Motivation and Contributions

Existing techniques for 4D dynamic scene reconstruction from multiple wide-baseline cameras suffer from following limitations:

1. They work in controlled environments, fixed and calibrated cameras;
2. Assumption of known background appearance and structure;
3. Per frame reconstruction incoherent in time.

Contributions of this work:
1. Temporally coherent reconstruction of complex dynamic scenes;
2. Optimisation of reconstruction using geodesic star convexity;

Framework for proposed general 4D scene reconstruction

Joint segmentation and reconstruction

Geodesic star-convexity

Sparse-to-dense framework

Results and Evaluation

Summary:
1. The proposed approach allows unsupervised 4D reconstruction without prior information on scene appearance or structure.
2. Temporal coherence and geodesic star-convexity constraint improved the segmentation and reconstruction accuracy over previous methods.
3. Tests on challenging datasets demonstrate improvements in quality of reconstruction and segmentation compared to state-of-the-art methods.

References


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