International Journal of Computer Science and Engineering Communications.
Vol.3, Issue 3, 2015, Page.1052-1056, ISSN: 2347–8586

Multiple Source Localization in Wireless Sensor Networks Using Extended Topology Control Algorithm

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Abstract **-** Wireless Sensor Network is used to receive the signal from source nodes and it will be transmitted into destination nodes. In multiple source localization the sensors are capable of obtaining more than one measurement. These measurements are not only generated by the objects but also possibly from the distributed heap. The existing work mostly requires three step algorithm Coarse location estimation, Source measurement association determination, Source location refinement. Its unaware of associations between measured signals and source nodes .These three step algorithm also depended on one another. The proposed Extended Topology Control Algorithm is chosen to reduce the network density and hence simulated. It uses three parameters such as distance, energy, link quality. It is extremely simple and fast. ETC proves correctness of general weighted network graphs. The proposed algorithm does not require availability of node position information.

Keywords-*Wireless Sensor Networks (WSN), ETC-Extended Topology Control Algorithm, TOA-Time of Arrival, AOA-Angle Of Arrival, Sensor.*

I.INTRODUCTION

A wireless sensor network (WSN**)** defines spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants and to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, enabling also to control the activity of the sensors. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on. The WSN is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node the size of a grain of dust, although functioning "motes"(demo video) of genuine microscopic dimensions have yet to be created. has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning of genuine microscopic dimensions have yet to be created.

Sensor nodes are distributed in a sensor field to observe a phenomenon of interest (i.e., environment, vehicle, object, etc.). Sensor nodes in the sensor field form an ad hoc wireless network and transmit the sensed information (data or statistics) gathered via attached sensors about the observed phenomenon to a base station or sink node. The sink node relays the collected data to the remote requester (user) via an arbitrary computer communication network such as a gateway and associated communication network. Since different applications require different communication network infrastructures to efficiently transfer sensed data, WSN designers can optimize the communication architecture by determining the appropriate topology (number and distribution of sensors within the WSN) and communication

infrastructure (e.g., gateway nodes) to meet the application's requirements. An infrastructure-level optimization called bridging facilitates the transfer of sensed data to remote requesters residing at different locations by connecting the WSN to external networks such as Internet, cellular, and satellite networks.

II.RELATED WORK

Locating the node cooperative localization in WSN[1]-To describe measurement-based statistical models useful to describe time-of-arrival (TOA), angle-of-arrival (AOA), and received-signal-strength (RSS) measurements in wireless sensor networks. Distributed algorithms is used in this networks are three protocols are used such as Energy-efficient scalable routing, Centralized algorithms, Hybrid algorithms. Have the distinct advantage of being able to measure TOA between nearby neighbors. The severely attenuated LOS problem is only severe in networks with large inter sensor distances. Mobility creates the problem of locating and tracking moving sensors in real time, and also the opportunity to improve sensor localization. Relative location estimation in WSN[2]The sensor location estimation when sensors measure received signal strength (RSS) or time-of-arrival (TOA) between themselves and neighboring sensors. algorithm is used in this networks are Location estimation algorithms, Distributed location algorithms, Centralized algorithms. To show the accuracy with which wireless sensor networks can estimate the relative sensor locations. The results should help researchers determine if the accuracy possible from relative location estimation can meet their application requirements. This paper began by proving that location estimation variance bounds (CRBs) decrease as more devices are added to the network. Needed to verify the variance of location estimators due to the non-ergodic nature of shadowing.AD HOC Positioning system using AOA[3]Devices such as GPS receivers and digital compasses provide good positioning and orientation outdoors, there are many applications requiring the same facilities indoors, where line of sight access to satellites is unavailable, or earth magnetic readings are unreliable. Algorithms used such as orientation algorithm, Ad Hoc Positioning System (APS) algorithm distance vector routing algorithms, DV-Bearing Algorithm. Absolute orientation, that it works well for disconnected networks. Doesn't require any additional infrastructure. These incipient realizations prove that it is feasible to get AOA capability in a small package that would be appropriate for future pervasive computing ad hoc networks. Angle of arrival of localization for WSN[4]To focus on localization techniques based on angle of arrival information between neighbor nodes. Algorithm used as Localization algorithm. A distributed AOA-based localization and orientation approach for wireless sensor networks under the assumption that all unknown sensors are capable of detecting angles of the incident signal from the neighboring nodes. Sensor network-based counter sniper system[5] The performance of the proposed system is superior to that of centralized counter sniper systems in such challenging environment as dense urban terrain. Algorithm used such as Sensor fusion algorithm Signal detection algorithm Optimization algorithm. The main advantage of the proposed integrated time synchronization and routing algorithm is that it does not require additional radio messages. Enables power management. A disadvantage of the TPSN protocol is that the two-way communication prohibits the use of message broadcasting, which results in higher communication overhead.

