Overcoming Singularity of Euler Angles in Robot Pose Estimation using Axis Rotation

Abstract

In this paper, the singularity of Euler angles rotation representation in robot pose estimation is overcome. This is accomplished through coordinate system rotating and sign-adjusting of the intrinsic parameter camera matrices. A stereo pair is attached to the robot and the extended Kalman filter is used as a recursive pose estimator. An extensive set of synthetic and real experiments have been carried out under various motion patterns in both singular and nonsingular settings. The approach has proved accurate in face of singularity and stable during Jacobian calculations as well.

References

2. A.B.M. K. Hassan, and E. Zahir, "Optimizing the turning velocity in a line follower robot", 
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Index Terms

Computer Science

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Keywords

Pose Estimation, Stereo, Euler Angles, Extended Kalman Filter.