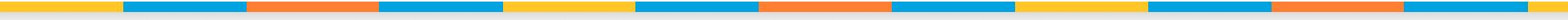

Robotic Perception

Low to Mid-Level Vision

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The Low to Mid-Level Vision Goal

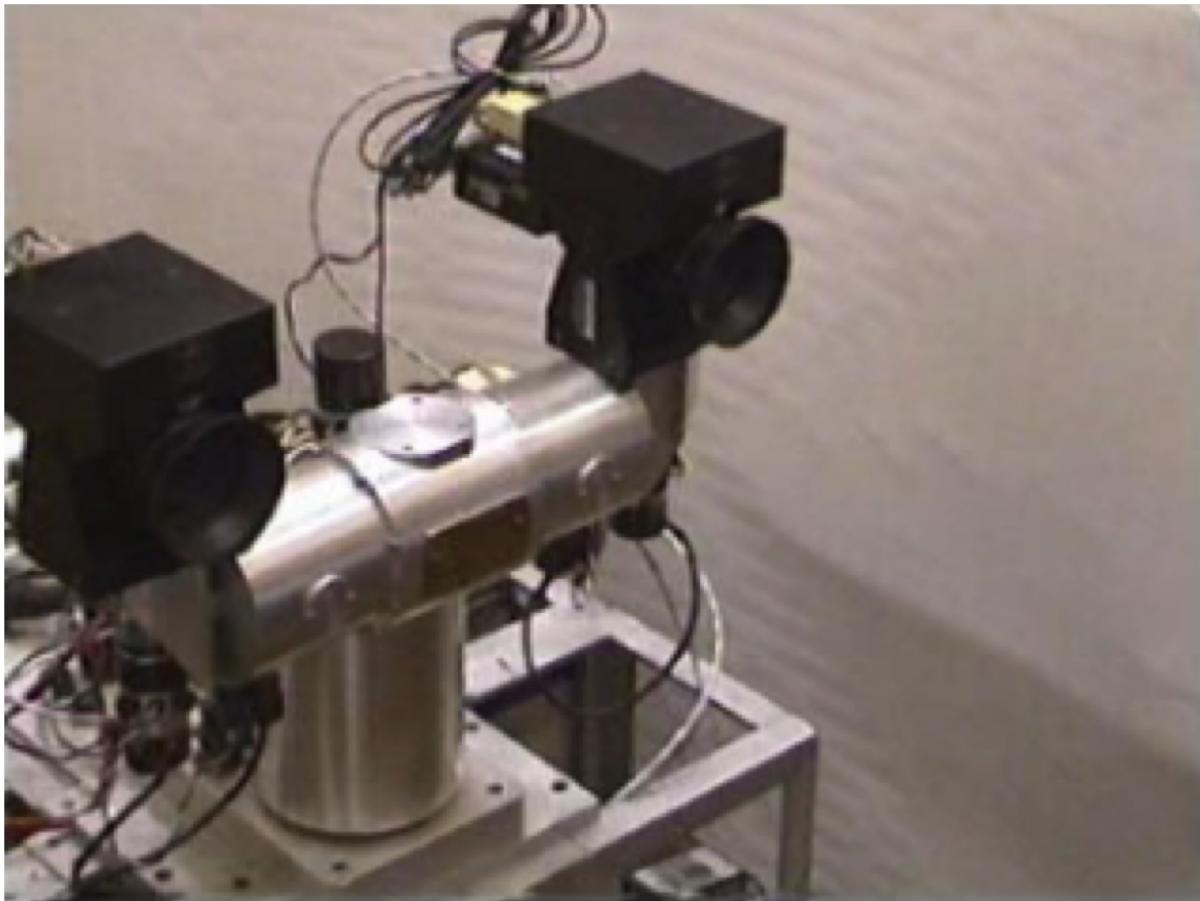


| What do we want to infer from observation?

P(Underlying Structure | Observation)

- | To estimate and understand the surrounding environment' geometrical structures from the observations.
- | The observation could be single image or multiple images taken from different locations and orientations.

