
Robotic Perception

Camera and Sensors

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Introduction to Perception

| What did robotic perception do?

- $P(\text{ States} \mid \text{Observation})$

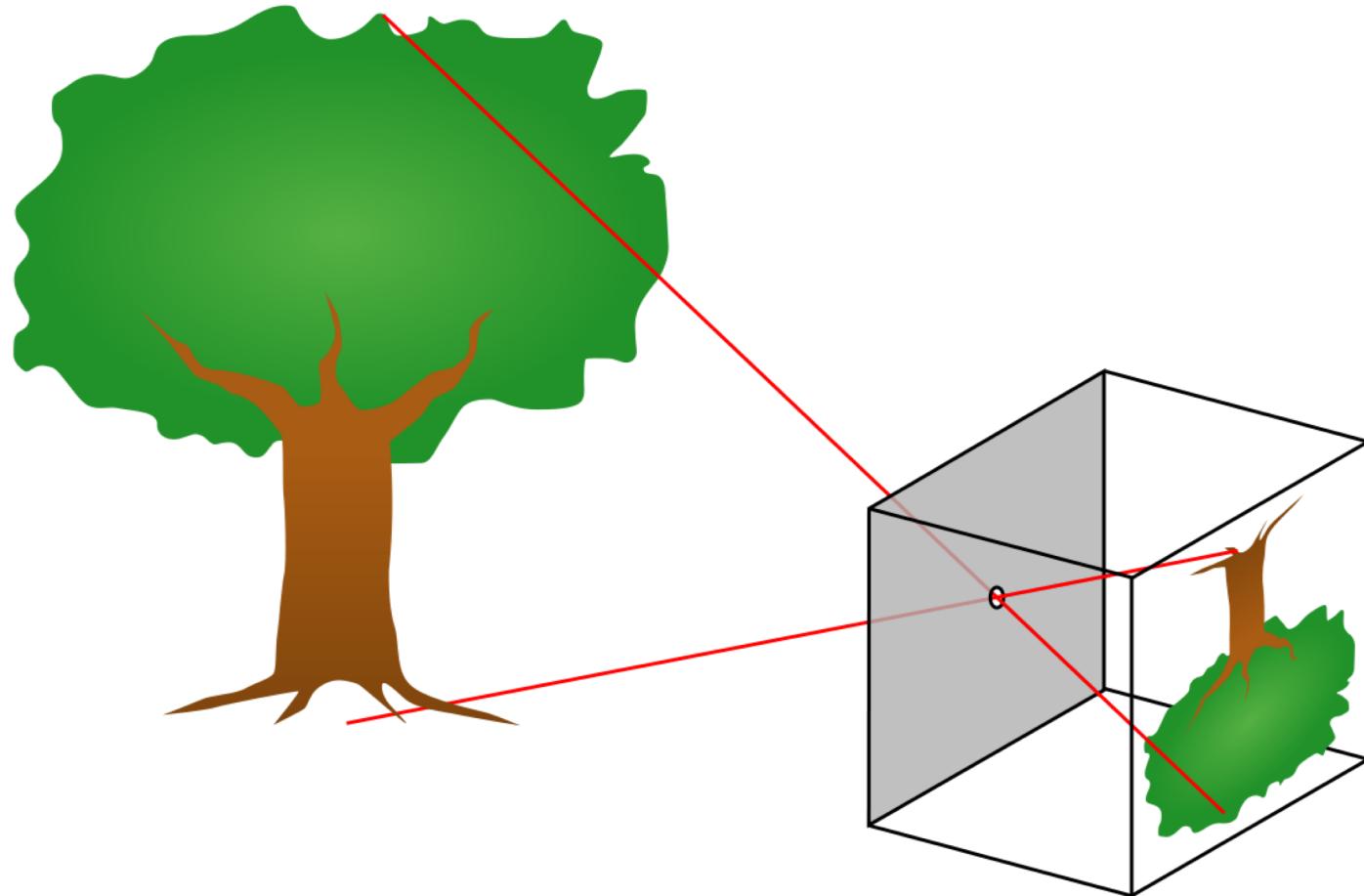
| Camera Model

- To estimate and understand the surrounding environment from the observations.

| Sensors

- The perception is physically implemented by sensors and by dedicated processing of the data they produce.

