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A Survey on Wireless Sensor Network Based on Sensor Localization Techniques and WSNGA

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Abstract — A sensor localization primarily based techniques using wireless device network and WSNGA .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 received signal strength, time of arrival, and time difference of arrival and angle of arrival. During this paper, we tend to specialize in localization techniques supported angle of arrival info between neighbor nodes. a replacement propose technique WSNGA device localization A wireless device network using device Localization primarily based Techniques wireless device 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. Receptive wireless device network techniques received signal strength and angle of arrival primarily based localization technique for WSN .A purposed algorithm as a WSNGA for wireless device network genetic algorithmic program localization is proposed during this paper to solve the problem that the positioning accuracy is low with minimum anchor nodes. thus during this paper we tend to are presenting a Genetic algorithmic program for optimization approach that tries to seek out the optimum location by satisfying each the factors with stripped error. Find the optimum location by satisfying each the factors with minimal error and optimum solution.

Keyword — Wireless device network, Genetic algorithm, WSNGA

1. Introduction

Wireless sensor network in sensor nodes are deployed in real geographical environment and observe some physical behaviors. WSNs have many analytical challenges. Sensors are small device in size, low cost accounting, and having low process capabilities. Due to the availability of such low energy cost sensors, microprocessor, and radio frequency circuitry for information transmission, there is a wide and rapid diffusion of wireless sensor network (WSN). Wireless sensor networks that consist of thousands of low-cost sensor nodes have been used in many promising applications such as health surveillance, battle field surveillance, and environmental monitoring. Localization is one of the most important subjects because the location information is typically useful for coverage, deployment, routing, location service, target tracking, and rescue [1].The emergence of Wireless Sensor Networks (WSNs) has facilitated our interaction with the physical environment. A WSN consists of a large number of distributed sensor nodes, which are generally inexpensive and resource constrained. The network is often configured such that the communication between the sensor nodes and the base stations requires multiple hops. Such a network topology can be traced back to the ancient defensive systems. Instead of using electronic sensors, in the past, beacon towers would send signals (e.g., beacon fires, flags, smoke and drums) upon the observation of enemy activity. The signals usually passed through several towers before reaching the command center. In contrast to this ancient system, modern WSNs require no or minimal human attendance. In many WSN applications, including monitoring and tracking, the data collected is meaningless without the positions of the corresponding sensor nodes. The positions can be discovered either by equipping each sensor nodes with a global positioning system (GPS) or by hand-placing the sensors. However, both are impractical for many WSN applications due to the expense in terms of cost and human effort. Another technique is to use a limited number of nodes that are aware of their positions (either from GPS or by being hand-placed). These nodes are referred to as beacons. The rest of the nodes are referred to as unknowns and utilize beacons' positions to localize themselves. Depending on the mechanisms used. Localization schemes can be classified into two categories:

1 Range-free or proximity-based: The range-free techniques can be divided into two main Categories
a: Fingerprinting
b: Hop Count

2Range-based: In range-based techniques several different types of measurements can be employed so that the position can be estimated, as described below.
a: Received Signal Strength (RSS)
b: The Time-Of-Arrival (Toa)
c: The Time-Difference-Of-Arrival (TDOA)
d: Frequency-Difference-Of-Arrival (FDOA)
e: The Angle-Of-Arrival (AOA)
f: Hybrid Measurements

While proximity-based schemes infer constraints on the proximity to the beacon nodes, range-based schemes rely on the range measurements (received signal strength (RSS), time of arrival (TOA), time difference of arrival (TDOA) and angle of arrival (AOA)) among the nodes. Most of the existing approaches fall into the second category [2]. In WSNs, sensor nodes are deployed in real geographical environment and observe some physical behaviors. WSNs have many analytical challenges. Sensors are small device in size, low cost accounting, and having low process capabilities. WSN's applications attracted great attention interest of researchers in recent years [2].

