RD-OPTIMIZED 3D PLANAR MODEL RECONSTRUCTION & ENCODING FOR VIDEO COMPRESSION

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Background
- Motion prediction/transform coding - lack of multi-frame redundancy.
- Structure-from-Motion (SfM) for 3D structure reconstruction.

Related work
- Model-based video coding [1],[2],[3] - high cost for roughly flat regions.
- Model accuracy v.s. coding cost.

Contribution
1. 3D planar modeling with appropriate planar grid density
2. Don't-care-region (DCR) optimized planar model coding

3D planar modelling
- video frames → point cloud set → RANSAC plane fitting
- Side information = planar boundary, texture, camera params, frame translation/rotation

DCR optimization
- Objective: minimize the number of non-zero transform coefficients.
- Idea: exploit frame redundancy with 3D planar modeling.

Planar model and video coding
- Planar boundary - AEC [5]; video frames - HEVC plus planar prediction

Results (2 videos)
- Planar model coding with QP’s 2-37
- Video coding with QP’s 2-37

References