CIS580 Problem Set 4

Sheil Sarda <sheils@seas.upenn.edu>
CIS580 Spring 2021

Contents

1 Mapping 2D points

1.1 Use solution for orthogonal Procrustes problem to obtain rotation matrix

1.2 Find solution that solves directly for the rotation angle θ and translation $[T_x, T_Y]$

2 Phone held vertically

2.1 Write projection equations

2.2 Solve equations for yaw angle θ and translations $[T_x, T_y, T_z]$

2.3 Conditions on camera position to obtain unique or finite number of solutions

3 Decompose H into rotation R and translation T

Given:

$$g_1 = \begin{bmatrix} 0 \\ \frac{1}{2} \\ \frac{\sqrt{3}}{2} \end{bmatrix}$$