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2. Characteristics of WSN

The important characteristics of a typical WSN which differ it from other wireless ad-hoc networks can be summarized as below: Limited computational capacity, Limited energy resources. Limited memory capacity, frequently changing infrastructure as against adhoc, networks due to mobility. Problem in assigning and maintaining unique global, identification due to very large number of nodes present. Higher chances of failure of nodes due to harsh environment, and limited energy capacity. More densely placed nodes [3].

3.Applications

WSN applications can be classified into two categories: monitoring and tracking. Monitoring applications include indoor/outdoor environmental monitoring, Area Monitoring, Traffic Control System, health and wellness monitoring, power monitoring, inventory location monitoring, factory and process automation, and seismic and structural monitoring. Tracking applications include tracking objects, animals, humans, and vehicles. While there are many different applications, below we describe a few example applications that have been deployed and tested in the real environment.

4. Challenges of Wireless Sensor Network

In spite of the diverse applications, sensor networks pose a number of unique technical challenges due to the following factors: 1. Ad hoc deployment: Various sensor nodes are deployed in regions which have no infrastructure at all. A typical way of deployment of node in a forest would be tossing the sensor nodes from an aero-plane. In such a situation, it is up to the nodes to identify its distribution and connectivity. 2. Unattended operation: In most cases, once deployment takes place, sensor networks have no human intervention. Hence the nodes themselves are responsible for its reconfiguration in case of any changes takes place. 3. Untethered: There is only a finite source of energy present, which must be optimally used for processing and communication i.e. the sensor nodes are not connected to any energy source. An interesting fact is that communication dominates processing in energy consumption. Thus, in order to make efficient use of energy, communication should be minimized as much as possible. 4. Dynamic changes: It is necessary that a sensor network system be adaptable to changing connectivity (for e.g., due to addition of more nodes, failure of nodes etc.) and also in changing environmental conditions. Thus, unlike traditional networks, where the focus is mainly on maximizing channel throughput or minimizing node deployment, the major consideration needed in a sensor network is to extend the system lifetime and its robustness [4].

2. RELATED WORK

O. Gnawali et al. [5]. investigates WSN application development simplification and software reuse. The proposed architecture is tiered, consisting of motes in the lower tier and relatively unconstrained platform nodes in the upper tier. Tenet supports only 2 tiers and this limits its scalability, as it assumes that no processing is performed at the lower tier. EMMON extends this view to multi-tier and supports processing at each tier.

M. Rudafshani et al. [6]. Present a survey on localization methods for mobile wireless sensor networks (MWSNs). First, the authors provide a brief taxonomy of MWSNs, including the three different architectures of MWSNs, the differences between MWSNs and WSNs, and the advantages of adding mobility. The MWSN localization discussed is consists of three phases: 1) coordination, 2) measurement, and 3) position estimation. In the coordination phase, sensor nodes coordinate to initiate localization, including clock synchronization and the notification that the localization process is about to begin. In the second phase, the measurement techniques, e.g., the angle-of-arrival (AOA) and the time-difference-of-arrival (TDOA) methods are presented. The measurements obtained in the second phase can be used to determine the approximate position of the mobile target node based on localization algorithms, e.g., the Dead Reckoning, the maximum likelihood estimation (MLE) and the Sequential Bayesian estimation (SBE). To the best of our knowledge, the reference is the first survey focusing on MWSNs localization.

M. Rudafshani et al. [7]. An overview of localization techniques is presented for WSNs. The major localization techniques are classified into two categories: centralized and distributed based on where the computational effort is carried out. Based on the details of localization process, the advantages and limitations of each localization technique are discussed. In addition, future research directions and challenges are highlighted. This paper point out that the further study of localization technique should be adapted to the movement of sensor nodes since node mobility can heavily affect localization accuracy of targets. However, the localization techniques proposed for mobile sensor nodes are not discussed.

A. Kulaib et al. [8]. the distance-based localization techniques are surveyed for WSNs. It is impossible to present a complete review of every published algorithm. Therefore, ten representative distance-based localization algorithms that have diverse characteristics and methods are chosen and presented in detail . The authors outline a tiered classification mechanism in which the localization techniques are classified as distributed, distributed-centralized, or centralized. Generally, centralized localization algorithms produce better location estimates than distributed and distributed-centralized algorithms. However, much more energy is consumed in the centralized algorithms due to high communication overheads for packet transmission to the base station. Distributed-centralized localization algorithms are always used in cluster-based WSNs, which can produce more accurate location estimates than distributed algorithms without significantly increasing energy consumption or sacrificing scalability.

