Proof of Concept for: „Fast and Robust Visual Odometry using Particle Filter“
Roadmap for Final Project

Dennis Mund, Evgeni Pavlidis, Zheng Qu, Diego Trematerra
Proof of Concept for:
„Fast and Robust Visual Odometry using Particle Filter“

**Motivation**
- Paper: „Fast Visual Odometry and Mapping from RGB-D Data“
- ICP needs good starting points
  - Not suitable for strong Movement changes
- Particle Filter is more Robust
  - Due to representation of many Particles
Proof of Concept for:
„Fast and Robust Visual Odometry using Particle Filter“

Partikel Filter

RGBD

Choose random points

Update Particles

Project 3D Points to particle Image

Weight Particles

Weighted Calculate mean (R,t)
Proof of Concept for:
„Fast and Robust Visual Odometry using Particle Filter“

Why Random Points

• Feature Point detection is Time consuming
• Kinect data becomes unstable at edges
• Moving objects tend to have many features
• Randomisation prevents bias
Proof of Concept for:
“Fast and Robust Visual Odometry using Particle Filter”

Particle Filter

• Models probability distribution of the Camera Pose

• Each Particle represents one Pose hypothesis

• Can have multiple hypothesis that are good (reoccurring patterns)
Proof of Concept for:
„Fast and Robust Visual Odometry using Particle Filter“

Roadmap

• Frame to frame Pose estimation without movement
• Add movement
• Reduce drift using Keyframes
• Remove drift by building a global map