International Journal of Innovative Research in Technology & Science (IJIRTS)

REVIEW ON DATA DELIVERY ACCURACY ANALYSIS OF RANGE BASED LOCALIZATION ALGORITHMS IN WSN

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Abstract: - Digital Localization error minimization based on positioning techniques and focus on moving sensor node in improving the accuracy analysis of range based location algorithms in wireless sensor networks**.** A sensor localization primarily based techniques awareness of the physical location for every node is needed by several wireless device network applications. The discovery of the position will be complete utilizing range measurements as well as sensor localization received signal strength in time of arrival and sensor localization received signal strength in time difference of arrival and angle of arrival. Positioning techniques supported angle of arrival info between neighbor nodes. A wireless sensor network using positioning techniques primarily based Techniques wireless sensor network nodes position estimation in area is thought as localization. Node Localization in wireless device network is very important for several applications and to seek out the position with Received Signal Strength Indicator needs variety of anchor nodes. Accessible wireless device system procedure traditional signal strength and angle of arrival primarily based localization technique for WSN .A purposed algorithm as a PA for wireless sensor network genetic algorithmic based on positioning techniques as proposed techniques. In study this paper problem that the positioning accuracy is low with minimum anchor nodes. Find the optimum location by satisfying each the factors with minimal error and best possible solution. WSNs, the closely located sensor nodes sensing and collecting the data about the same event will result in better accuracy and reduced uncorrelated noise.

KEYWORDS: - Wireless Sensor Network, Error Correction, range-based methods, range-free methods, Received Signal Strength, Data Delivery Accuracy.

I. Introduction

In the last few years wireless sensor networks (WSNs) have drawn the attention of the research community, driven by a wealth of theoretical and practical challenges [1]. This progressive research in WSNs explored various new applications enabled by larger scale networks of sensor nodes capable of sensing information from the environment, process the sensed data and transmits it to the remote location [2, 3]. WSNs are mostly used in, low bandwidth and delay tolerant, applications ranging from civil and military to environmental and healthcare monitoring. WSNs as shown in Fig.1 generally consist of one or more sinks (or base stations) and perhaps tens or thousands of sensor nodes scattered in a physical space. With integration of information sensing, computation, and wireless communication, the sensor nodes can sense physical information, process crude information, and report them to the sink. The sink in turn queries the sensor nodes for information. WSNs have several distinctive features like: a) Unique network topology b) Diverse applications c) Unique traffic characteristics, and d) Severe resource constraints WSN node is comprised of low-power sensing devices, embedded processor, and communication channel and power module. The embedded processor is generally used for collecting and processing the signal data taken from the sensors. Sensor element produces a measurable response to a change in the physical condition like temperature, humidity, particulate matter (e.g. CO2) etc. The wireless communication channel provides a medium to transfer the information extracted from the sensor node to the exterior world which may be a computer network and inter-node communication [5]. However, WSN using IEEE 802.15.4 Wireless Personal Area Network protocol (WPAN) or Bluetooth is complicated and costly Using RFID to implement wireless communication is relatively simple and cheap [5]. Zigbee protocol can also be used for communication; alternatively the RS232 standard for wireless transmission of data can be adopted because the data rate of RFID and that of RS232 is same in terms of bits per second (bps). The rest of the paper is organized as follow. Section 2 defines the system requirements. Section 3 compares different WSN motes that can be used in variety of WSN configuration targeting different applications. Section 4, evaluates these nodes based upon size, range, technology they have used, storage capacity, communication technology, power, security etc. And finally Section 5 concluded this paper and suggested future work.

Types of localization algorithm in WSN

1. Range-based WSN: this category of algorithms is based on using range measurement techniques for location estimation. According to the manner of using the range measurement techniques, this category can be divided into two types: fully-range-based and hybrid-range-based localization algorithm. Both of them are even anchor based or anchor free.

2. Range-free WSN: In order to estimate the location of unknown node, this category is based on the use of the topology information and connectivity. According to the manner that location of unknown node is obtained. The range-free schemes can be further divided into two types: fully-range-free and hybrid-range-free scheme [6].

WSN System Requirements

Here we discuss some of the characteristic requirements of a system comprising wireless sensor nodes. The system should be:

1. Fault tolerant: the system should be robust against node failure (running out of energy, physical destruction, H/W, S/W issues etc). Some beep mechanism should be incorporated to indicate that the node is not functioning properly.

2. Scalable: The system should support large number of sensor nodes to cater for different applications.

3. Long life: The node's life-time entirely defines the network's life-time and it should be high enough. The sensor node should be power efficient against the limited power resource that it have since it is difficult to replace or recharge thousands of nodes. The node's communication, computing, sensing and actuating operations should be energy efficient too.

