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

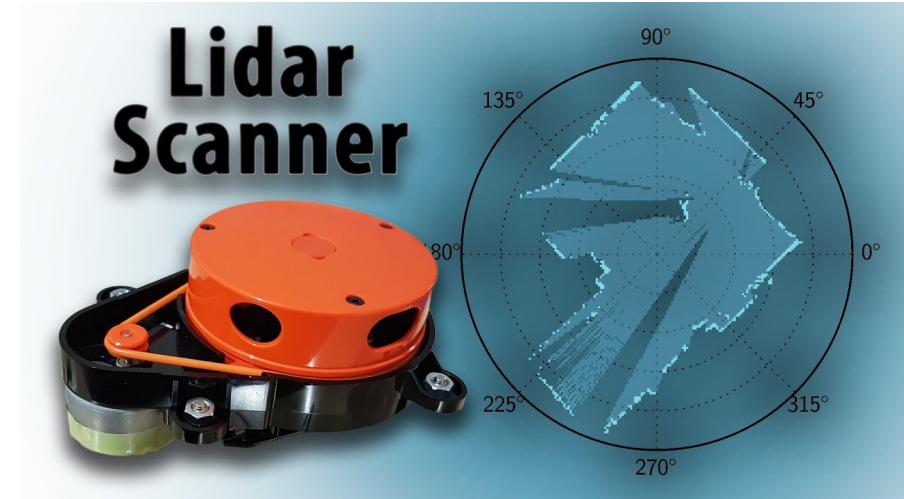


xiaomi lidar

Choice of proprioceptive sensor

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

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



xiaomi lidar

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.