A LOCATION BASED SCHEDULE RESOURCE ALLOCATION SCHEME FOR OFDMA TECHNIQUES IN WIRELESS SENSOR NETWORK

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Abstract:- Sensor networks are widely used in the large geographical area and this has to be finding the location of every transmission. The frequencies are considered the major persuasion in sensor networks. Frequency division multiple access (FDMA), time division multiple access (TDMA) and Code division multiple access techniques (CDMA) are used to share the available bandwidth, but these approaches are deviating the frequencies in a wireless communication system. The proposed system of this research described that why OFDMA are best than all other multiplexing techniques. Based on, how resources are used to allocate the bandwidth with narrow beam without subdivisions of the frequencies. The Schedule resources allocation scheme (SRAS) are allocated parallel to accessing data in the particular zone to avoid overlapping bandwidth and also increased the energy level for accessing quick data. Then finally it produces average time measurement in all multiplexing technique with weighted centroid Localization method.

Keywords: Wireless Sensor Networks, Localization, FDMA, CDMA, OFDMA, Schedule Resource allocation scheme

I. INTRODUCTION

The purpose of WSN node localization is to determine the appropriate positions of sensor nodes without knowing initial location information. The scenario of various multiplexing technique defined under the multipath environment with same frequencies and bandwidth, but in the case of all techniques of multiplexing in Mac protocol such as FDMA, CDMA and SDMA are used in narrow beam. In this case every technique are divided the frequencies and produce the lower bandwidth. The OFDMA is the best solution, even if we do not use any statistical techniques to identify the errors. The OFDMA should not divide the frequencies and produces the higher bandwidth. Cross-layer optimization for uplink transmission technique in OFDMA can be fully obtained such as reduction in power consumption and increase in service rate and energy savings in the uplink transmission of mobile stations [9]. Distributed time-frequency division multiple access protocol for wireless sensor networks scheme proposed the stability of the new protocol and estimate the delay until the balanced system state is reached [5].

The reliable and energy efficient Medium Access Control (MAC) Protocols design approach for wireless sensor network and to motivate the researcher, while showing the future aspects in the area of wireless sensor networks[11]. To improve energy efficiency in WSN through scheduling and routing specified that the sensor data in this application may be light intensity, temperature, pressure, humidity and their variations [10]. Hierarchical clustering in decentralized lifetime maximizing tree for data delivery in wireless sensor networks that will minimize the energy consumption, delay during data collection and reduce time complexity[2]. Minimizing interference in TDMA MAC Protocols for WSN operating in shadow-fading channels slot allocation based on channel probing Contention based protocols present some specific sources of inefficiency such as idle listening, collisions, message overhearing, and control packets overhead[7]. A Self localization scheme with relay nodes for mobile wireless sensor networks stated that the anchor node sends the positional information of the sensor nodes within its one-hop communication range to the sensor nodes using a received signal strength indicator (RSSI). A Review of OFDMA and Single-Carrier FDMA and some recent results that motivation for OFDMA in cable TV networks was related to the presence of narrowband interference which affects the uplink. Indeed, TDMA- and CDMA-based systems are very sensitive to this interference and they cannot operate when the interference level exceeds some threshold [6]. An uniformly minimum variance unbiased point estimator using fuzzy observations proposes a new method propose the make use of a uniformly minimum variance unbiased estimator and we develop this new method for a fuzzy random sample [4]. Uniformly Minimum Variance Unbiased Estimation of Gene Diversity developed a numerical re sampling based method for obtaining variances and confidence intervals based on the maximum likelihood [8].

Range free localization scheme in wireless sensor networks stated that the Sensors are identified with the same minimum hop counts pair to Sink X and Sink Y to form a zone, and the estimated location of each unknown sensor is adjusted according to its relative position in the zone. This scheme proposed that the accuracy, communication cost, and
computational complexity [3]. Resource allocation schemes in integrated heterogeneous wireless and mobile networks proposed that the two preemption based resource allocation schemes to support multiple traffic in an integrated heterogeneous wireless and mobile network [12]. A dynamic guaranteed time slots allocation scheme in wireless sensor networks stated that the predicted information to reserve resources and also improve the connectivity and system reliability in mobile wireless sensor [13][14]. Market-based resource allocation for distributed data processing in wireless sensor networks has shown the experimentally validated on a network of wireless sensing prototypes, where it is shown to be capable of Pareto optimally allocating scarce network resources. Then, it is applied to the real world problem of rupture detection in shipboard chilled water systems [1].

The entire follow of this paper is reminded as follows. Section 2 states the related works of multiplexing technique in Mac protocol. Section 3 describes the proposed approach the OFDMA receiver is used for obtaining the frequency in communication medium and also it specifies that the localization technique. In section 4 described that the Efficiency of OFDMA techniques in WSN is discussed. In section 5 describes the proposed algorithm of zone based scheduled resource allocation scheme for distributing the efficient bandwidth for fixing the high throughput value. In Section 6, simulation results are provided to analyze the OFDMA showing the best result than FDMA and CDMA. Finally, conclusion is drawn in section7.