M. Presser et al. [9]. provided heterogeneous WSN solutions to enable context capture for ambient intelligence. Three classes of applications were investigated: (a) body sensor network applications, (b) WSNs applications with and (c) without localization. The network architecture comprises various possible instantiations of mesh WSNs connected via gateways to a core network, e.g., a cellular network. While three different instantiations were presented, this project does not provide a fully–implemented unified architecture and does not address scalability, as EMMON does

S. Krishnamurthy et al. [10] .Was one of the major efforts in the community to build an integrated WSN system for surveillance Its goal was to develop an operational self-organized WSN to provide surveillance with a sentry-based power management scheme, in order to achieve a minimum 3–6 month lifetime with current hardware. Although not directly related to EMMON scenarios, the energy-aware design methodology for large scale networks used has actually inspired part of our design

G.J. Yu et al. [11]. Range-based and range-free schemes are further divided into two sub-categories: fully schemes and hybrid schemes. That is fully-range-based, hybrid-range based, fully-range-free, and hybrid-range-free. It is pointed out that hybrid localization algorithms can achieve a better localization performance compared with fully localization ones. However, in hybrid localization algorithms, large computations are required to estimate locations and the time complexity of them is relatively high

M. Aruna et al. [12]. have presented a detailed survey on various localization techniques and path planning mechanism for the mobile beacon node in order to reduce the collinear problem and localization error and with less path length and localization time. Various results show that proposed trajectory has less localization error when compared to existing trajectory

A. Arora et al. [13]. fielded a 1000+ node WSN with an ad-hoc backbone network of 200+ 802.11-equipped devices, in a 1.3 km by 300 m remote area, for intrusion detection. This project organized the biggest WSN deployment to date and although it supports only a single application, its multi-tier network architecture is relevant to EMMON. However, the application targeted is quite different and a planned and regular topology makes the solutions adopted too specific

C. J. M. Liang et al. [14]. aims at using WSN for improving energy– efficiency in data centers with a working prototype system of almost 700 nodes. The most interesting aspect of RACNet is that it proposes a solution to maintain robust data collection trees rooted at the network's gateways. It builds upon the IEEE 802.15.4 protocol and includes an analysis of its co–existence with other technologies, such as Wi-Fi, sharing the same band. EMMON opts for a similar approach, but instead of implementing tokenbased communication among the nodes, it allows for a more structured network coordination of clusters of nodes, focusing on guaranteeing a given level of QoS.

M. I. Akbas et al. [15].proposed a localization algorithm for wireless networks with mobile sensor nodes and stationary actors. The proposed localization algorithm overcomes failure and high mobility of sensors node by a locality preserving approach complemented with an idea that benefits from the motion pattern of the sensors. The algorithm aims to retrieve location information at the actor nodes rather than the sensors and it adopts one-hop localization approach in order to address the limited lifetime of the WSAN. The accuracy of the proposed algorithm can be further improved with RSS or other measurement techniques at the expense of increased energy consumption.

S. K. Rout et al. [16]. A subsurface current mobility model is adopted and tailored according to the requirements of the scenario. The result presented through extensive simulations shown that the localization estimation can be realized using local multihop information. In overall, as the multi-hop chains are allowed to become longer, more positions can be estimated with the cost of lower accuracy. The selection of the maximum hop number is therefore an issue depending on the requirements of network

3. EXPECTED OUTCOME

A study new research in the field of wireless sensor networks and identifies various challenges in the field of following objective to work in the field .Find the optimum location by satisfying each the factors with minimal error and optimum solution**.**

4. CONCLUSION

In study on wireless sensor networks and localization for mobile wireless device networks. Localization in MWSNs 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 MWSN applications. Further work is required that targeted on dropping and run-time latency, maintaining positioning and find accuracy. But not good in data and also error full data and not effect.

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