Keyframe Based SLAM

Final Presentation

Team Pixel
Goals

☐ Reduce drift considerably
☐ Run in real-time
☐ Optionally: Use bundle adjustment
Approach

• Feature detection with BRISK
  – StarFeatureDetector adjusted dynamically
  – FREAK extractor
• Select Keyframes
  – Every 25 frames
  – Distance/Angle threshold
  – Inlier rate
• Compute pose from 3D-to-2D matches
  – Perspective n point problem->solvePnP RANSAC
• Optionally: Do local Bundle Adjustment with Ceres-solver/GTO
  – OpenCV wrapper for the SBA library
Goals

☑ Reduce drift considerably
☑ Optionally: Add Dense Stereo Matching
☐ Run in real-time
☐ Optionally: Use bundle adjustment
Trajectory
Lessons Learned

• 3D-to-2D pose estimation better than 3D-to-3D
• Drift in turns has to be tackled differently, maybe with edgelets as in Klein & Murray (2008)
• If there is already OpenCV functionality, don’t reinvent the wheel.
• Don’t use unsupported OpenCV API unless you have the time to fix it yourself.
Discussion