Integrated Real-Time Calibration of Electromagnetic Tracking of User Motions for Engineering Applications in Virtual Environments

ABSTRACT: A real-time integrated calibration system for virtual reality environments has been developed that enables accurate electromagnetic tracking of user motions. Electromagnetic tracking systems suffer degradation in accuracy due to the presence of metals and other electromagnetic distortions in the environment. Calibration of the virtual environment to account for these distortions is essential for VR applications in engineering where correlation between the virtual environment and the physical world is important. The major contribution of the paper is the presentation of a comprehensive methodology for calibrating the VR space, the numerical/ mathematical techniques proposed for the calibration and case studies for calibration accuracy and execution time to enable using these techniques in real time in an integrated setup.