

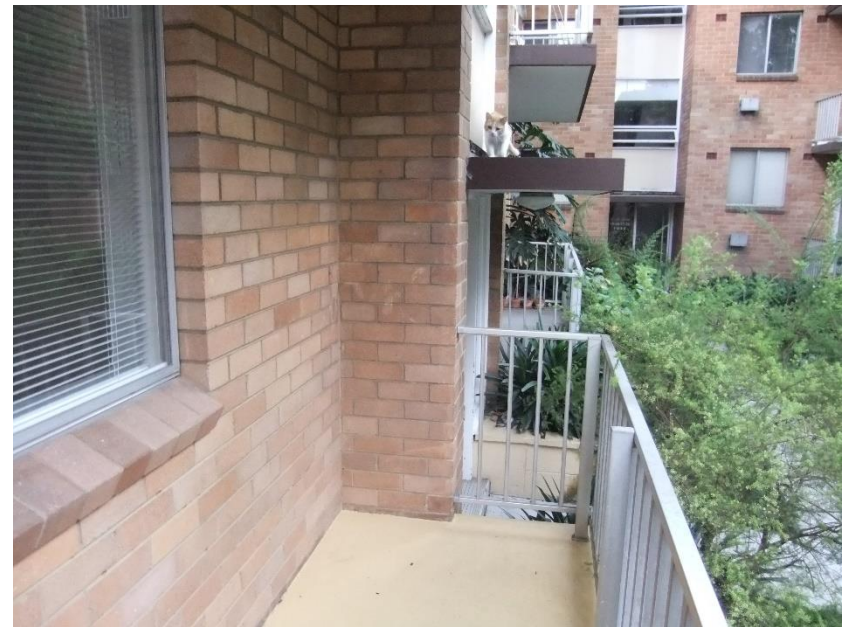
Practical Course: Vision-based Navigation Winter Term 2017/2018

Projects

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1. MAV Navigation to Photo-Goal

- Idea:
Direct where your ordered packet should be delivered to by taking a photo of the goal location..
- Possible approach:
 - Direct image alignment for tracking
 - Simplifications to start with:
 - Take a RGB-D photo
 - Start from a nearby view
 - Make gradually more difficult
 - Small or no overlap with the goal view
 - DSO instead of RGB-D



2. Person Following

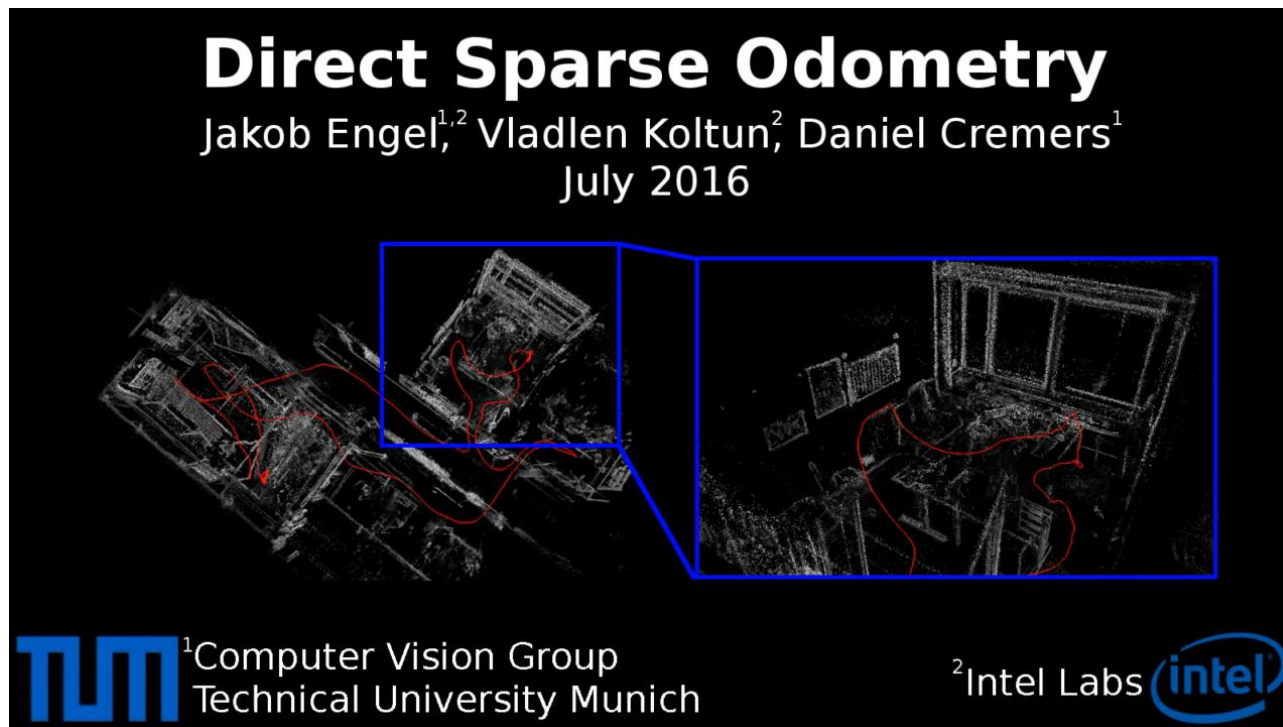
- Follow a person with onboard camera on the quadcopter
- Try different options for human detection:
 - Bright color T-shirt: BLOB detector
 - Markers
 - Keypoints on textured objects
 -
- Evaluate stability of tracking
- Implements several flight modes

