

Camera Calibration and Tracking for Gimbaled Like Eye Structure in Robots with Hardware Implementation

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Abstract—Confront location based on camera tracking is an active research area as it offers numerous applications, particularly for security-based surveillance, robot vision and visual guidance. This paper presents a camera calibration technique for target tracking by designing a feedback control system for a camera mounted servo based gimbaled eye structure which in turn signals the tracking station to position and lock the laser pointer to the target. The tracking of the target is based on pose recovery and face detection using Voila Jones algorithm for computer based robot vision whereas the feedback controller is based on PID technique. A mathematical description of the tracking system based on the transformation from the world coordinates to the camera coordinates along with the camera calibration is also presented. **Keywords**—computer vision; visual servoing; face detection

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