Camera Model

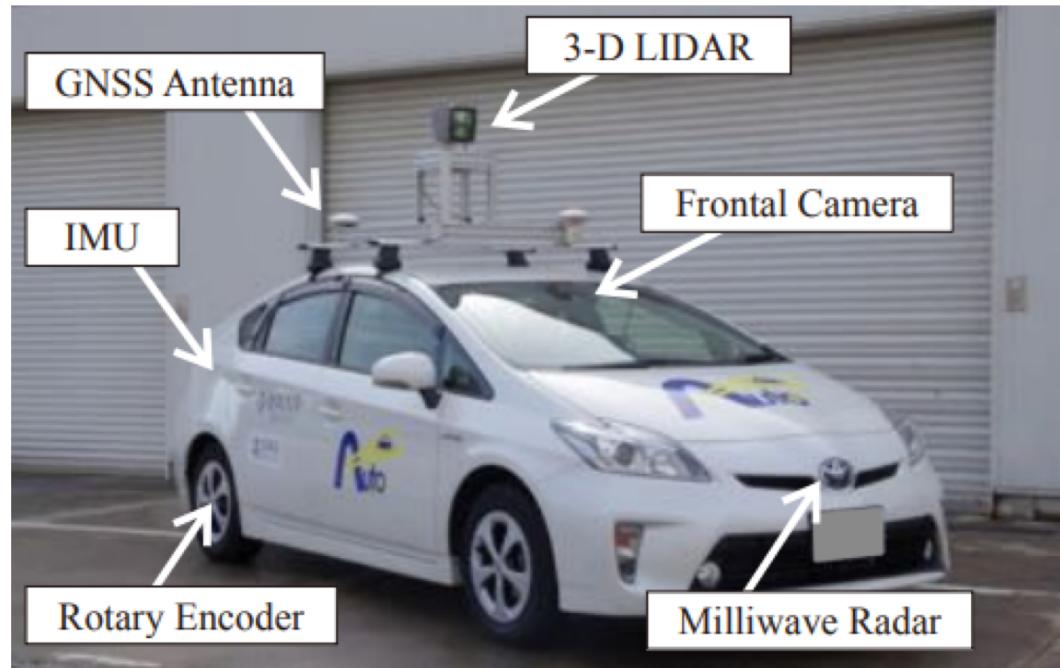
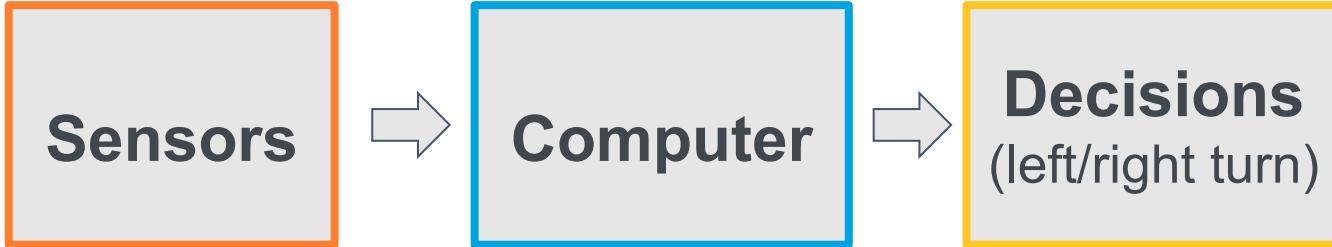


Pinhole Camera Model

Various Sensors

Sensors

- Pressure Sensor
- IR Sensor (Infrared Sensor)
- Light Sensor
- Temperature Sensor
- Camera
- Lidar



