Indian Institute of Technology Jodhpur
(Real Time) Autonomous Systems, Fractal-2
Programming Assignment 1

Due Date: March 6, 2022, Max Marks: 50

1. Consider two images I_1 ("im1.jpg") and I_2 ("im2.jpg") of a static scene captured from a single camera with the given intrinsic camera matrix K ("Intrinsic_Matrix_K.txt").

   - Find a set of ground-truth correspondences $\{(\mathsf{p}_i, \mathsf{p}'_i)\}_{i=1}^{n}$ using any of the existing implementations. Ensure that there are at least $n = 100$ true correspondences.
   - Assume that the world-coordinate system is aligned with the coordinate-system of the camera location. Implement the algorithm taught in the class to find the Essential matrix E.
   - Decompose the obtained Essential matrix E into the camera motion rotation matrix R and the translation vector t.
   - Let P_i be the corresponding 3D point for the pixel pair $(\mathsf{p}_i, \mathsf{p}'_i)$. Find P_i, $\forall i \in \{1, 2, \ldots, n\}$ using the triangulation approach learned in the class.
   - Plot the obtained P_i, $\forall i \in \{1, 2, \ldots, n\}$ and the camera center t.