How feasible is the use of magnetic field alone for indoor positioning?

Binghao Li, Thomas Gallagher, Andrew G Dempster
School of Surveying and Spatial Information Systems
University of New South Wales
Sydney, Australia
Binghao.li@unsw.edu.au

ABSTRACT

The use of magnetic field variations for positioning and navigation has been suggested by several researchers. In most of the applications, magnetic fields are used to determine the heading. However, for indoor applications, accurate heading determination is difficult due to the presence of magnetic field anomalies. But location fingerprinting technology can take advantage of these anomalies. In fact, the more significant the local anomalies, the more unique the magnetic fingerprint. General speaking, in each fingerprint, the more elements, the better for positioning. Unfortunately, magnetic field intensity data only consists of three components, i.e. intensities in X, Y and Z directions. Since true north (or magnetic north) is unknown, even with help of the accelerometer to detect the direction of the gravity, only two components can be extracted, i.e. the horizontal intensity and the vertical intensity (or total intensity and inclination). Furthermore, moving objects containing ferromagnetic materials and electronic devices may affect the magnetic field. Tests were carried out to investigate the feasibility of using magnetic field alone for indoor positioning. Possible solutions are discussed.

KEYWORDS: Fingerprinting; Magnetic field