

A Survey on Effective Data Transmission in Mobile Sensor Network

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Abstract— Wireless Sensor Networks (WSNs) provide a bridge between the real, physical and virtual worlds. It allows the ability to seem at the previously imperceptible at a fine resolution over large spatio-temporal scales. A problem with energy constrained positioning in WSN is that it locates the nodes by consuming the energy but here each node is communicating with respect to energy consumption and time constrained. In previous papers, the nodes estimates their position based on positional information exchanged between nodes using wireless communications. For positioning the nodes by consuming the energy here WMCL-B positioning algorithm used for local connectivity information to impose constraints on the position of a node. In this paper, we assume that every node is capable of fixed positioning algorithm i.e. Novel Positioning Algorithm (NPA) in which the nodes communicates properly and activates modules selectively for consuming energy and determining the velocity of the node.

IndexTerms— TOA (Time of Arrival), TDOA (Time Difference of Arrival), AOA (Angle of Arrival), VON (Velocity of Node).

I. INTRODUCTION

A wireless sensing element network (WSN) (sometimes known as a wireless sensing element and actor network (WSAN) of spatially distributed autonomous sensors to observe physical or environmental conditions, like temperature, sound, pressure, etc. and to hand and glove pass their information through the network to a main location. Wireless Sensor Networks (WSNs) are highly distributed networks of small, lightweight wireless nodes deployed in large numbers and monitors the environment or system by measuring physical parameters such as temperature, pressure and humidity. In fig: 1 we are showing the Wireless Sensor Networks (WSNs) where we are representing all the active nodes. A Wireless Sensor Network [1] is a self-configuring network of small sensor nodes communicating among themselves using radio signals, and deployed in quantity to sense, monitor and understand the physical world. It allows the ability to observe the previously unobservable at a fine resolution over large spatio-temporal scales. This algorithm used in various applications like cell Identification, terrestrial signal triangulation, satellite navigation, angle of arrival.

There have been several papers on the energy cost of positioning in different types of wireless networks. Here used various predictive mobility models and computed the frequency of positional required maintaining a maximum positional error.

Our work is most similar to [2], in that it uses a positioning algorithm i.e. Novel Positioning Algorithm (NPA) to estimate the position of the available nodes. However, this paper differs from E. Doukhmitch, M. Salamah [2], in which three most commonly used techniques are: Time of Arrival (TOA), Time Difference of Arrival (TDOA) and Angle of Arrival (AOA).



Fig 1: Active Nodes

The models which are used to study the tradeoff between energy uses, positional error and protocol. The rest of the paper is organized as follows: Section 2 reviews problem statement that describes Lack of accuracy [3], Distance and speed and no network behavior performance factor. Section 3 presents the proposed methodology in which we are going to use Novel Positioning Algorithm (NPA) for finding the position of the node. Section 4 presents the result and discussion of the paper in which four

parameters are to be taken: End to End packet delay, Packet delivery ratio, Energy conservation and Low latency. Section 5 describes the conclusion of the paper.

Effective Data Transmission-Effective data transmission [8, 9], is that in which if node to node communication is going on then the error must be less. Fig. 2 it is shown that with the aid of computer programs, the analysis of traffic passing through all the nodes in the network can be done and statistical information obtained and preliminary analysis of the workload on the communication channels can be carried out.

Here if we activate every node at a time then it will consume more and more energy and during the communication chances of error will much more increases. In this paper, we will activate only that node that wants to communicate and deactivates the respective nodes through which we can consume more and more energy. Here, we will be going to implement the routing algorithm i.e. Novel Positioning Algorithm (NPA) [4] between the nodes. For example, Fig 3: shows that the node which are communicating is the active nodes and the rest of the nodes are in sleep mode or the rest of the node are de-active nodes and communication will be done using routing protocol through which chances of error will be decreased.

II. PROBLEM IDENTIFICATION

3.1 Lack of accuracy- The lack of correct sensing element network specific radio models, and also the restricted experimental knowledge on actual link behavior, warrant additional investigation in this area. That means the sensor network didn't get the accurate position of the node so that for communication it will be going to difficult to communicate between them.

