Localized Mobility Prediction with Divided Sensitive Ranges for Underwater Sensor Networks

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ABSTRACT

Limitation of mobile nodes is irreplaceable for underwater communication. The location mobile nodes are additionally required for underwater acoustic communication. This method is more adaptable and proficient. The aquatic application such as marine surveillance requires minimum hundred to thousand nodes. This paper focused on the localization of mobile nodes in larger network. The mobility prediction algorithm based on divided sensitive ranges which follows the cell transformation probability. The Predictive TOA model is applied to attain high precision. Thus, the results reveal that localization scheme can precisely foresee the mobile nodes location even in the absence past location history.

KEY WORDS: Acoustic Network Simulation, UWSN.

1. INTRODUCTION

The earth is a water planet. Currently, there has been a developing enthusiasm for checking submerged medium for logical investigation, business misuse, and assault insurance. A distributed UWSN is not a perfect method for acoustic communication. A scalable UWSN is a superior resolution for aquatic environments. The Scalable wireless sensor networks deployed which can observe and discover ecological measures in 3-dimensional underwater space. Mobile sensors can facilitate to pathway changes in acoustic communication. The monitoring coverage area will be changed dynamically by floating sensors. It will also increase system reusability. The self-organizing network of mobile sensors yields better provisions in sensing, monitoring, surveillance, scheduling, underwater control, and failing tolerance. Radio wave does not work well in underwater environments, so that acoustic communications must be used. The sensor nodes are mobile due to water speed. So mobility is another difficulty to propose this method. The sink should provide collective information about event detection of sensor networks.

2. RELATED WORK

SLMP Scheme: Mobility prediction algorithm does not require the past position record. Predictive resources used randomly. Additionally, prediction can be widely employed through wireless networks. The probability of cell transformation is called as sensitivity.

Architecture Model: In this Architecture model, 1000 sensor nodes are arbitrarily scattered in a 200 m X 200 m X 200 m region. Node density can be controlled by changing the communication range of every node. Range measurements between nodes calculate mean and standard deviation. Mean value tracks real distance between nodes and average deviation.

Figure 1. Underwater buoys based sensor network

First calculate the minimum distance between mobile nodes and boundaries to agree mobile nodes sensitivity. If the node is located in lowermost cell, no changes will be there and directly predict that the next cell. If the node is located in medium cell, have to calculate the next cell. If the node is located in the higher most cells, have to predict the future node.

Figure 2. Underwater Sensor Nodes Deployment
Location Detection & Monitoring: In a localization period, if localization message is not received by non-localized ordinary node, the previous location estimation helps to update its current location estimation and to predict the speed vector. If a reference node sends localization message, it is going to update its reference record and perform new area estimations.

Predictive TOA Model: The mobility prediction algorithm based on dividing sensitive ranges predicts the future cell of a terminal unit according to its own real-time movement characteristics, so it is appropriate for most terminal units. The order-1 Markov predictor is based on the transition probability matrix, so it is not suitable for the terminal units whose movement characteristics are not marked.

3. RESULTS AND DISCUSSION

In this Architecture model, 1000 sensor nodes are arbitrarily scattered in a 200 m X 200 m X 200 m region. SLMP have minimum localization error and communication price. The Predictive TOA model is applied to attain high precision & mobile node prediction reduces the communication cost. Thus, the results reveal that the proposed scheme can precisely foresee the location of cell nodes even in the drawback of missing area history. Thus, communication cost and energy utilization are often reduced.

4. CONCLUSION AND FUTURE WORK

The complication of underwater mobile nodes is determined in the high sensitivity range, which makes it more logical to use the predictive resources. In addition, this method can obtain better precision rate.

- Investigate different submarine quality pattern and inspect the relevancy of mobile nodes.
- Observe different prediction schemes and study however they have an effect on the localization performance.

REFERENCES