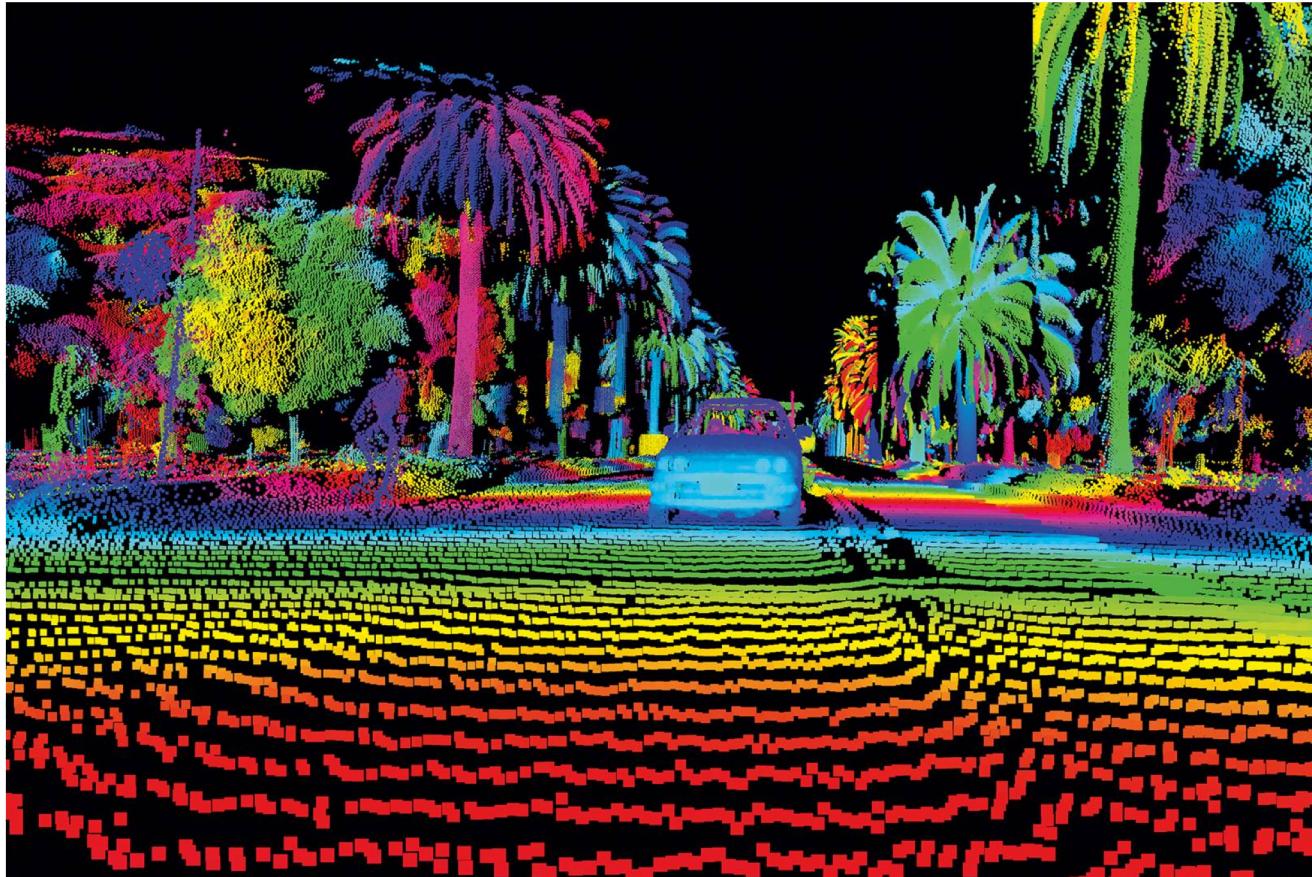
Various Sensors



Lidar for Autonomous Driving

Zhu, Quanwen, et al. "3d lidar point cloud based intersection recognition for autonomous driving." 2012 IEEE Intelligent Vehicles Symposium. IEEE, 2012.