3.2 Distance and speed- Few factors like distance and speed has only been considered that means the concept of velocity is going to be added just to have an effective communication.

3.3 No network behavior performance factor - There square measure several factors that have an effect on your Wireless Networking Performance that square measure obsessed on varied inside the network itself from the technology of the devices used, the native setting the signals can travel through, the elemental physics behind wireless transmission and a lot of. a number of these cannot be avoided and measures should be taken to do to attenuate the negative have an effect on that these factors can wear the network performance however others will be resolved fully either though' instrumentality upgrading or sensible network designing. Various factors are:

- Network range and distance between devices
- Poorly deployed antennas
- Signal sharing

3.4 Absence of prediction model like Markov model - Markov model is the models that randomly change the position of the node and the future states solely on the current state and not on the sequence of events that preceded it.

3.5 Absence in use of intelligence techniques – Absence in use of intelligence technique means intrusion or interruption are going to be detected which means act of intruding of the condition of being intruded on.

III. METHODOLOGY

In previous papers, we have studied that several methods are used:

1. TOA (Time of Arrival)
2. TDOA (Time Difference of Arrival)
3. AOA (Angle of Arrival)
4. VON (Velocity of Node)

1. **TOA (Time of Arrival)** – Time of Arrival, means travel time of a radio signal from a single transmitter to a remote signal receiver.

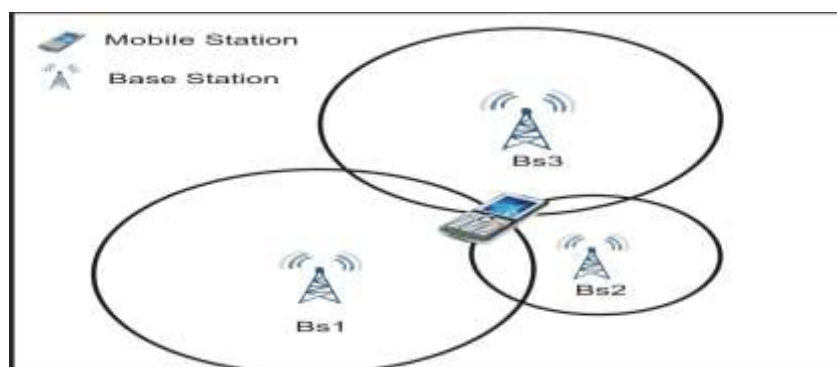


Fig 2: Time of Arrival (TOA)

2. **TDOA (Time Difference of Arrival)** – It is an electronic technique used in direction finding and navigation in which the time of arrival of a specific signal, at physically separate receiving stations with precisely synchronized time references are calculated.

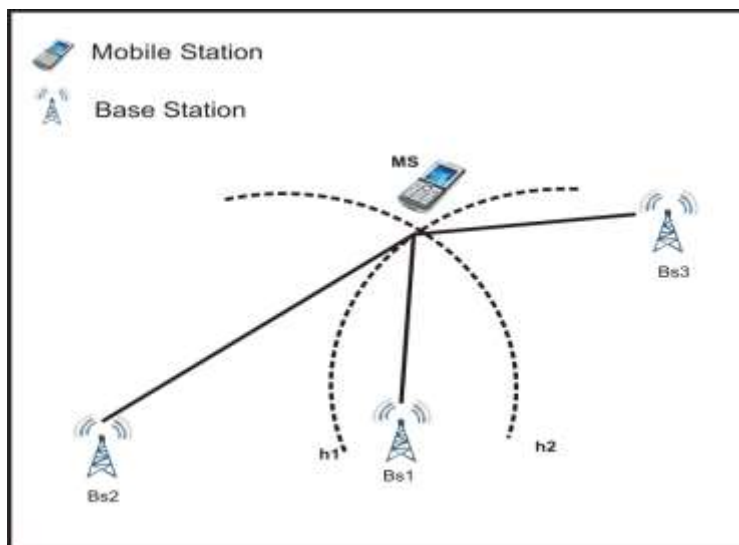


Fig 3: Time Difference of Arrival (TDOA)

3. **AOA (Angle of Arrival)** – Angle of Arrival is the radio wave analysis method which depends on Time Difference of Arrival (TDOA).

