Project2 Phase2 Report

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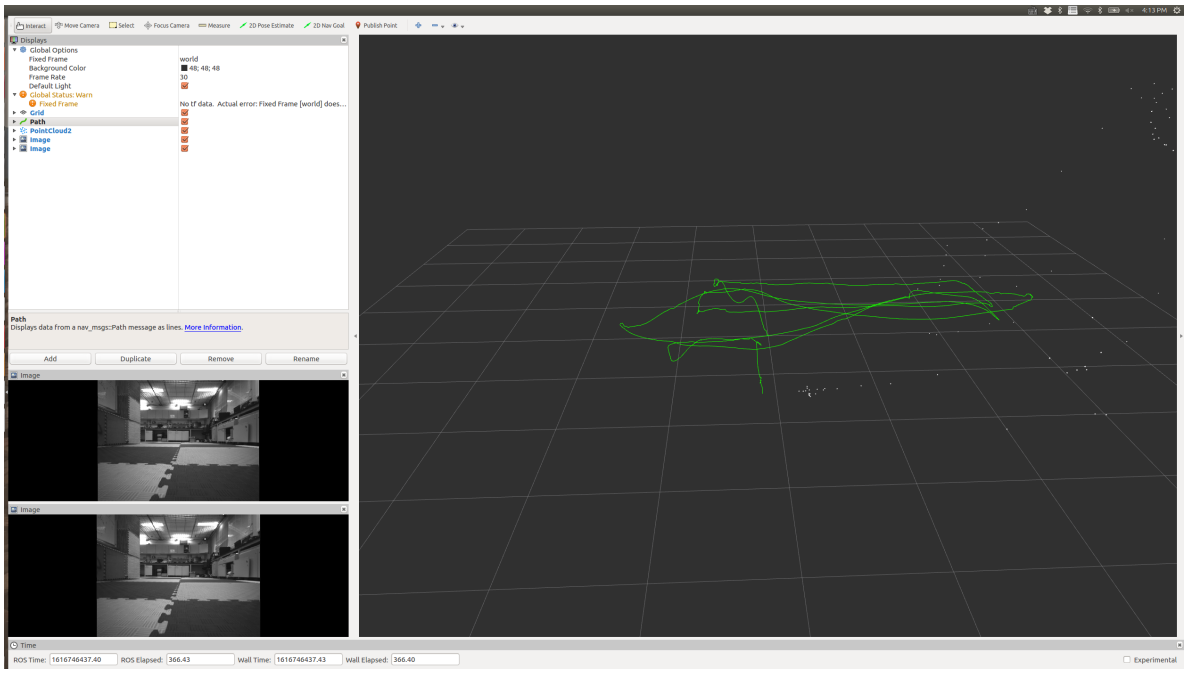
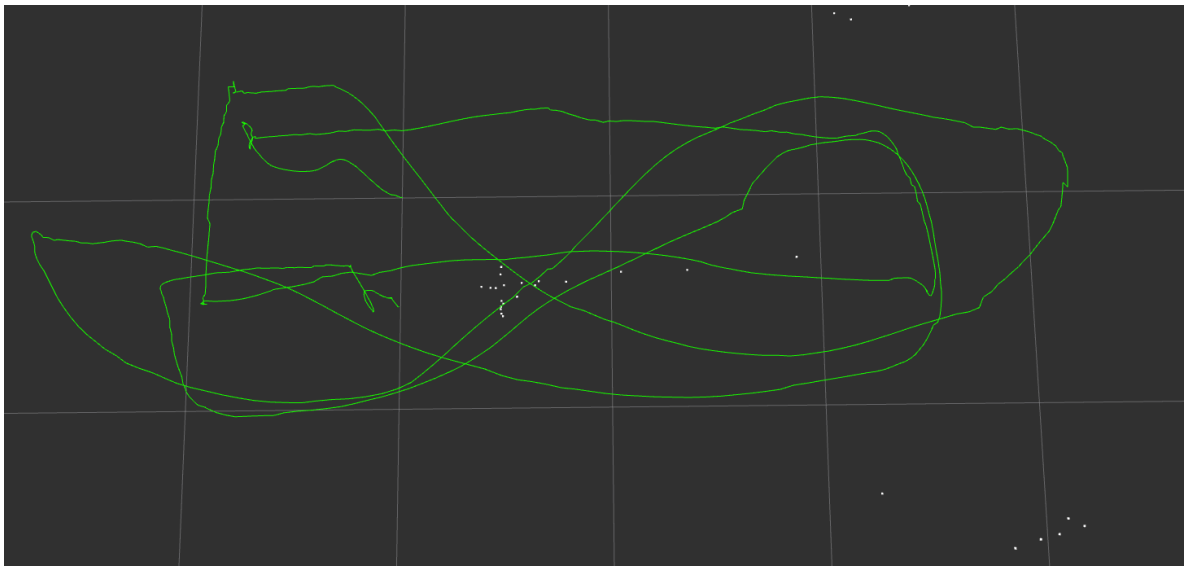
Figures





Implementations

- Feature detection:

  Base on OpenCV `cv::goodFeaturesToTrack()` function.

- Feature matching between left image and right image:

  Base on OpenCV `calcOpticalFlowPyrLK()` function.

- Generate 3D points

  Obtain the undistorted points in left and right images with `undistortedPts()` function, generate the 3D point with `generate3dPoints()` function.

- Feature matching between current image and key image:

  Base on OpenCV `calcOpticalFlowPyrLK()` function.

- Get relative transformation between current frame and key frame:

  Obtain the undistorted points with `undistortedPts()` function, get R_{ck} and t_{ck} with `cv::solvePnPRansac()` function.

  R_{ck} means the rotation matrix from current left camera frame to key frame.

  t_{ck} means the translation vector from current left camera frame to key frame.

- Get current frame pose:

  Get R_{kc} and t_{kc} with obtained R_{ck} and t_{ck}. Get current pose based on composition rule for rigid body motions.

- Update latest states:

  Calculate the body frame pose used on composition rule for rigid body motions.

Other things

- The comments on c_R_k and c_t_k are confused. In my understanding:
  - c_R_k is the rotation matrix from current left camera to key frame.
  - c_t_k is the translation vector from current left camera to key frame.
- To deal with outliers, I used `findFundamentalMat()` function with RANSAC, this implementation is based on VINS-MONO.