Abstract

Combining Global Positioning System (GPS) and Short Message Service (SMS), this paper develops a realistic system, called Mobile Navigation and Tracking System (MNTS), to provide navigation and target tracking services. MNTS is an Android based mobile application which integrated many enhanced mechanisms for navigation and target tracking services. MNTS not only provides users with the GPS navigation capability, but also supports Quick Response (QR) code decoding, nearby scenic spot searching, friend positioning and target tracking. In target tracking, MNTS utilizing SMS mainly adopts two proposed novel approaches: location prediction and dynamic threshold to reduce the number of short message transmissions while maintaining location accuracy within an acceptable range. Location prediction utilizes the current target’s location, moving speed, bearing to predict its next location. When the distance between the predicted location and the actual location exceeds a threshold, the target sends a short message to the tracker to update the actual location. Based on the movement speed of the target, the threshold is dynamically adjusted to balance the location accuracy and the number of short messages. Furthermore, as MNTS is free and open-source software, service providers or developers can easily extend their own services based on this system.

Keywords

Navigation system, Target tracking, GPS, QR code, SMS.