

ECE 497 - Introduction to Mobile Robotics

Spring 09-1

Lecture 4-1: Common Sensing Techniques for Reactive Robots Reading: *Introduction to AI Robotics* (Sec. 6.1 – 6.5)

Objectives:

- Define the difference between active and *passive sensors*
- Define the following terms in one or two sentences: proprioception, extereoception, exproprioception, proximity sensor, logical sensor, false positive, false negative
- List the metrics for rating sensors
- Describe the problems of specular reflection, cross talk, and foreshortening with an ultrasonic transducers
- Describe the types of behavioral sensor fusion and be able to apply to a real world problem
- Write perceptual schemas from any logical equivalent range sensor to produce a polar plot for obstacle avoidance behavior

<u>Perception</u> is one of the most important tasks of an autonomous robot. It takes sensor feedback to acquire knowledge about the robot's environment.

In a reactive system, perception

- Releases a behavior
- Guides the actions of the behavior

_____ sensors provide some form of energy and then measure the return to understand the environment such as sonar or laser.

_____ sensors receive energy already in the environment such as a bumper or camera.



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sensors do not require a great deal of processing or
computation but the information they provide is simple or limited such as distance or light
levels.
sensor require more processing and computation but
may provide more information such as a camera
The to extract data determines whether a sensor is <i>active</i> or
<u>passive</u> .
The of the data determines whether a sensor is <u>simple</u> or
<u>complex</u> .
Some sensors detect elements in the robots internal state such as battery power or distance
and these are sensors.
Sensor which perceive information about the robot's environment such as temperature or light
intensity these are sensors.
What is an example of sensor redundancy on the Traxster II?
What is an example of complementary sensors on the Traxster II?



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What are the 3 types of behavioral sensor fusion?

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1.			
2.			
3.			

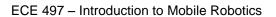
Active ranging systems are used for

- Obstacle detection
- Obstacle avoidance
- Localization
- Environment modeling

Name 3 objects that are difficult for an infrared range sen	sor to detect.
1	_
2	_
3.	

 $What is your \ definition \ of \ specular \ reflection \ in \ one \ or \ two \ sentences?$





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