2. Person Following



3. Mapping and Waypoint Navigation with DSO

- Use DSO to track the pose of the drone (Bebop)
- Fly to a list of waypoints
- Map the environment



4. Collision Avoidance with DL-based Mono Depth

Collision Avoidance for Quadrocopters using Monocular Dense Mapping

Humberto Alvarez, Lina Paz, Jürgen Sturm, Daniel Cremers



Computer Vision Group
Department of Computer Science
Technical University of Munich



4. Collision Avoidance with DL-based Mono Depth

NYU Depth v2

Make3D

RGB

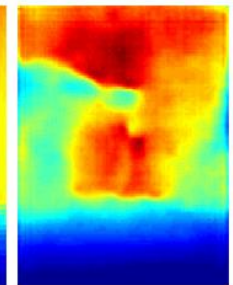
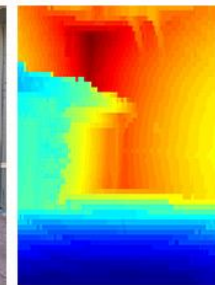
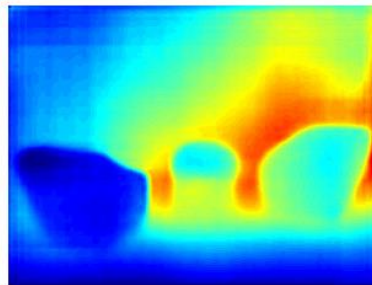
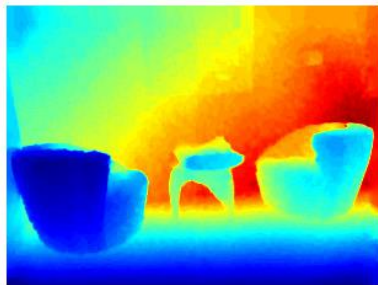
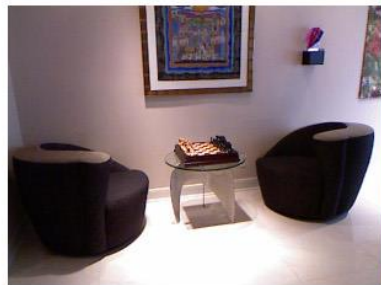
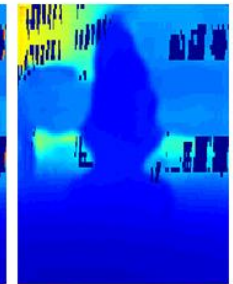
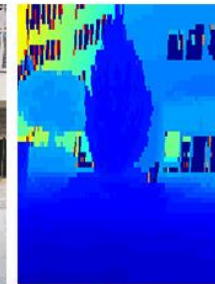
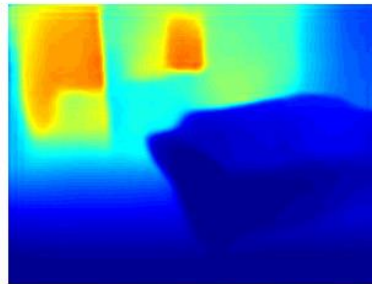
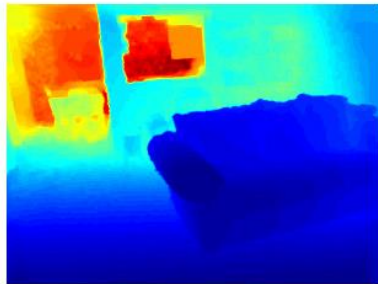
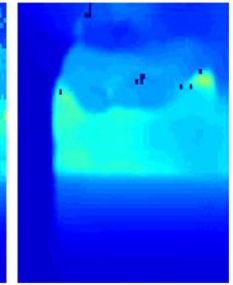
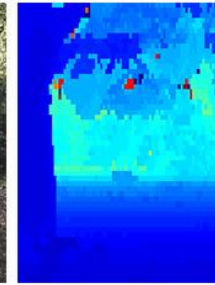
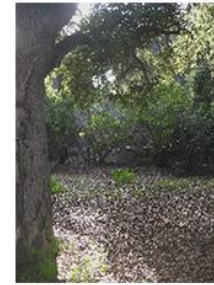
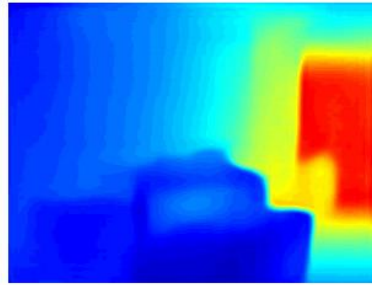
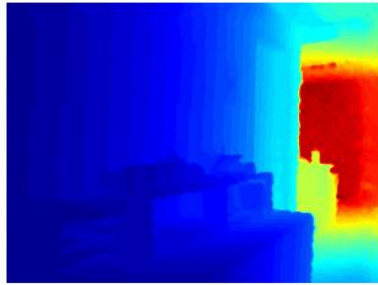
Ground Truth

Depth Prediction

RGB

Ground Truth

Depth Prediction



Laina et al., 3DV 2016

4. Collision Avoidance with DL-based Mono Depth

- Fly between waypoints and avoid obstacles on a parcours
- Use mocap to determine ground-truth pose for navigation
- Dense depth maps obtained using deep learning approach (offboard processing)

Questions ?