

Geomagnetic based on Fingerprint Database method for Indoor position

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Abstract

As for the WLAN-based technology, the higher the density of its AP infrastructure, in case of a change in the conditions of AP comprising the localization infrastructure, a change in the pattern of signal strength occurs, and so the signal strength map should be updated.

Owing to limitations arising from dependence on the existing radio waves, it's necessary to introduce other new resources guaranteeing constancy and property in indoor. The geomagnetic field can be used as a method for position having constancy and property even without the establishment of indoor. The fingerprint localization is most suitable for indoor applications among stochastic models that estimate position by means of the value of signal strength, whereas in the case of geomagnetism, strength of the geomagnetic is used for database building.

For database building, the value of strength should be measured at each point, and several measurements should be carried out at the same point to enhance the accuracy of measurements. Therefore, this paper suggests a method for building database using interpolation so as to reduce time spent to build database for using geomagnetic field-based localization systems.

First determines the point of data acquisition for space that requires positioning for database building, and then acquires data by means of the geomagnetic component-acquisition sensor. Data on a point skipped with the random widening of a gap between points is interpolated on the basis of this data. And then the existing measured data and the value estimated through interpolation were compared.

This experiment made it possible to reduce the points of data acquisition for data building essential for the geomagnetism-based fingerprint localization technique. Indoor localization performance is improved as the time for database building is reduced and database for the map is built more densely through estimating the values of strength for points not measured.

Keywords: geomagnetic, fingerprint, Indoor position.