II. RELATED WORKS

The related works of this paper described any kind of radio communications have adopted the solution of earlier multiplexing techniques. This technique can be classified as FDMA, CDMA and TDMA. The Frequency division multiple access(FDMA) technique were used in all applications, but in the case of frequency has been deviated in all the channels, The frequency is divided in all channels, because of the reason is the channel is split into several sub channels. Every communication channel also has the different frequency level. In this case the bandwidth performance is also getting delayed. The code division multiple access techniques (CDMA) are the three major access techniques used to share the available bandwidth in a wireless communication system. These two techniques can be grouped as narrow band and wide band systems, depending upon how the available bandwidth is allocated to the users. It is providing a very high tolerance to multi path delay spread, peak power clipping and channel noise. The time division multiple access (TDMA) technique is used for minimizing collisions[13]. It can be used to access the multi channel MAC protocols aim for load balancing via frequency division multiple access. Three these multiple access techniques are specified that each channel is accessed low bandwidth and difference frequencies. It assigns the fixed sending frequency to a transmission channel between a sender and a receiver for a certain amount of time.

III. PROPOSED APPROACH OF OFDMA

The orthogonal frequency division multiple access techniques (OFDMA) is a wide band wireless digital communication systems in general. OFDMA uses the spectrum much more efficiently by spacing the channels much closer together. This is achieved by making all the carriers orthogonal to one another. The proposed approach is defined with OFDMA in frequency channel without having to specify any error during the communication. In this case, how OFDMA is efficiently working in all carriers and how it produces the frequency level in all the nodes. When nodes are connected to every other neighboring nodes, the multiplexing technique can be used to communicate in all channels. At the time of overhead in the channels, the bandwidth is measured in terms of frequency. The signal strength is measured with FDMA in all communication channels, but it is dividing the frequency in certain kilometer distance. So in this scenario, the bandwidth of the frequency is very less and signal strength is getting very low at the time of communication. To overcome this situation, the OFDMA can be implemented and it gives the better result at least 80% of the bandwidth can be utilized fully in all nodes. With help of the OFDMA, the node can not be any interpretation during the data or voice transfer from source to destination in Wireless sensor nodes. So that every sensor nodes are diagnosing signal with appropriate antenna position, the frequency level is measured. If the frequency level is difference in every location, the time measurement can not be predict in all nodes. In this case the OFDMA is best approach, the frequency level cannot be broken and it can be used in straight line fashion of the communication. The advantage of the OFDMA technique is the frequency level is constant with same limit of the distribution in every location and also once the time and frequency are fixed and also it produces accurate solution to find the errors in all location in WSN. The Figure1 shows the overall WSN Model and how the data can be transferred dynamically from source to destination.

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The Figure 2 shows the nodes which identify the error using OFDMA technique. The simulation results can be shown in section 5.

**FIGURE 2. Errors Identification of nodes in WSN**

IV. EFFICIENCY OF OFDMA IN WSN

A clustered network topology and cooperation protocol is proposed to realize multi-hop long haul signal transmission. The effect of the cluster scale is studied thoroughly to obtain the optimal size of clusters subject to the cooperation overhead. Simulation results show that the proposed cooperation scheme can consistently reduce the transmission power with the increase of cooperation scale. Since the orthogonal frequency division multiplexing (OFDM) systems offer some overwhelming features:

1. The bandwidth is very less compare to all other multiplexing techniques
2. Robustness against the multipath channel, flexible resource allocations and high spectral efficiency, the OFDM scheme is being gradually applied in WSNs.
3. Due to the difference of channel conditions, distinct energy consumptions are occurred within sensor nodes.
4. Unfair energy usage can result in that excessive energies are consumed by some advantageous sensor nodes that minimize transmit power for OFDM under a WSN.

V. ZONE BASED SCHEDULE RESOURCE ALLOCATION SCHEME

The zone based schedule resource allocation scheme is used to find the resource in location wise. The sensor networks are clustered in every zone. Each sensor nodes are transmitting the data to its neighboring nodes. If the neighboring nodes are available for sending the data, then the sensor nodes are finding the signal position in every zone. If the signal strength is high in the particular location then the priority has been allocated to the appropriate zones. The Figure 3 shows the no of zones with no of nodes to communicate to its neighboring nodes. Every zone is communicated through the OFDMA bandwidth along with the SRAS scheme.

