

Simultaneous Localization and Mapping

Final Project Presentation in Lab Course
Applied Computer Vision for Robotics

Frank Gerling, Michael Haus, Marvin Ludersdorfer and Matthias Wisniowski

Technische Universität München
Department of Informatics
Institute of Robotics and Embedded Systems

Juli 17th, 2013

Outline

What is it all about?

How does it work?

Difficulties

Conclusion

What is it all about?

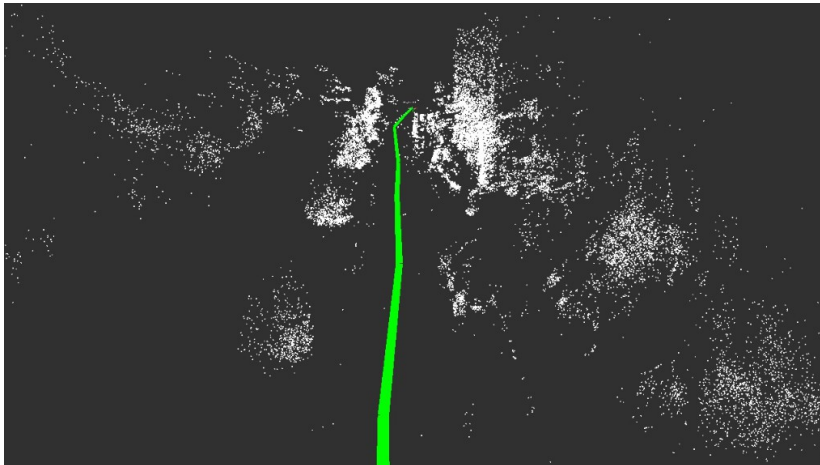
Combine

- ▶ Stereo SLAM (Sparse Stereo Matching)
- ▶ Dense Disparity Maps

to get a dense 3d point cloud representation of the world.

Sparse Matching?

Recall assignment sheet 3

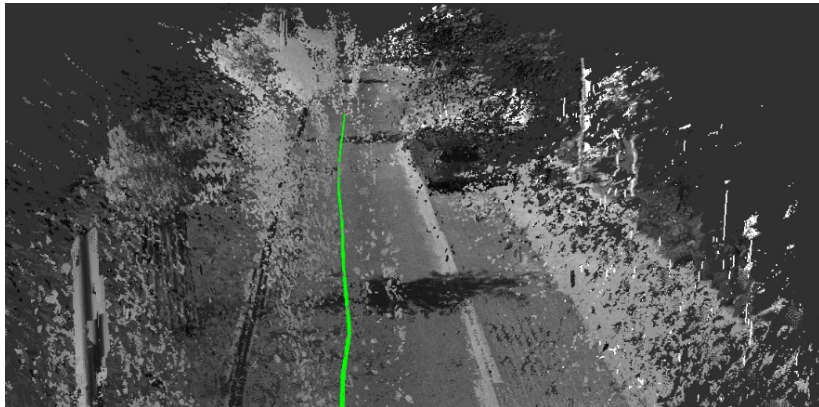


Dense Matching?

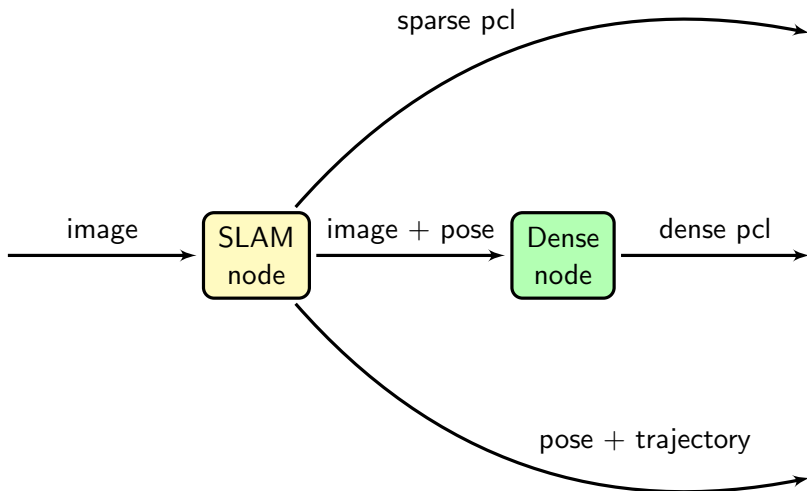
Recall assignment sheet 4



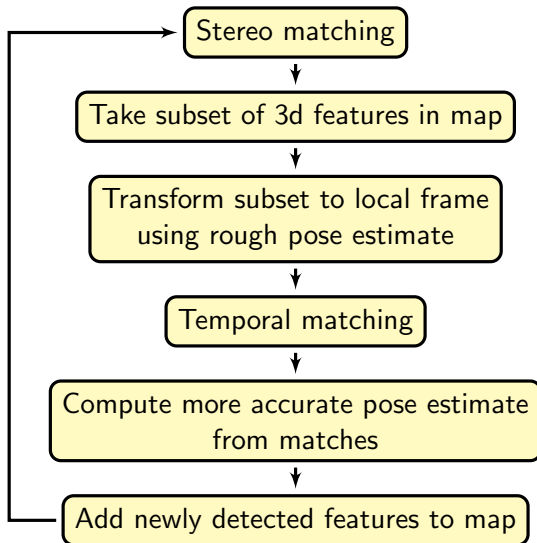
What does it look like?



