

Paper Reading for Advanced Computer Graphics Class #4

Cube2Video: Navigate Between Cubic Panoramas in Real-Time

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Cube2Video: Navigate Between Cubic Panoramas in Real-Time

Navigate a sparse point-to-point of collection panoramas can be a less pleasant viewing experience, since they will bring users apparent visual discontinuity. The proposed methods overcome this by make the cubic panoramas into much more smooth movie via **triangle-to-triangle** homography-based warping and **interpolate** novel viewpoints from the given reference panoramas.

I Outlines

- extend the matching-triangulation-interpolation procedure with special considerations of the spherical domain
 - employ angular error metric to get reliable sparse correspondences between two cubic panoramas
 - applied convex hull triangulation to triangulate the panorama normalized on the unit sphere
 - interpolate a new warping scheme between pairs of spherical triangles
- proposing a (spherical) triangle-to-triangle warping, which combines homography and affine transformation

- achieve physically plausible and visually pleasant interpolation results
- describe a compensation transformation to improve the temporal smoothness of the synthesized video

II Some noticeable parts

II.1 Finding Reliable Correspondences

angular error metric

assume the angles between different correspondence pairs are close

Avoid wrong candidate matches lie on or close is antipodal to the epipolar plane by translate the point into the second panorama sphere, and calculate the angle between the resulting and its possible match, if the angle is too much, great chance this is a false positive.

II.2 Triangulating Panoramas

triangulating a panorama by applying convex hull triangulation algorithm on the feature points.

checking-and-rematching process to solve such overlaps in the triangulating process.

ping-pong technique to deal with the remain unchanged unmatched regions.

II.3 Generating A Novel View

Interpolating the panoramas by simply projecting the scene points causes temporal shaking in the generated video.

This is mainly caused by estimation errors in the reconstruction of 3D scene points.

Solution: transform the gray curve (simply projecting) to make its starting and end point coincide with the desired ones.

II.4 Implements

It seems that the program is really no trial.

III Conclusion

At that time, the panoramas is not so widely used and since the commercial usage is mainly Google Street View, and they are not so into the smooth navigation since the sample distance can be a little too large. While

nowadays, more and more applications show up and more players come into this field, this work shows more value.