Discussion #7

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1 The Fundamental Matrix

What is the relationship between fundamental matrix and essential matrix?

2 Eight-Point Algorithm

This algorithm fits the fundamental matrix defined by corresponding points $\mathbf{x_1} \leftrightarrow \mathbf{x_2}$ in an image pair. In particular, assume points $\mathbf{x_1^i} = (x_1^i, y_1^i)$ in the first image corresponds to points $\mathbf{x_2^i} = (x_2^{(i)}, y_2^{(i)})$ in the second image for $i = 1, ..., N$. We need $N \geq 8$ (at least 8 corresponding points).

1. How to find the fundamental matrix?

2. How to get the essential matrix?

3. How to get the rotation and translation from the essential matrix?

4. Geometrically, why we have two solutions (or four solutions consider the sign of essential matrix)?

5. How to decide which is the valid solution by triangulation?