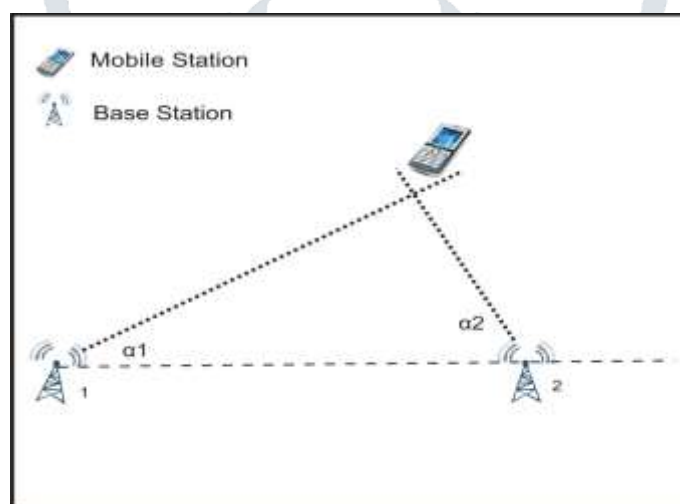


Fig 4: Angle of Arrival (AOA)

4. **VON (Velocity of Node)** - Velocity is the rate of change of the position of the node, the difference between the final and initial position of a node. Velocity is equivalent to a specification of its speed and direction of motion. If there is a change in speed, direction, or both, then the node has a changing velocity and is said to be undergoing acceleration. For example, 70 m/sec in north direction, which means the node, is moving in north direction with the speed of 70 m/sec.

Description of the flow diagram:-The flow diagram represents the working of the project in which there is three phases i.e. initialization phase, optimum node placement phase and deployment phase. In initialization phase, first it has judge the position of the mobile station and calculate the distance to node and check the transmission range of the node and if the node comes in the transmission range then it will start transmitting the packets and if the node is not in the transmission range then it will wait for the neighbor node. In optimum node placement phase, three techniques are used i.e. TOA (Time of Arrival), TDOA (Time Difference of Arrival) and AOA (Angle of Arrival). The TOA will calculate the time of arrival of the packet and then it will first find the parameters then find mobile station position by synchronous vector length incrementing and then calculate the intersection (x,y) by synchronous hyperbolic rotations and then connect to the base station. The TDOA will perform the Time Difference of Arrival of the packets from mobile station to the base station and also done the hyperbolas by shift operations and then it will also connect to the base station. The AOA will calculate the angle by which the packet has delivered to the base station. By applying all the four techniques i.e. TOA (Time of Arrival), TDOA (Time Difference of Arrival), AOA (Angle of Arrival) and VON (Velocity of Node) we can position the wireless node very effectively and efficiently.

