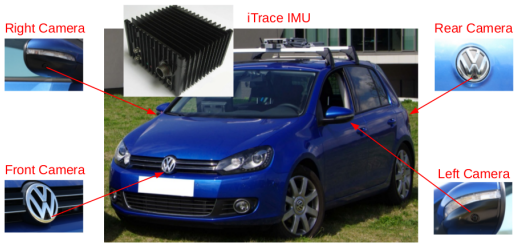
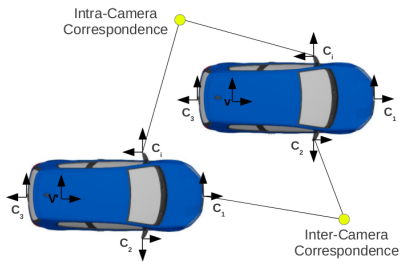
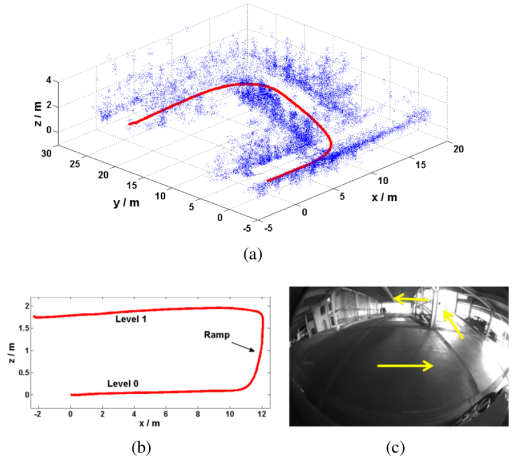
Relative Pose Estimation for a Multi-Camera System with Known Vertical Direction

G. H. Lee, M. Pollefeys, and F. Fraundorfer (CVPR 2014)







- Relative pose estimation of a multi-camera system with known vertical directions (known absolute roll and pitch angles)
- Problems with the previous approaches:
  - The high number of correspondences needed
  - Identifying the correct solution from many solutions
  - Strict assumption on the planarity of ground
- Minimal 4-point and linear 8-point algorithms within RANSAC
- 4-point algorithm
  - Hidden variable resultant method
  - 8-degree univariate polynomial that gives up to 8 real solutions
- Linear 8-point algorithm: an alternative solution for a degenerated case of SVD
- Four fish-eye cameras fixed onto a car for ego-motion estimation
- Evaluated on simulations and real-world datasets