*IOSR Journal of Computer Engineering (IOSR-JCE)*
*e-ISSN: 2278-0661,p-ISSN: 2278-8727,*
*PP 14-16*
*www.iosrjournals.org*

# Location Tracking And Positioning In Dtns(Disruption Tolerant Network)

N.B. Upadhyay[1], S.V. Wagh[2], N.M.Gandhi[3], S.R. Kathkade[4], R.M.Shaikh[5]
[1,2,3,4,5] *(Dept of Computer Engineering, KVNNIEER, SPPU, India)*

***Abstract :*** *As the vast research in the field of technology increases, location dependent applications becomes highly important as positioning and tracking of mobile devices plays an important role in context aware and pervasive services. While physical localization and logical localization for satellite has been highly and extensively researched, networks with fixed reference points like GSM and WiFi are densely deployed and tracking and positioning techniques in Sparse Disruption Tolerant Networks (DTN) have not been well researched. In this paper, we propose a cooperative and localized method called Pulse Counting for DTN localization and a probability based tracking method called Prob Tracking to solve the problem. To evaluate user walking steps and movement orientation, we use Pulse Counting by using cell phone's accelerometer and electronic compass. By exploiting the encounters of mobile nodes, it improves the accuracy and estimates users location by accumulating walking segments. There are several methods for refinement of location estimation which are also discussed, such as, mutual refinement of location estimation for encountering nodes based on maximum likelihood and adjustment of trajectory based on reference points. We use Protracting method to track user movement which uses Markov chain to describe movement patterns and predicts the most possible user walking trajectory without full record of user's location.*

***Keywords****: Bluetooth, GPS, Pulse Count, Prob Track, WiFi*

## I. Introduction

With the increasing research and development in the field of technology, a location dependent application plays a very important role for positioning and tracking of mobile devices. Physical and logical localization for satellite like GPS has been widely researched and used, networks with fixed reference points like GSM and WiFi are densely deployed and tracking and positioning techniques in Sparse Disruption Tolerant Networks (DTN) have not been well researched. There is an increasing demand and need to implement localization techniques in DTN and overcome its problems

### 1.1 Basic Concept

Disruption Tolerant Networks (DTNs) are mobile ad hoc networks where nodes connect with each other intermittently. DTNs allow people to communicate without a network infrastructure. Due to the lack of fixed infrastructure and continuous network connection in DTNs, identifying the user's mobile location and tracking their movement trajectories are challenging. To overcome this ways of problem, a method called Pulse Counting for DTN localization and a probability based tracking method called Protracting is used. Pulse Counting defines user's walking steps and movement with the help of cell phone's accelerometer and electronic compass. By exploiting mobile nodes, it improves the accuracy and estimates user's location by accumulating walking segments. Protracting is used to track user movement. For tracking user movement in DTN using Protracting, we follow six steps. Namely, Bootstrapping, Step Counting, Direction Mapping, Trajectory Generation, Location estimation and refinement.

### 1.2 Application

It can be used to in a limited field area, like a university campus or industry's campus, to track the user's location and store their trajectory and path history for the later use and path estimation. It can also be used to determine a user's location and provide a destination location to which the user wants to travel to.

## II. Proposed System

In this paper, we propose a cooperative and localized method called Pulse Counting for DTN localization and a probability based tracking method called Prob Tracking to solve the problem. To evaluate user walking steps and movement orientation, we use Pulse Counting by using cell phone's accelerometer and electronic compass. By exploiting the encounters of mobile nodes, it improves the accuracy and estimates users location by accumulating walking segments. There are several methods for refinement of location estimation

which are also discussed, such as, mutual refinement of location estimation for tracking nodes based on maximum likelihood and adjustment of trajectory based on reference points. We use Prob Tracking method to track user movement which uses Markov chain to describe movement patterns and predicts the most possible user walking trajectory without full record of user's location.

### 2.1 Parameters

#### 2.1.1 Pulse Counting:

Pulse Counting evaluates the number of user walking steps using the accelerometer data, and decides the orientation of each moving step using the electronic compass measurements. By accumulating the segments of walking steps, it is able to form an accurate current location. Pulse Counting further takes advantage of the opportunity of encounters in DTNs to refine the location estimation

#### 2.1.2 Prob Tracking:

Prob Tracking system can create the most probable user trajectory from incomplete observations. According to the historical movement data, it describes the user's mobility as a finite state Markov chain, and generates a rough trajectory for the mobile user based on partial location records.

