Computer Vision II

"+2 ECTS" project description

Camera tracking by alignment of point cloud measurements using Iterative Closest Points

Summer Term 2014

Motivation

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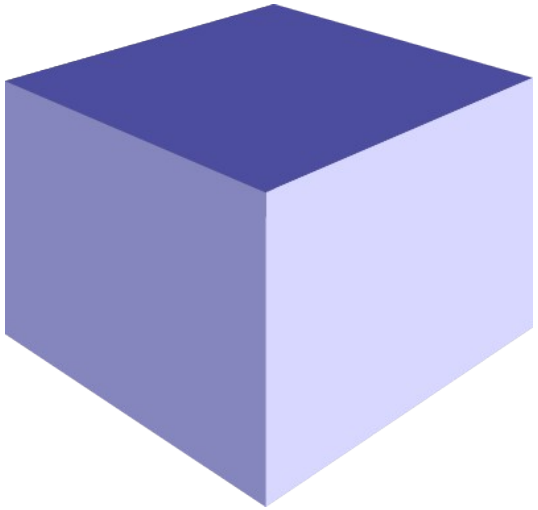
Object



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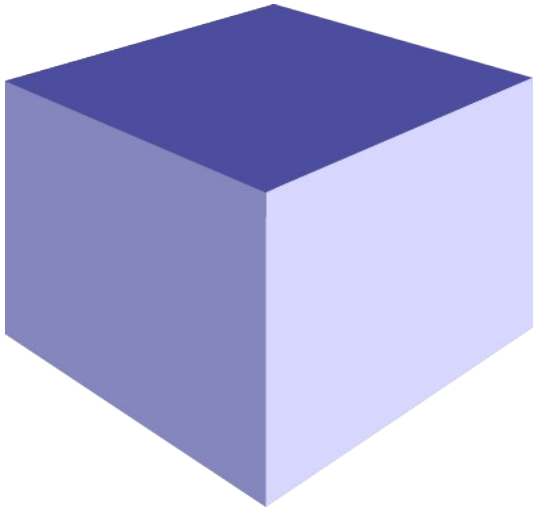
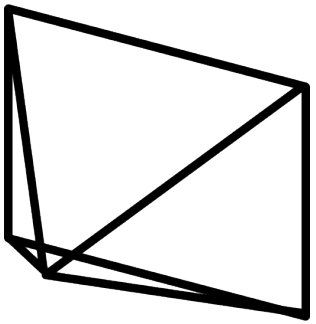
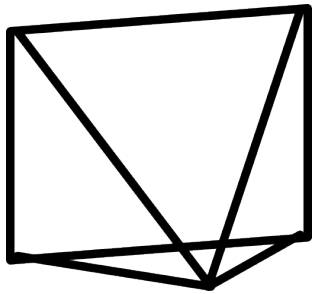