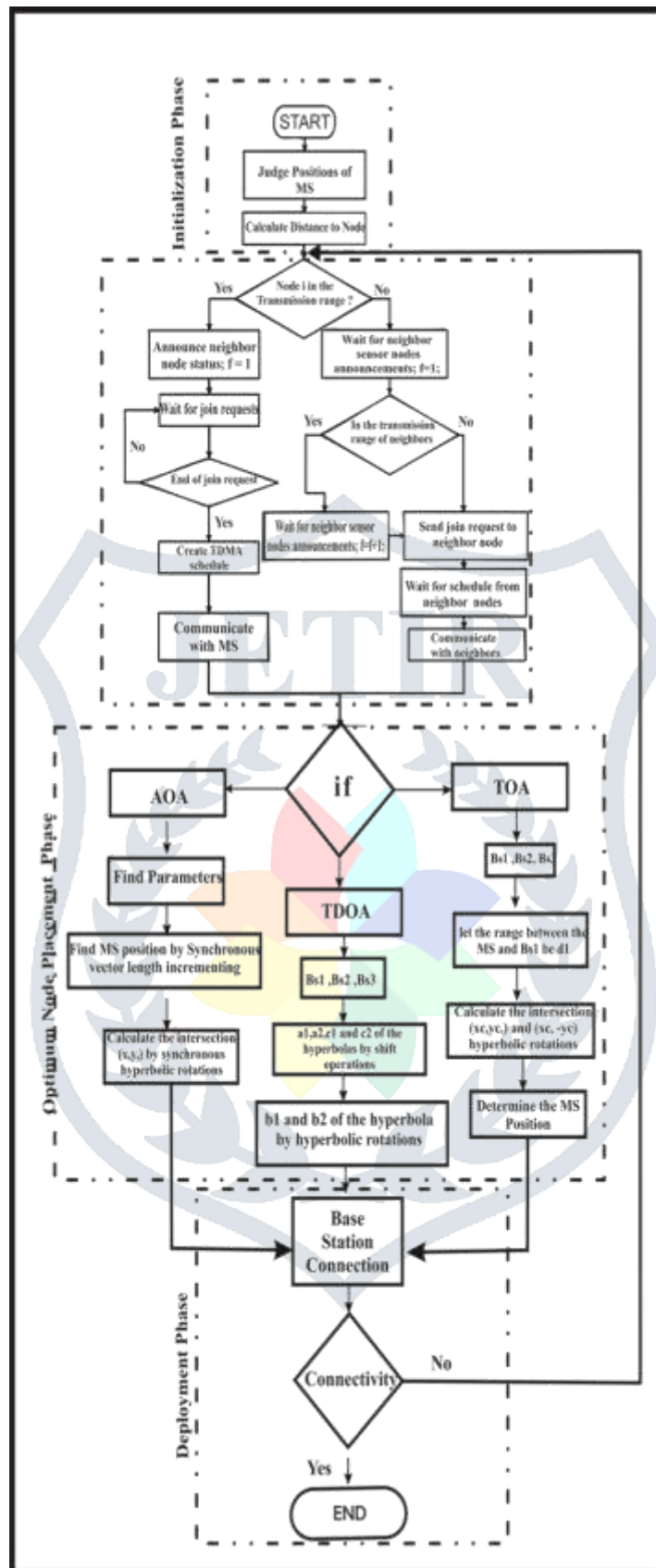


Fig 5: Flow Diagram of Methodology

IV. PARAMETERS USED

End To End Delay- Time taken for transmitting of packets through network from source to destination.
 For example- A circuit-switched network can guarantee a certain amount of end-to-end bandwidth for the duration of a call.

$$\Sigma (\text{arrive time} - \text{send time}) / \Sigma \text{Number of connections}$$

Packet Delivery Ratio- The ratio of the number of delivered data packet to the destination.

$$\Sigma \text{Number of packet receive} / \Sigma \text{Number of packet send}$$

Energy Conservation- Energy conservation refers to reducing energy consumption through using less of an energy service. Energy conservation differs from efficient energy use.

For example- In fig:3 for effective data transmission here it is going to be activate those nodes which will be going to communicate and the rest of the nodes are in the standby mode by which it is going to conserve the energy.

Low Latency-Low latency allows human-unnoticeable delays between an input being processed and the corresponding output providing real time characteristics.

V.CONCLUSION

The Effective Data Transmission is an important issue in Wireless Sensor Networks (WSNs). In this paper, the effective data transmission is used by estimating the position of nodes through positioning algorithm. This paper's objective is to present the major positioning techniques. This paper surveys some of the techniques in order from the year 2010 to 2014. The techniques considered in this paper are TOA (Time of Arrival), TDOA (Time Difference of Arrival), AOA (Angle of Arrival), Key Pre-Distribution, Shared Key Discovery Phase and Path Key Establishment, Proposed Efficient Power Aware Broadcasting Algorithm are used. The experimental result show that the methods TOA (Time of Arrival), TDOA (Time Difference of Arrival) and AOA (Angle of Arrival) with Novel Positioning Algorithm (NPA) gives better result for effective data transmission with energy consumption having Velocity of Node (VON) which is used for the finding the node speed and is our approach for better result.

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