Kinematic GPS for differential positioning in mobile application

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Abstract

Global Positioning System (GPS) is a technology for spaced-based positioning, used to track and navigate with a timing system. It is currently working on 24 satellites, located at various locations and collaborates with several ground monitoring stations. Recently, with the advance of technology especially with the development of the Global Positioning System, locating certain location or building is no more a daunting task. Finding a particular location at a particular time is a common task to everyone. It has been made easy with the navigation and mapping application and these applications are also available on mobile phones, making the application more accessible for everyone. Yet, the current mobile apps that focused on promoting remote tourism places were still limited or none at all. Instead of saving coordinates of the targeted POI in the coding, the optimization algorithm used by Rathiah *et. al.* was able to automate the appearance of tourism places as a new POI. The Kinematic Differential Global Positioning (KDGPS) algorithm also was able to increase the frequency of updating map view in mobile application. This research would analyze the limitation of the existing GPS mobile application and designed a GPS mobile application based on kinematic and optimization algorithm. Plus, it would verify the effectiveness of the new GPS mobile application. The optimization and KDGPS algorithm were included in the coding as an extra capability to the new developed mobile application. The significant of using different Internet Service Provider (ISP) in running the mobile applications was included in the test. The result gathered from the tests proved that KDGPS algorithm was able to increase the frequency of map view and the optimization algorithm was able to appear the tourism places that didn't displayed in Google Map apps. In addition, between the three ISPs that have been tested, Maxis has the least average of frequency in updating map view compared to Celcom and Digi.

Keywords

GPS, Mobile Application, Kinematic Differential, Optimization Algorithm

Introduction

Introduced by the United States of Defense (DoD), the Global Positioning System (GPS) is a technology for spaced-based positioning, used to track and navigate with a timing system. It provides geo-location signals, measurement between different objects e.g., vehicles, people and provide efficient roaming between different locations 24/7. The tracking can cover from the earth's surface to geosynchronous orbit in space. A less-known element omitted from many descriptions is the embedded timing system that serves as an essential element in its navigation services. Precise time and stable frequency signals available from GPS are at least equal in importance to its navigation and velocity determination functions. They are the synchronization sources for global communications, electronic transactions of all types, power-distribution networks, and many other applications. With the advance of technology especially with the development of the Global Positioning System, locating certain location or building is no more a daunting task. The work on a mobile hot-spot navigator for instant POI finding in an unfamiliar area (a case study of restaurant findings in Da-an District, Taipei city, Taiwan) has