Let zones are classified as $Z_1, Z_2, Z_3, ..., Z_n$ and the sensor nodes are defined as $S_1, S_2, ..., S_n$. Every node in the zone transferred the data to the another sensor node in zone can be defined as $Z_1 S_1, Z_1 S_2$ to $Z_2 S_1$. So SRAS(s)={ $Z_1 S_1, Z_1 S_2; Z_2 S_1, Z_2 S_2$.} The cost for SRAS selection of nodes $S_1$ to reach the two-hop neighbor $S_2$ as the intermediate node ($Z → S_1 → S_2$); it is given by

$$C_{SARS} = C_{Z S_1 S_2} + C_{Z S_1 S_2} + \left( \frac{1}{E_{S_1}} \right)$$ (1)

Where $S_1, S_2, ..., S_n$ are the intermediate nodes on the path and $Z_1, Z_2, ..., Z_n$ are the zones with the cost of SRAS is $C$. The algorithm shows the process of resource allocation with scheduled time.

**Algorithm : Scheduled Resource Allocation Scheme**

**Step1:** If the band width are available in the Zone

Call neighboring nodes by network N1.

else Wait for the signal position in the zones

$Z_1, Z_2, ..., Z_n$

**Step 2:** If bandwidth is allocated with the time period then Call accepted by the network with highest bandwidth Resources $R_1, R_2, ..., R_n$ are allocated to transfer the data.

**Step3:** Start with an empty SARP set SARP(s) of node $S_i$. First identify those two-hop neighbor nodes in N2(s) which have only one neighbor in the one-hop neighbor set N(s). Add these nodes of N(s) to the SARP(s) if they are not already in SARP(s).

**Step 4:** Allocate the frequency $w$ in $i^{th}$ OFDMA multiplexing technique for defining bandwidth Add that node of N(s) in SARP(s) if it is not already in SARP(s).

else call enters into the queue

VI. SIMULATION RESULTS

The simulation results have done the variation of the frequency level has been compared with all other multiplexing techniques. The Figure 4 shows the capacity of the frequency in various levels of nodes. The Figure 3 shows that the no of nodes totally
measured as 30 and each node can be measured certain level of frequency between 0-10 with respect to bps/Hz. The OFDMA is given the higher bandwidth compare to other techniques like CDMA and FDMA. During the transmission the bandwidth can be measured 8.5, 9.0, and 9.5 with respect to FDMA, CDMA and OFDMA. The curve in the Figure 4 represents the upper layer of frequency in all nodes in OFDMA. The TABLE1 is pointed out that the no of nodes can be observed the frequency but in the bandwidth level is 9.5 with upper limit in OFDMA compare with all other frequencies.

The Figure 6 shows that time is varying in all multiplexing techniques with various frequency level measurements and also the time calculation is measured in terms of higher frequency with lowest time. The Figure 5 shows the OFDMA is performed the task with 0.2 minute. Once the frequency level and bandwidth is measured, then the average time is measured with the following weighted average centroid equation. This method is calculated based on the frequency and finally give the average time of all frequency during the data or voice transmission.

![Figure 4. Capacity of OFDMA frequency with other Multiplexing techniques](image)

**TABLE 1** The variation of frequency bandwidth in multiplexing techniques

<table>
<thead>
<tr>
<th>S.No</th>
<th>No of Nodes</th>
<th>Access Control</th>
<th>Capacity(bps/Hz)</th>
<th>Bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-30</td>
<td>FDMA</td>
<td>0-10</td>
<td>8.5</td>
</tr>
<tr>
<td>2</td>
<td>0-30</td>
<td>CDMA</td>
<td>0-10</td>
<td>9.0</td>
</tr>
<tr>
<td>3</td>
<td>0-30</td>
<td>OFDMA</td>
<td>0-10</td>
<td>9.5(Upper Limit)</td>
</tr>
</tbody>
</table>

![Figure 5. Error Residuals in Channels with OFDMA Technique](image)

![Figure 6. Time Measurement with frequency of all Multiplexing Techniques](image)

The Figure 7 shows that the average time of all multiplexing techniques with respect to the equation 1. If the time frequency level is more and the time measurement is very high, then the bandwidth of the communication channel is getting over headed. In this case the equation 2 is performed with all multiplexing technique and finally it produced the average time of OFDMA technique is 0.4 compared to FDMA and CDMA. So the Every resources are allocated the average time for communication with respect SRAS scheme. The SRAS scheme has been defined the average time 0.4 is less than the other multiplexing technique. The TABLE2 shows the raw data of all multiplexing access technique with respect to appropriate frequency and also it shows the average time of OFDMA, FDMA and CDMA. The OFDMA is very less average time than other techniques.

![Figure 7. Average Time of all Multiplexing Techniques](image)
CONCLUSIONS

This paper is mainly discussed about the survey of multiplexing access techniques. This proposed concept of this paper focused mainly reliable distribution of data. The result of analysis performed with SRAS scheme to identify the errors and the frequency level also measured with respect to OFDMA technique. The results are given Table 1. The various signal level is measured in terms of frequency and finally OFDMA is given the best frequency bandwidth in all nodes. The bandwidth of the node with OFDMA multiplexing technique is 9.5 with upper limit and also the error rate is 2.0. The average time of the OFDMA is also calculated with 0.4 seconds. From this utilization of the network, we can say that the orthogonal frequency multiple access technique is better in bandwidth characteristics than other techniques.

REFERENCES