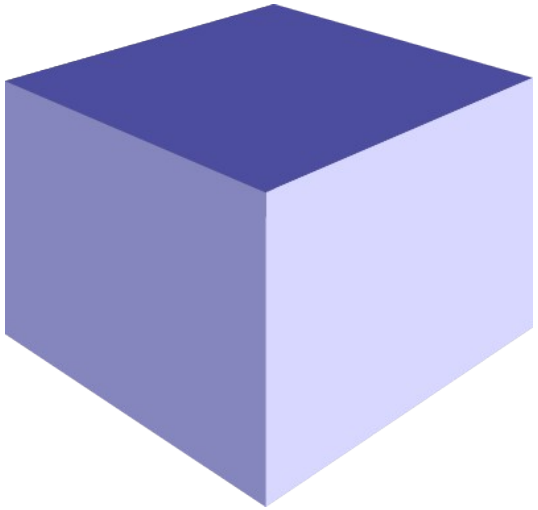
Camera 1

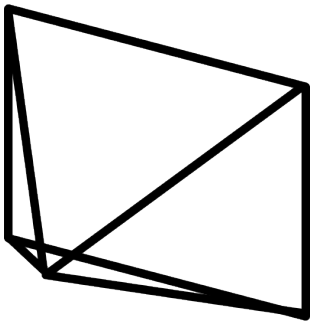


Camera 2

Motivation

Object





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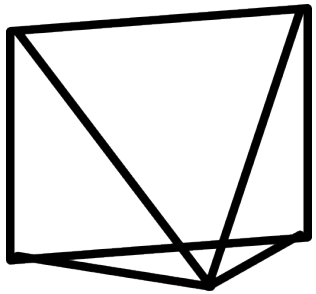
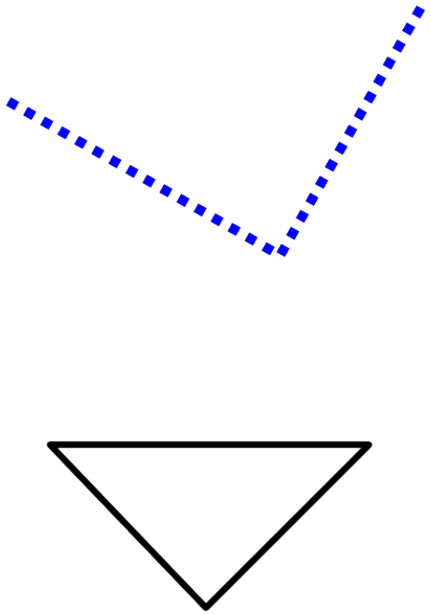
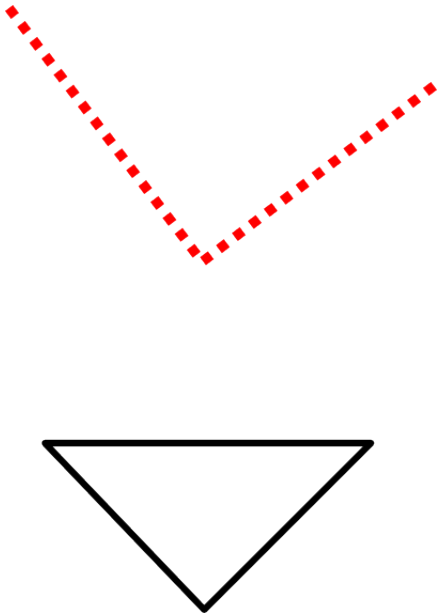


Camera 2



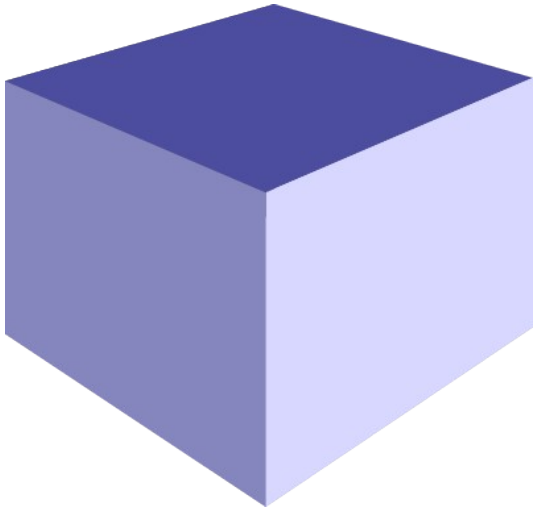
View of cam 1

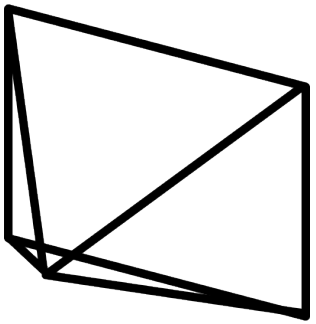


View of cam 2

Motivation

Object





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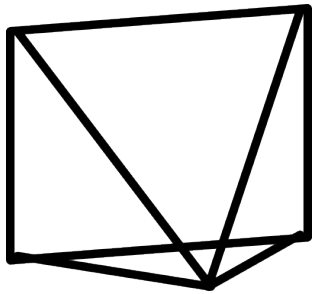
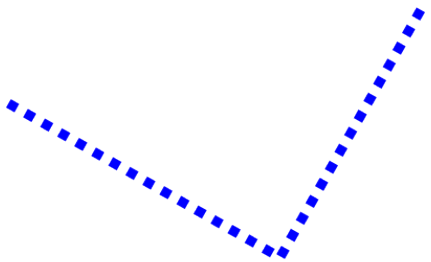
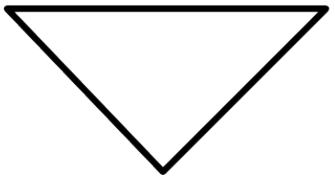
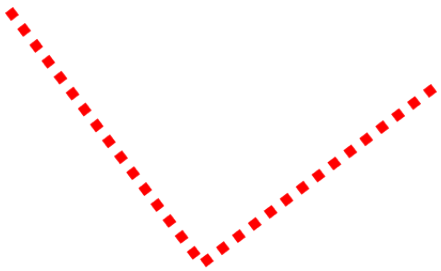


