**Cooperative Positioning and Tracking in Disruption Tolerant Networks**

**ABSTRACT:**

With the increasing number of location-dependent applications, positioning and tracking a mobile device becomes more and more important to enable pervasive and context-aware service. While extensive research has been performed in physical localization and logical localization for satellite, GSM and WiFi communication networks where fixed reference points are densely-deployed, positioning and tracking techniques in a sparse disruption tolerant network (DTN) have not been well addressed. In this paper, we propose a decentralized cooperative method called PulseCounting for DTN localization and a probabilistic tracking method called ProbTracking to confront this challenge. PulseCounting evaluates the user walking steps and movement orientations using accelerometer and electronic compass equipped in cellphones. It estimates user location by accumulating the walking segments, and improves the estimation accuracy by exploiting the encounters of mobile nodes. Several methods to refine the location estimation are discussed, which include the adjustment of trajectory based on reference points and the mutual refinement of location estimation for encountering nodes based on maximum-likelihood. To track user movement, the proposed ProbTracking method uses Markov chain to describe movement patterns and determines the most possible user walking trajectories without full record of user locations. We implemented the positioning and tracking system in Android phones and deployed a testbed in the campus of Nanjing University. Extensive experiments are conducted to evaluate the effectiveness and accuracy of the proposed methods, which show an average deviation of 9m in our system compared to GPS.

**EXISTING SYSTEM:**

Several recent research focuses on GPS-free localization in wireless networks by incorporating fixed landmarks and surrounding characteristics. Surround Sense identifies logical location using the surrounding information like sounds, lights and colors. CompAcc adopts a distance estimation method using accelerometer and compass and determines location by matching to possible path signatures generated from an electronic map. Escort provides a logical navigation system to help a person navigate to another person in a public place with the aid of context features.

**DISADVANTAGES OF EXISTING SYSTEM:**

* Escort provides a logical navigation system for social localization. Its goal is not to identify the physical location, but to help a person navigate to another person in a public place such as a hotel. By periodically learning the walking trails of different individuals, as well as how they encounter each other in space-time, a route is computed between any pair of persons. However, it needs global information of users’ movements and their encounters to construct the navigation graph, which does not apply for DTNs.
* These methods need continuous communication with a centralized server to process a large amount of surrounding data, which are not suitable for the decentralized structure and the opportunistic communication nature of DTNs.

**PROPOSED SYSTEM:**

In this paper, we propose a decentralized cooperative method called PulseCounting for DTN localization and a probabilistic method called ProbTracking to track the movement of mobile nodes. PulseCounting evaluates the number of user walking steps using the accelerometer data, and decides the orientation of each step using the electronic compass measurements. By accumulating the segments of walking steps, it is able to form an estimation of current location. PulseCounting further takes advantage of the opportunity of encounters in DTNs to refine the location estimation: on the one hand, the encountering APs and phones equipped with GPS could be regarded as reference points; on the other hand, the encounters of two mobile nodes enable the possibility of mutual adjustment to reduce estimation error. ProbTracking detects the movement trajectory based on the partial location information reported by the other mobile nodes. It constructs a Markov chain using the movement his tory data and uses it to determine the most probable user walking route without the need for global location information in DTNs

**ADVANTAGES OF PROPOSED SYSTEM:**

* It constructs a Markov chain using the movement history data and uses it to determine the most probable user walking route without the need for global location information in DTNs.
* Accuracy of direction mapping

**SYSTEM ARCHITECTURE:**

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**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

* System : Pentium IV 2.4 GHz.
* Hard Disk : 40 GB.
* Floppy Drive : 1.44 Mb.
* Monitor : 15 VGA Colour.
* Mouse : Logitech.
* Ram : 512 Mb.
* MOBILE : ANDROID

**SOFTWARE REQUIREMENTS:**

* Operating system : Windows XP/7.
* Coding Language : Java 1.7
* Tool Kit : Android 2.3 ABOVE
* IDE : Eclipse

**REFERENCE:**

Wenzhong Li, Member, IEEE, Yuefei Hu, Student Member, IEEE, Xiaoming Fu, Senior Member, IEEE, Sanglu Lu, Member, IEEE, and Daoxu Chen, Member, IEEE, “Cooperative Positioning and Tracking in Disruption Tolerant Networks,”. **IEEE Transactions on Parallel and Distributed Systems, 2014.**