

A Localization Technique based on Magnetic Marker under a Variable Background Magnetic Field

Alaa Adel, Mina Maged and Islam S. M. Khalil

Abstract—The accuracy of Measuring the position and the orientation play a crucial rule in the haptic rendering process. In this study, we develop a localization technique based on a magnetic marker for measuring the position and the orientation for a small magnetic dipole under a variable background magnetic field. First, we formulate the mathematical model for the localization problem. Second, we design and optimize arrays of three-dimensional magnetic field sensors to provide an accurate real-time measurement of magnetic field values. Third, we test our localization system with a 3d high accuracy motion stage, the average absolute error in position and the orientation is ... mm and ... deg. We make a fusion between the magnetic-based localization system and the Leap Motion sensing device, we achieve an average absolute error of ... mm in the position and ... deg in the orientation.

Index Terms—Localization, magnetic marker, sensor fusion.



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