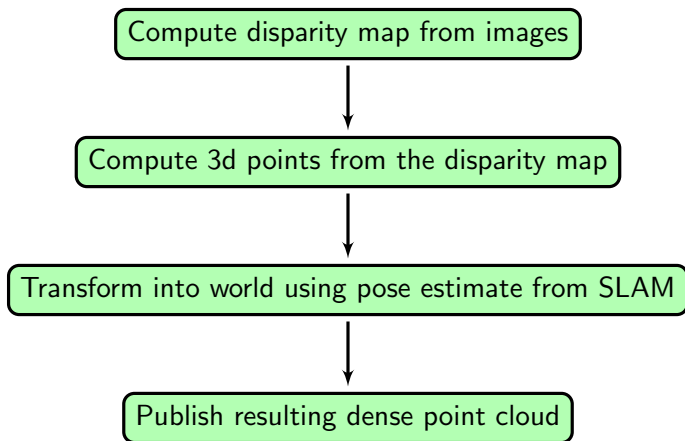
How does it work?



SLAM



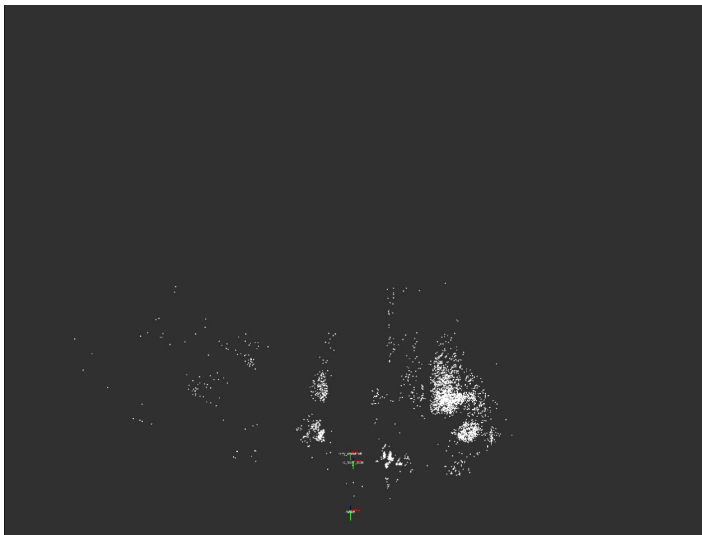
Dense Reconstruction



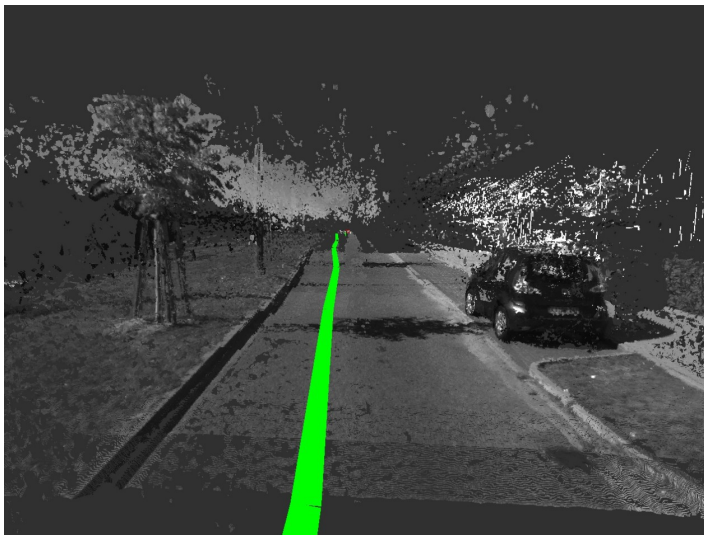
Demo Time - Flow



Demo Time - Sparse



Demo Time - Dense



Difficulties & Features

Biggest issues:

- ▶ **Running time**
- ▶ **Descriptor** to use
 - ▶ Needs to be invariant to scaling and rotation
 - ▶ Using OpenCV implementation of BRIEF64
- ▶ **Memory consumption**
- ▶ **Noise**

Conclusion

- ▶ SLAM + Dense point cloud
- ▶ Possible extensions
 - ▶ Some refinement needed for turns
 - ▶ Motion model (Kalman filter)
 - ▶ Optimization of the map (detect revisited areas)

Thank you for your attention!
Questions?
Input?

