Initial disparity estimation using sparse matching for wide-baseline dense stereo

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Abstract
Triangulation based initialization method for dense disparity estimation from uncalibrated wide-baseline image pairs using sparse correspondences is proposed. The method includes: (a) sparse correspondence retrieval, (b) Delaunay triangulation and homography estimation, and (c) obtaining a dense initial disparity map to initialize dense stereo algorithms.

Problem Formulation
Existing stereo algorithms fail in the case of wide-baseline views due to the large disparity range. Comparative study of stereo matching for narrow-baseline views is presented in [1].

Method

Dense disparity estimation using triangulation

References

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Results

Dense disparity map for Valbonne: (a) BM with [2], (b) SGBM with [2] and (c) Proposed approach with [2]

Conclusion and Future Work

Conclusion
- The approach has been evaluated on wide-baseline uncalibrated image pairs of various indoor and outdoor scenes.
- The proposed approach is faster and gives a better disparity map compared to the existing stereo initialisation approaches.

Future work
- Quantitatively evaluate the approach on other methods for refining the dense stereo like graph-cut or belief propagation based disparity refinement.
- Extend the approach for dense reconstruction of dynamic scenes.