Recent years, of sensors that are smaller, cheaper, and intelligent. These sensors are equipped with wireless

III.ETC ALGORITHM

The ETC ad-hoc network topology control algorithm operates with a general notion of order over the neighbors link qualities.

The algorithm consists of three main steps:

- Neighbor ordering.
- Neighbor order exchange.
- Edge selection

The network node u computes a total order over all its neighbors in the network graph G. From an abstract point of view, this order is intended to reflect the quality of the links to the neighbors. A node u will consider its neighbors in G according to u ordered with respect to decreasing link quality: The link to a neighbor appearing early in the order u is regarded as being of higher quality than the link to a neighbor placed later in u. A neighbor w appearing before v in order u is denoted as w u v. The neighbor order reflects a much more general notion of link quality, such as signal attenuation or packet arrival rate. The neighbor order information is exchanged among all neighbors.

The ETC algorithm is executed at all nodes.. In a variant of the algorithm a node u could apply a growing radius technique starting with the "best" neighbor to decide on a neighbor v.

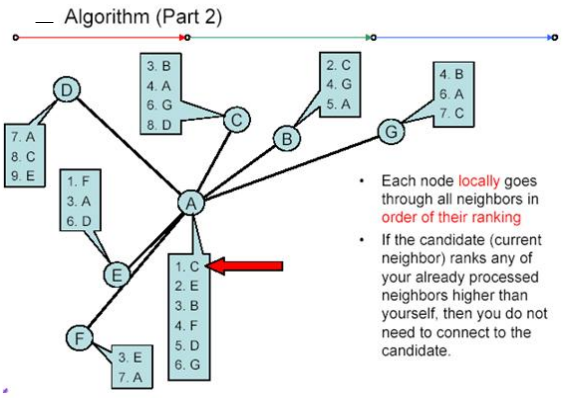

Fig1:structure of the ETC algorithm

A. Node Configuration Setting

The mobile nodes are designed and configured dynamically, designed to employ across the network, the nodes are set according to the X, Y, Z dimension, which the nodes have the direct transmission range to all other nodes.

B. Nodes Unique Identity

All the mobile nodes tend to have a unique id for its identification process, since the mobile nodes communicates with other nodes through its own network id. If any mobile node opted out of the network then the particular node should surrender its network id to the head node.

C. Route Discovery

The module states a 4 step message exchange process i,e POLL, REPLY, REVEAL, REPORT. As soon the protocol executed the, POLL and REPLY messages are first broadcasted by Source and its neighbors, respectively. These messages are anonymous and take advantage of the broadcast nature of the wireless medium, allowing nodes to record reciprocal timing information without disclosing their identities.

D. Data Transmission

The input data entities are message to be transmitted from the source to the destination node in the form of packet with IP address for its identification. The outcome formatted packet with the required information for communicating between the source and the destination node.