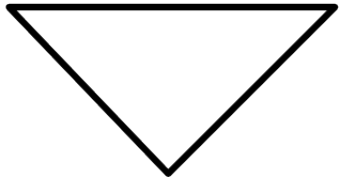
Camera 2





View of cam 1

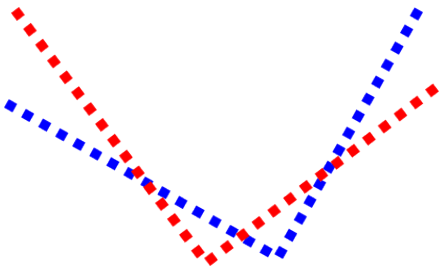


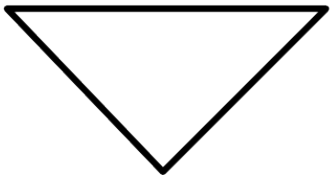


View of cam 2

What is the relative pose difference between the two cameras?

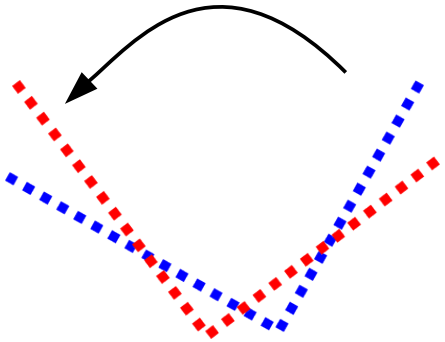
Camera tracking by point cloud alignment

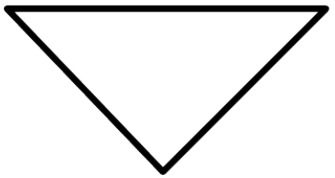




Assume both cameras are in the origin.

Camera tracking by point cloud alignment





Compute a transformation that aligns the second point cloud with the first one.

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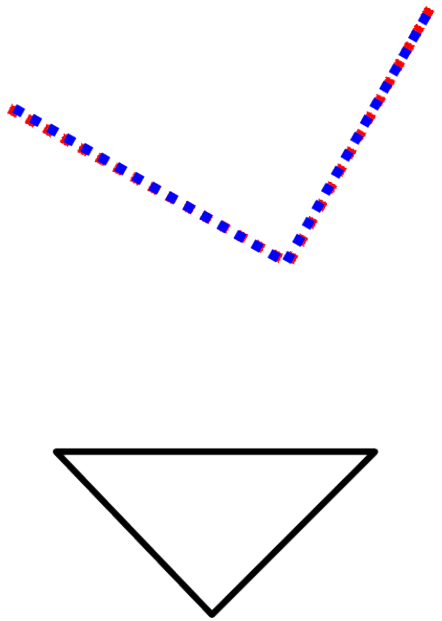
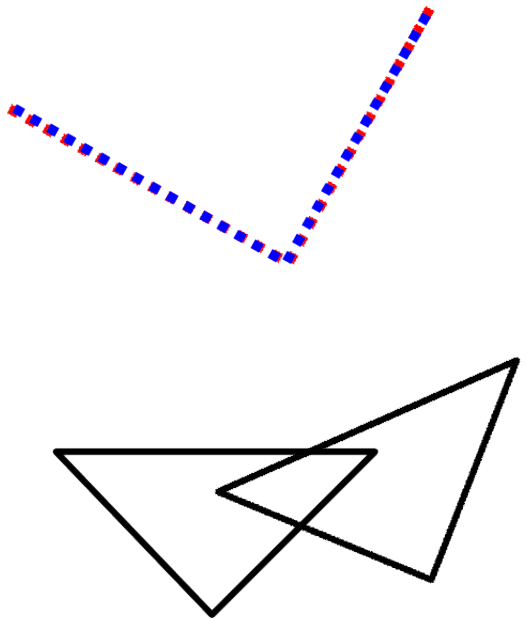


Apply transformation to the second point cloud...

Camera tracking by point cloud alignment



...and the corresponding transform to its camera.

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The goal is to track the camera over many frames using this alignment technique and intermittent simplification of the combined point cloud. ICP is the easiest variant to compute an alignment, and you should try different variants (point weighting, using/ignoring point colors...) to see which works best.

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*Not really, but the sensor is the same.