Sensor (Camera) Settings



Stereo Head

Sensor (Camera) Settings

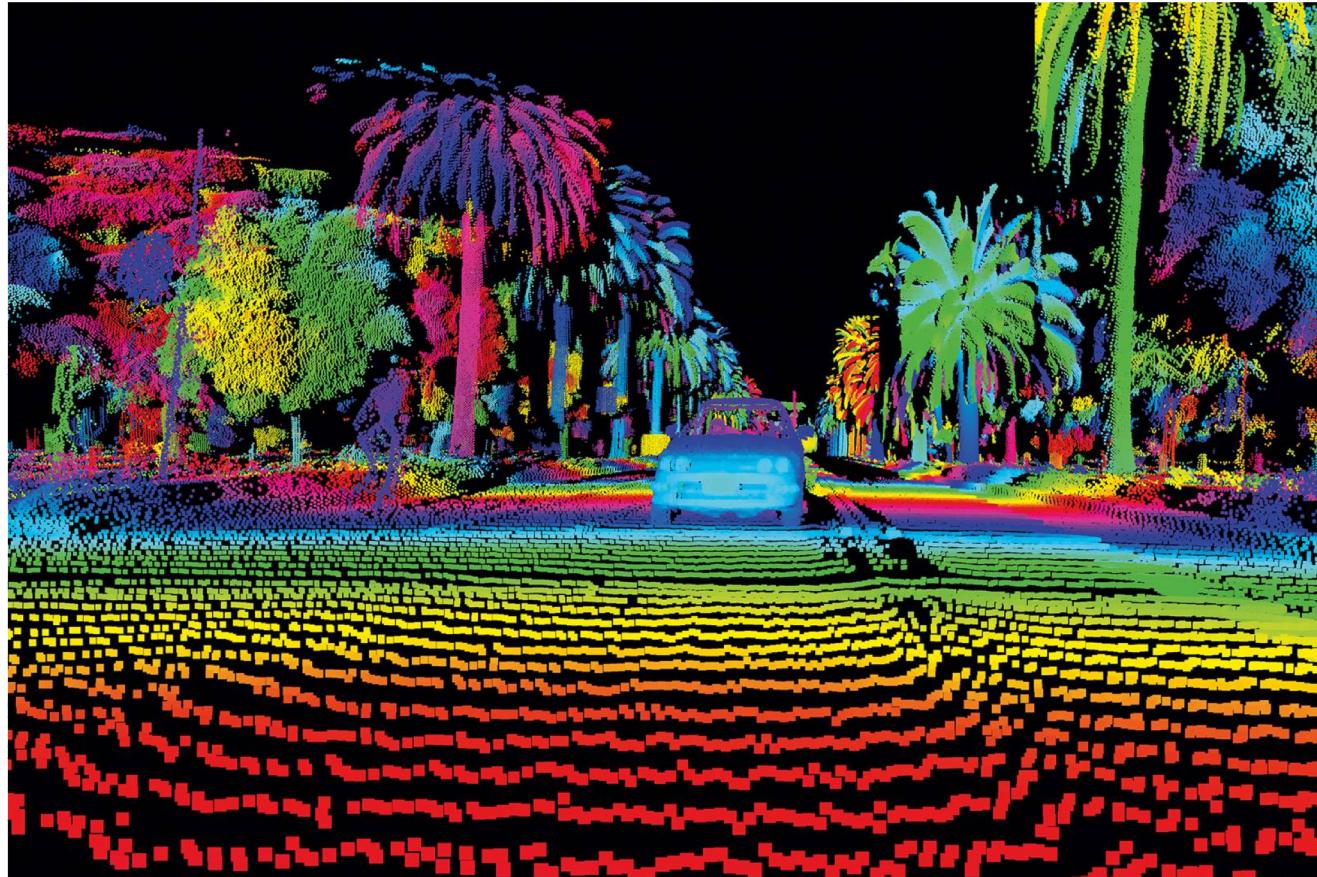


Camera on a Mobile Vehicle

Sensor (Camera) Settings



The Underlying Structure



Map constructed by Lidar

Depth Estimation

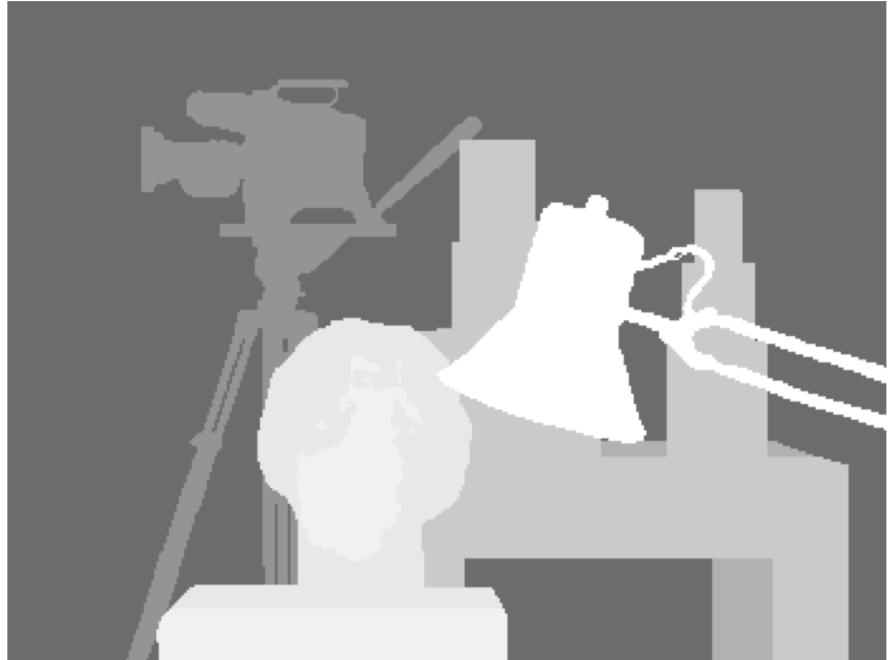
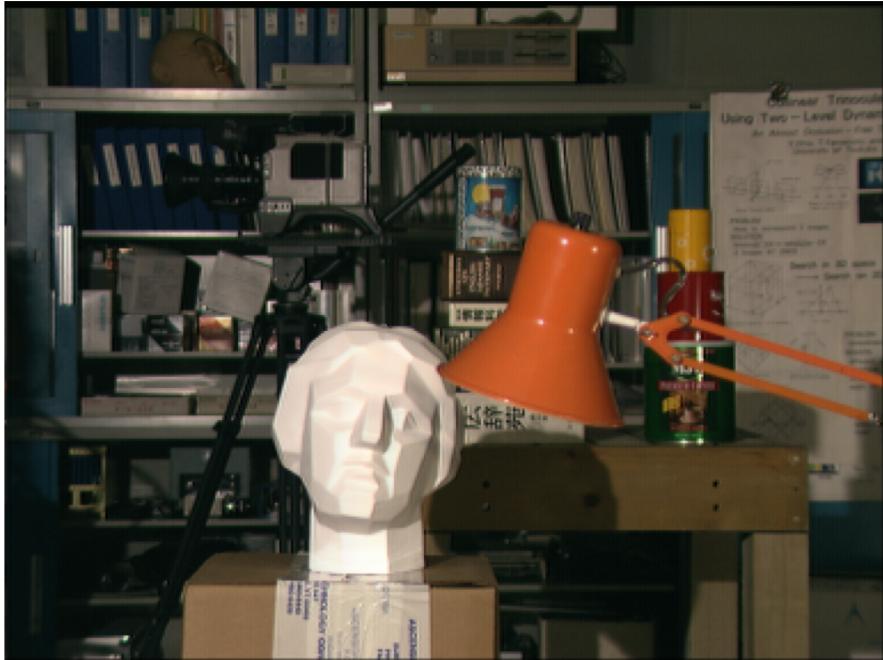


Image and Depth

Optical Flow (Motion Estimation)



Drayer, Benjamin, and Thomas Brox. "Combinatorial Regularization of Descriptor Matching for Optical Flow Estimation." BMVC. 2015.

Structure from Motion (SfM)



Crandall, David, et al. "Discrete-continuous optimization for large-scale structure from motion." CVPR 2011. IEEE, 2011.