IV.RESULT AND DISCUSSIONS

Write were Tcl scripts in any text editor like Joe or emacs. First of all, we need to create a simulator object. This is done with the command set ns [new Simulator] Now we open a file for writing that is going to be used for the nam trace data. Set nf [open out.namw] $ns namtrace-all $nf The first line opens the file 'out.nam' for writing and gives it the file handle 'nf'. In the second line we tell the simulator object that we created above to write all simulation data that is going to be relevant for nam into this file. The next step is to add a 'finish' procedure that closes the trace file and starts nam. The root of the hierarchy is the Tcl Object class that is the super class of all OTcl library objects (scheduler, network components, timers and the other objects including NAM related ones). As an ancestor class of Tcl Object, Ns Object class is the super class of all basic network component objects that handle packets, which may compose compound network objects such as nodes and links. The basic network components are further divided into two subclasses, Connector and Classifier, based on the number of the possible output data paths.

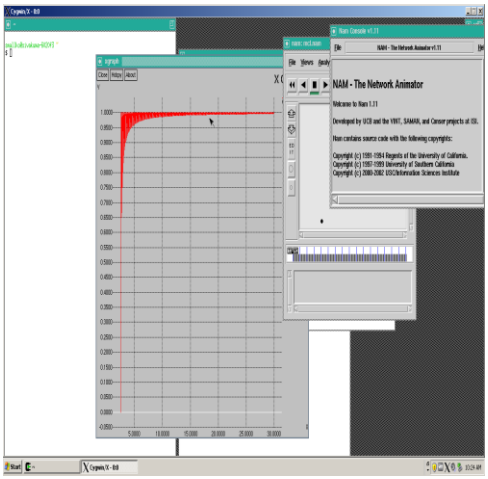

Fig1.1Energy Level Draph

NS starts with the command ns (assuming that we are in the directory with the ns executable, or that were path points to that directory), where is the name of a Tcl script file which defines the simulation scenario (i.e. the topology and the events). We could also just start ns without any arguments and enter the Tcl commands in the Tcl shell, but that is definitely less comfortable. Everything else depends on the Tcl script. The script might create some output, it might write a trace file or it might start nam to visualize the simulation.

A Heterogeneous Network (MANET) is a kind of wireless ad-hoc network, and is a self-configuring network of mobile routers (and associated hosts) connected by wireless links the union of which forms an arbitrary topology. The routers are free to move randomly and organize themselves arbitrarily, thus the network's wireless topology may change rapidly and unpredictably. There are various routing protocols available for MANETs. The most popular ones are DSR, AODV and DSDV. In this thesis, an attempt has been made to compare these three protocols on the performance basis under different environments.

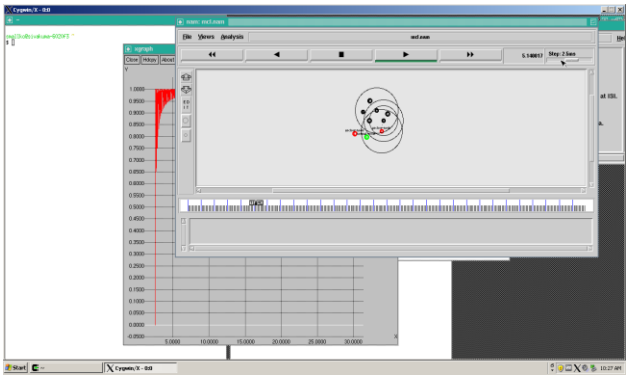

Fig1.2signal Transmission

V.CONCLUSION

The product was implemented and tested with data and were found to be error free. Also, it is found that the system will work successfully. To make the system maximum user friendly. Even with minimal assumptions (neighbor ranking), it is possible to construct a topology with provable properties. The technologies yet to be introduced can be announced so the customers avail the service in effective time. It can be implemented for transmitting images, sounds and pictures using the same. The requirements of this project will be good only if the client and server is kept in a good condition. Implementation of the system is done as fresh and a whole. The basic functionalities are implemented first and then the others are done next according to needs. The project may be made to include new concern with its requirements and easily portable.

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