### 2.2 Analysis of Algorithm

Step 1: Bootstrapping: Each node need to know the initial position. Without initial position, there is no reference point for the location estimation. In DTN, we assume a small number of fixed landmarks which are deployed in the environment with known locations and there are also a few GPS-nodes willing to report their location to other nodes. Thus, common nodes can obtain a rough initial location when they first encounter these landmarks or GPS-nodes. It is not possible that all common nodes will obtain their initial locations at the same time, so the initialization process is asynchronous.
Step 2: Step Counting: For this process, we use accelerometer equipped android mobile to measure walking steps. The accelerometer records user's movements in three dimensions: X, Y, Z.
Step 3: Direction mapping: For this process, we use electronic compass which comes equipped in the android mobile. This cell phone compass records the user's orientation in the form of an angle with respect to the magnetic north. Since, the compass data is densely sampled (about 22 data samples per second), we use direction mapping to make the data discrete to eight directions: North, northeast, south, southeast, west, east, northwest, southwest.
Step4: Trajectory generation: From the results of step counting and direction mapping we are able to describe the movement trajectories. It is defined with a series of segments with distance and direction.
Step 5: Location Estimation: If the initial location of a node is known, we can estimate its location at any time.
Step 6: Refinement: the measurement of user's step size is a random variable following Gaussian distribution. With the increasing number of segments, the estimation has been more inaccurate.

### 2.3Advantages of Proposed System:

- It constructs a Markov chain to describe movement patterns and predicts the most possible user walking trajectory without full record of user's location.
- Accuracy of direction mapping

## III. System Architecture

An Android app which will be installed on the user's mobile. The app will estimate the user's location and demonstrate the moving trajectory in the screen. It can also receive GPS-node, if encountered; the positioning system will receive GPS coordinates to refine the trajectory. Tracking system will be implemented on a PC server which will be connected to the internet and could be accessed via web browser. This tracking server will emulate the trajectories of any user's mobile nodes and display their traces on the map.


Fig. 1.Architecture of system

In this architecture, when a user (Common node) enters in the network range, user can know his own location via an app installed on the user's android device. The app can locate the user and also create the trajectory and predict the destination and path. If it gets in the range of a GPS node, then the location accuracy will be increased. At the infestation, when the user gets connected it generates a map for the user and can track the user and can store the trajectory and visited nodes of the user at the server database.

## IV. Conclusion

Localization in DTNs faces two major difficulties: the mobile node can only use sparse reference points to estimate its location, and the tracking server need to determine and predict movement trajectories with partial location information. To overcome these difficulties, we propose PulseCounting and ProbTracking for positioning and tracking in DTNs.Extensive experiments show that the proposed system achieves an average deviation less than 9 m compared to GPS.

## Acknowledgement

Feel great pleasure in submitting this project stage I report on **"Location Tracking And Positioning In DTNs(Disruption Tolerant Network)".** We wish to express true sense of gratitude towards my project guide, **Prof. R. M.Shaikh** Who at very discrete step in study of this project, contributed his valuable guidance and helped to solve every problem that arise. Our great obligation would remain due towards **Prof. K. V. Ugale**, **Head of Department of Computer Engineering** who was a constant inspiration during our project. He provided us with an opportunity to undertake the project at **K.V.N. Naik Institute of Engineering Education Research, Nasik**. We feel highly indebted to **Prof. N. V. Kapade** who provided us with all our project requirements, and done much beyond our expectations to bring out the best in us. Our sincerely thanks to **Principal Dr.A. K. Dwivedi** proved to be a constant motivation for the knowledge acquisition and moral support during our course curriculum.

## References

[1]. K. Fall, delay-tolerant network architecture for challenged internets," in Proc. ACM Conf. Appl., Technol., Architect. Protocols Comput.Commun., 2003, pp. 27–34.
[2]. A. Lindgren, A. Doria, E. Davies, and S. Grasic, "Probabilistic routing protocol for intermittently connected networks," RFC 6603, Internet Research Task Force, Aug. 2012.
[3]. S. Gaonkar, J. Li, R. R. Choudhury, L. Cox, and A. Schmidt, "Micro-blog: Sharing and querying content through mobile phones and social participation," in Proc. 6th Int. Conf. Mobile Syst., Appl., Serv., 2008, pp. 174–186.
[4]. E. D. Kaplan, Understanding GPS Principles and Applications. Norwood, MA, USA: Artech House, Feb. 1996.
[5]. J. Soubielle, I. Fijalkow, P. Duvaut, and A. Bibaut, "GPS positioning in a multipath environment," IEEE Trans. Signal Processing, vol. 50, no. 1, pp. 141–150, Jan. 2002.