

DodecaPen: Accurate 6DoF Tracking of a Passive Stylus

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Introduction

• Our proposed system can track the 6DoF pose of a calibrated pen from a single camera with submillimeter accuracy.







DodecaPen: Puppy

Drawing

-DodecaPer

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Proposed 6DoF Pose Tracking System



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DodecaPen

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Why Dodecahedron?

To prevent pose jumping (due to coplanar points)











Evaluation with Synthetic Data

- 24 pose sequences
 - 300 frames / sequence
- Degradation
 - Shot noise
 - Spatial blur
 - Camera resolution
 - Mask kernel width



oculus













Evaluation with Real Data

- Four real drawings
- Compare with a motion capture system
 - Constructed with 16 OptiTrack Prime 17W (1.7 megapixels, 70 degrees fieldof-view) cameras





DodecaPen @TALC













DodecaPen VS. Mocap

- The accuracy of the proposed method is comparable to a motion capture system with 10 active cameras.
- TW\$ 10,000 VS. TW\$ 1,000,000

















Conclusion

- 6DoF tracking using a set of readily available and easyto-assemble components
- Sub-millimeter accurate
- Single camera pose estimation can be fast enough and robust enough for drawing in 2D, 3D and in VR

