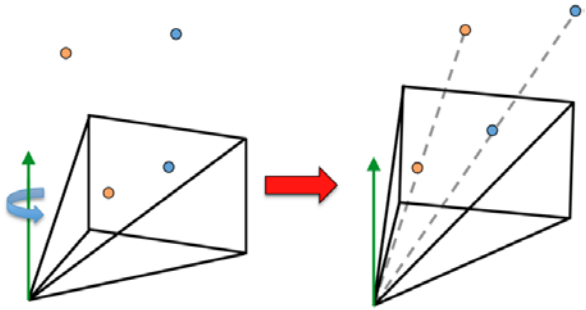
Benchmarking Relative Pose Solvers

Goal: Implement two pose estimation methods and find which is the best algorithm for relative motion plus a vertical direction.

Description:

Many algorithms for upright relative motion (camera to camera motion with a known direction) exist, the most important ones are [1], [2] and [3] (code online). However, these papers do a bad job of comparing with each other and currently no survey that compares them fairly exist.

In this project you will implement [1,2,3] and compare their time performance and accuracy using simulated data (provided by the supervisor). You will also compare them against the state-of-the art in relative motion without known vertical direction [4] (code online).



[1] Kalantari, Mahzad, et al. "A new solution to the relative orientation problem using only 3 points and the vertical direction." Journal of Mathematical Imaging and Vision 2011
[2] Naroditsky, Oleg, et al. "Two efficient solutions for visual odometry using directional correspondence." IEEE transactions on pattern analysis and machine intelligence 2012
[3] C. Sweeney, J. Flynn, B. Nuernberger, M. Turk, T. Hollerer. Efficient Computation of Absolute Pose for Gravity-Aware Augmented Reality. International Symposium on Mixed and Augmented Reality (ISMAR), 2015.
[4] Hartley, Richard, and Hongdong Li. "An efficient hidden variable approach to minimal-case camera motion estimation." *IEEE transactions on pattern analysis and machine intelligence* 34.12 (2012): 2303-2314.

Requirements / Tools:

Required: MATLAB and C++

Supervisor:

Federico Camposeco
fede@inf.ethz.ch