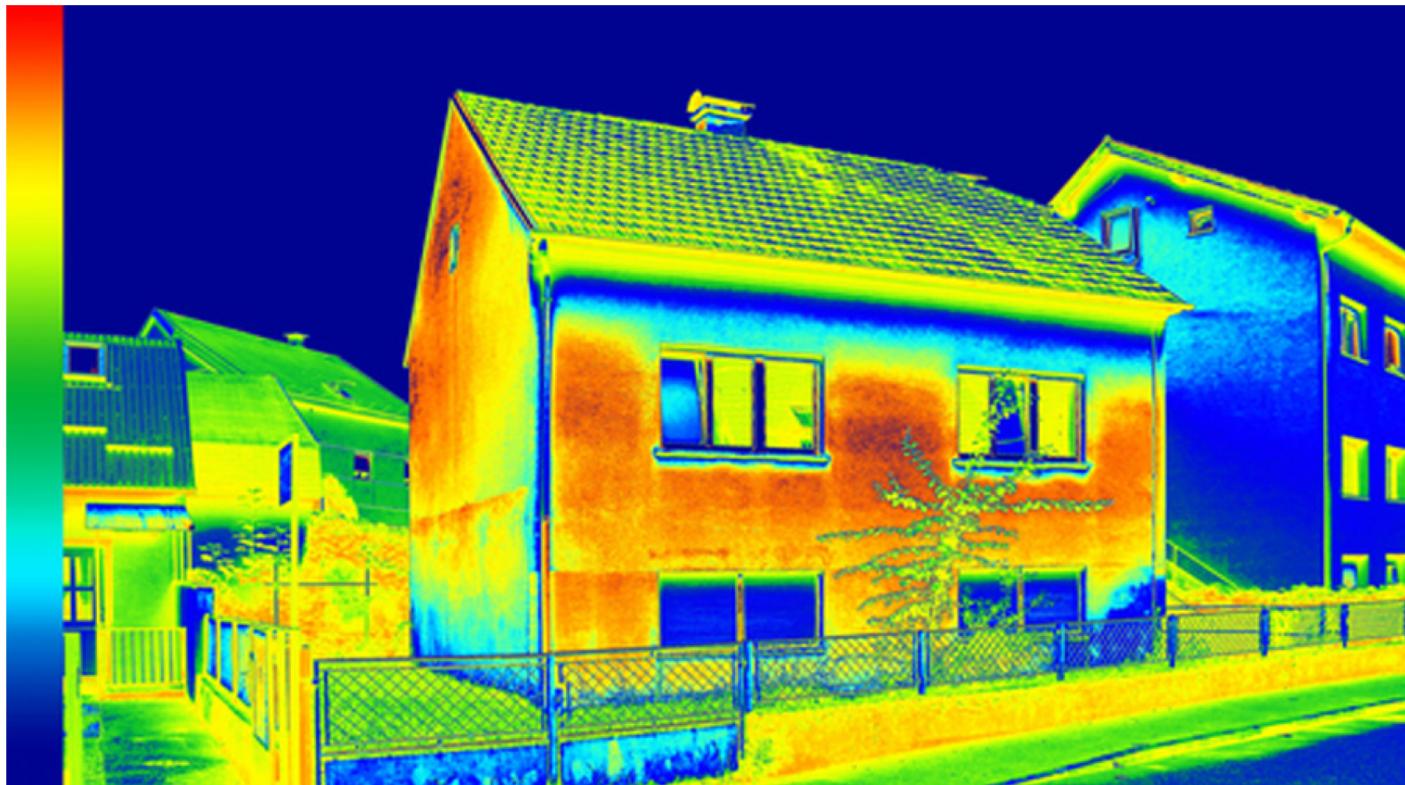
Various Sensors



Map constructed by Lidar

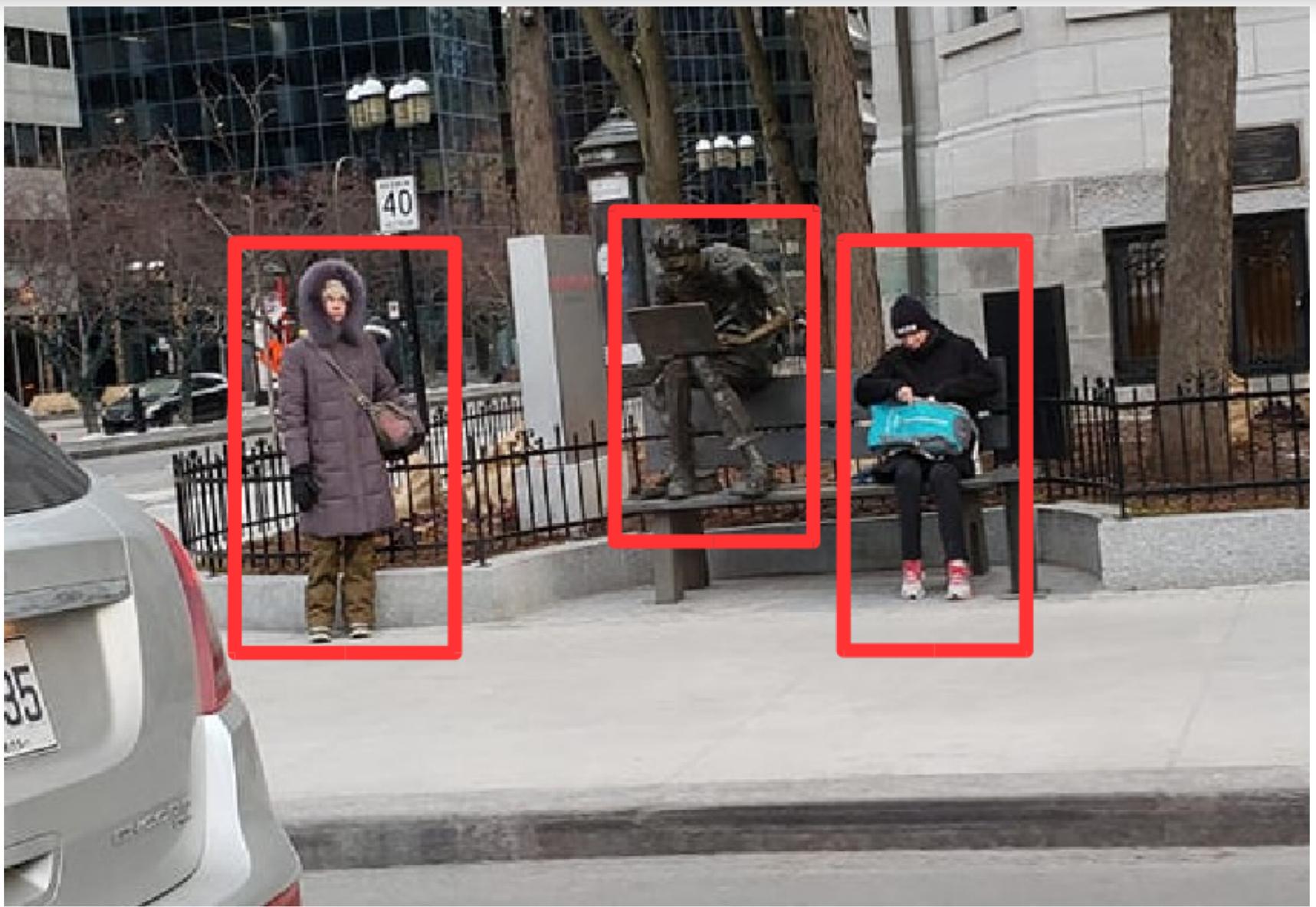
Image Courtesy, What is LiDAR technology and how does it work? 2019.

Various Sensors

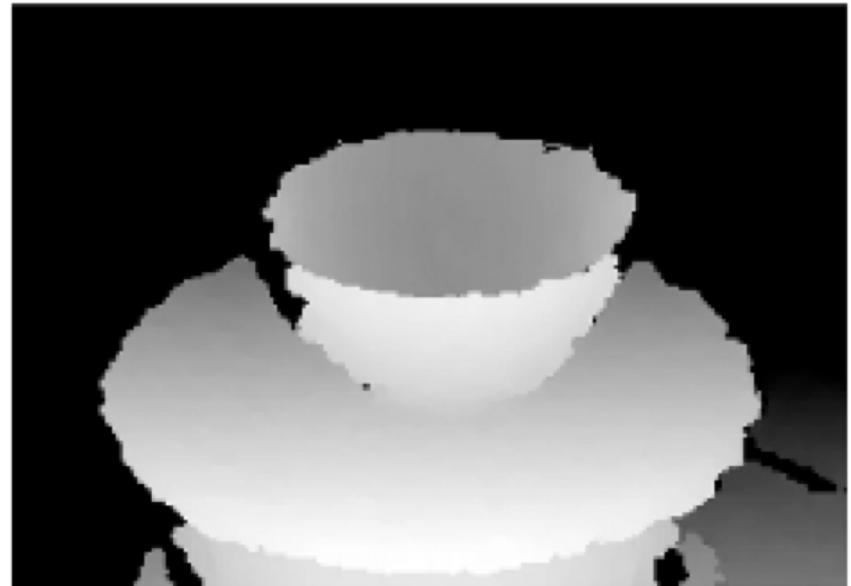


Infrared Image from Thermal Camera

Example

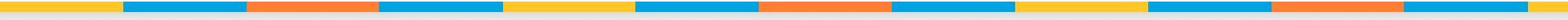


Various Sensors



Depth Images from Kinetic.

Summary



- | **What does robotic perception do?**
- | **Camera as the most common sensor used.**
- | **Together with a variety of other sensors work together to make AI to perceive.**