4. Programmable: the reprogramming of sensor nodes in the field might be necessary to improve flexibility.

5. Secure: the node should support the following
a. Access Control: to prevent unauthorized attempts to access the node.
b. Message Integrity: to detect and prevent unauthorized changes to the message.
c. Confidentiality: to assure that sensor node should encrypt messages so only those nodes would listen who have the secret key.
d. Replay Protection: to assure that sensor node should provide protection against adversary reusing an authentic packet for gaining confidence/network access, man in the middle attack can be prevented by time stamped data packets.
6. Affordable: the system should use low cost devices since the network comprises of thousand of sensor nodes, tags and apparatus. Installation and maintenance of system elements should also be significantly low to make its deployment realistic [7].

II. Literature Survey

In Celestine et al. [8].a flooding method routing technique is introduced that depends on dummy data sources. The main idea behind this technique is that each node can be considered as a dummy data source that sends real data after sensing an event to the destination node; all of this node's neighbor nodes will receive dummy data. Although this approach has the advantage of making it difficult for an adversary to distinguish between the real packets and dummy ones, it leads to dummy traffic and power consumption as a result of this. A novel solution is proposed by using variable sized dummy packets. The dummy packets will differ in size from the real packets, thus saving energy; however, an adversary will still find it difficult to distinguish the real packet from the dummy ones.
U. W. Bilstrup et al. [9]. The Free2move wireless sensor node is based on a transceiver operating in the 2.4 GHz ISM band. The node was initially thought of as an active RFID tag for monitoring temperature in goods. However, it has been shown that it is also possible to use it as a wireless sensor network node. The node is equipped with an extremely low power micro controller for executing communication protocols and sensor functionality. The memory and processing resources are very limited to keep the price and energy consumption as low as possible. The node is also equipped with a temperature sensor. Overall we can see that most of the research is focused on developing smart sensing nodes for WSN. Hence we studied the most important nodes in the current literature to see which application can be practical. The next section evaluates these nodes.

In M. Sarvabhatla et al. [10], a protocol based on public key cryptography for external agent authentication and session key establishment has been proposed. An external agent communicates through a public key encryption technique with a base station, which communicates with sensor nodes through sharing of a private key. The process for this protocol is broken down into three phases: registration, authentication and session key establishment.
In Kemal Akkaya et al. [11]. This paper surveys recent routing protocols for sensor networks and presents a classification for the various approaches pursued. Data-centric, hierarchical and location-based are three main classifications that are examined in this paper. Network flow and QoS modeling are also discussed.
In Gomez J et al. [12] .Conserving Transmission Power in Wireless Ad Hoc Networks" in 2001. In this paper, the detailed design of PARO and evaluate the protocol using simulation and experimentation is presented. Through simulation that PARO is capable of outperforming traditional broadcast-based routing protocols (e.g., MANET routing protocols) due to its power conserving point to-point on-demand design. Some initial experiences from an early implementation of the protocol in an experimental wireless test bed using off-the-shelf radio technology are also discussed.

In R. Govindan et al. [13]. Published their paper about "Understanding Packet Delivery Performance in Dense Wireless Sensor Networks" in 2003. This paper shows that wireless sensor networks promise fine-grain monitoring in a wide variety of environments. Many of these environments (e.g., indoor environments or habitats) can be harsh for wireless communication. From a networking perspective, the most basic aspect of wireless communication is the packet delivery performance: the spatial-temporal characteristics of packet loss, and its environmental dependence. These factors will deeply impact the performance of data acquisition from these networks. In this paper, writers report on a systematic medium-scale (up to sixty nodes) measurement of packet delivery in three different environments: an indoor office building, a habitat with moderate foliage, and an open parking lot. Our findings have interesting implications for the design and evaluation of routing and medium-access protocols for sensor networks.

In Zeljko Zilic et al. [14]. Architecture of Increased Availability Wireless Sensor Network Nodes". In this paper, the availability and serviceability of WSN nodes is considered that can be addressed by indulging the remote testing and repairing the infrastructure for individual sensor nodes using COTs components, they built and evaluate the system level test interface for remote testing repair and software upgrade. This also contains contents regarding the design approaches which were carried to investigate the complexity using the proposed infrastructure. Wireless broadcast can be easily used in various testing with optimum cost.

In Michael Broxton et al. [15].Localizing \A Sensor Network Via Collaborative Processing Of Global Stimuli. The paper marketed the development and implementation of a sensor network localization algorithm that combines three aspects of ultrasound time-of-flight range finding within network alteration to reach at a localization method. This method realize on correlated light flashes and ultrasound pulses to elect anchor points which is used in standard linear late-ration algorithm.

