EE838 Assignment 10
Robust estimation: Two-view 3D reconstruction

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Detailed assignment explanation

1. Preliminary: study the lecture note about “Two-view 3D reconstruction”
2. Detailed implementation
   A. Input : Stereo images
      → Reference : DTU Robot image datasets
      (http://roboimagedata.compute.dtu.dk/?page_id=36)


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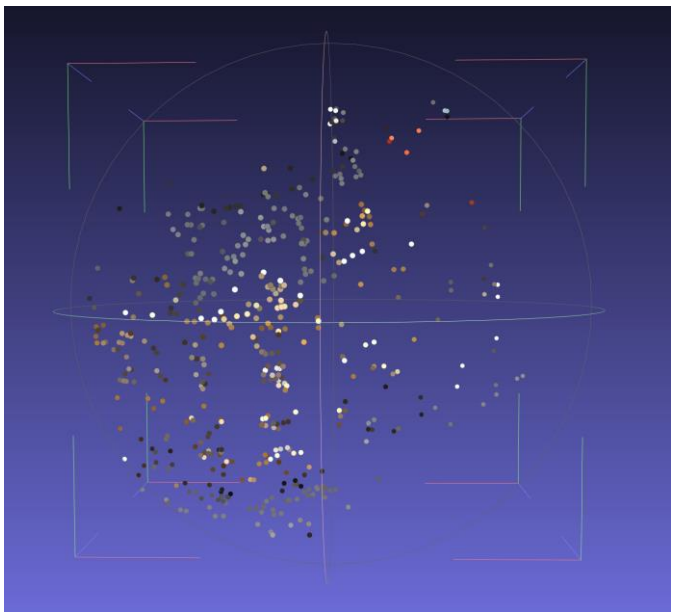
   B. Automatic computation of F (Assignment 9)
   C. Compute the essential matrix (E)
      i. Check the “Intrinsic_parameter.txt” file.
   D. Decompose E to R, T
   E. Triangulation
      (The reconstruction result is illustrated in the figure below)



3. In your report, answer the following questions.
   A. Visualize 3D points with the “MeshLab” program
   B. [BONUS 1] Analyze the difference in reconstruction results as each method changes.
      i. Feature extraction methods, feature matching methods, RANSAC variants, distance measures etc.. (Related to assignment 9)
   C. [BONUS 2] Take two images directly and perform 3D reconstruction.
      i. Estimate intrinsic parameters through camera calibration. (Related to assignment 8)

Submission guidelines

- On the top of your report, clarify your name, ID number, and the assignment title.
- Make your report as a single PDF file.
- Write your report in English.
- Title your report as “A#_firstname_lastname.pdf”, where ‘#’ indicates the assignment number (e.g., **A10_Gildong_Hong.pdf**).
- If there are additional files for assignments, put them into a folder along with your report, and then compress into a zip file (e.g., **A10_ Gildong_Hong.zip).**
- Upload your report (or zip file) to the submission page of the KLMS.

What to submit for assignment 10

- A report that does not exceed 8 pages
  (Focus on analysis & discussion rather than method descriptions or code explanations)
- MATLAB code files
  (Detailed annotations are required)

Helpful resources

- Lecture Notes
- Google