III. Expect Outcome

A take a look at new research inside the area of Wi-Fi sensor networks and identifies and demanding situations within the field of following objective to work in the area of WSN .Locate the most useful region in minimum fault and most reliable answer. Data delivery Accuracy analysis and minimum error within the expected sensor positions.

IV. Conclusion

WSN algorithm based on localization schemes range-based (RSS, AOA) and also called WSN. Which are simultaneously optimized by the genetic algorithm to find the optimal solution of the location of the sensor node using some anchor nodes the simulation results will be different scenario shows that the present algorithm gives the highest accuracy with a minimum error with is twice better than the closest competitor AOA. In study on wireless sensor networks and localization for mobile wireless device networks. Localization in WSNs entails new challenges that effect from integrating resource-constrained wireless sensors on a mobile platform. The localization ways and algorithms that give larger accuracy on larger-footprint mobile entities with fewer resource restrictions are no longer appropriate. Similarly, centralized and large latency and localization techniques for fixed Wireless network are undesirable used for the majority of WSN applications. Find accuracy and good in data and also error minimum data and not effect.

References

[1]. J. Feng, F. Koushanfar, M. Potkonjak, "System Architectures for Sensor Networks Issues, Alternatives, and Directions", IEEE International Conf on Computer Design, Germany, 2002. pp. 226- 231

[2]. D. Culler, D. Estrin, M. Srivastava, "Overview of Sensor Networks", IEEE Computer, USA, vol 37, pp. 41-49, August 2004.

[3]. K. Raja, I. Daskalopoulos, H. Diall, S. Hailes, T. Torfs, C. Van Hoof and G. Roussos, “Sensor Cubes: A Modular, Ultra-Compact, Power-Aware Platform for Sensor Networks”, Int Conf on Inf Proc in Sensor Networks (IPSN SPOTS), USA, pp. 2065-2075, vol 48, No6, April 2007.

[4]. L. Tomas J. Marusak, "Bi-directional Wireless Detection System” USA, Jun. 19, p. 18, 2008.

[5]. K. S. Hitoshi Kitayoshi, "Long Range Passive RFID-Tag for Sensor Networks," in Vehicular Technology Conference, 2005. VTC-2005-Fall. 2005 IEEE 62nd, Dallas, Sept., 2005, pp. 2696-2700.

[6]. Kazem Sohraby, Daniel Minoli and Taieb Znati (2007) “Wireless Sensor Networks Technology Protocols and Application”, Wiley-Inter Science, ISBN 978-0-471-74300-2

[7]. Suraiya Tarannum (2010) “Energy conservation Challenges in Wireless Sensor Networks: A Comprehensive Study”, Wireless Sensor Network 2010, Scientific Research, Vol.2 PP. 483-491

[8]. Celestine, J, “An energy efficient flooding protocol for enhanced security in Wireless Sensor Networks. In Systems, Applications and Technology Conference (LISAT), IEEE Long Island. 2015.

[9]. U. W. Bilstrup, P.A, "An architecture comparison between a wireless sensor network and an active RFID system," in Local Computer Networks, 2004. 29th Annual IEEE International Conference on, Halmstad University, CERES, Nov. 2004.

[10]. Sekhar, V.C. and M. Sarvabhatla. Security in wireless sensor networks with public key techniques. In Computer Communication and Informatics (ICCCI), 2012 International Conference on. 2012. IEEE.

[11]. Kemal Akkaya, Mohamed Younis, “A Survey On Routing Protocols For Wireless Sensor Networks”, Ad Hoc Networks 3, pp. 325-349, 2005.

[12]. Gomez, J., A. T. Campbell, M. Naghshineh and C. Bisdikian, ―Conserving Transmission Power in Wireless Ad Hoc Networks‖ 2001.

[13]. J. Zhao, R. Govindan, Understanding packet delivery performance in dense wireless sensor networks, in: Proceedings of the First International Conference on Embedded Networked Sensor Systems (Sensys), Los Angeles, CA, 2003.

[14]. Man wah Chiang, Zeljko Zilic, Katarzyna Redecka and Jean Samuel Chenard ―Architecture of Increased Availability Wireless Sensor Network Nodes”, IEEE, Vol.2.pp 1232-1240, Feb 2004.

[15]. Michael Broxton, Josh Lifton, Joe Paradiso, “Localizing a Sensor Network via Collaborative Processing of Global Stimuli‖ IEEE, pp 321-332, 2005.