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Enhanced Protocol Based on Energy Consumption for WSN

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Abstract
WSN is wireless sensor network having wireless sensor node. Collects the data from the local environment. Collects the data and after the threshold of time send the data to the base station through cluster head. Various technique are used for localization of the nodes so that awareness about their location. So that for the consideration of the relay node to reach to the base station. Comparative analysis for various hierarchy based protocols on the basis for three parameters like number of dead nodes, life time of node, residual energy of each Node. Apteen has outperform the all three protocols. In enhanced Apteen we have mentioned the data selection based technique, which will aggregate the data rather than submitting all the data will submit only partial data. Because in a cluster the factor change will be minimal. So only few sensor node data will be transmitted to the cluster head and then to the base station. Will automatically save the energy and life time of the node. Also produces less no of dead nodes. For energy the enhanced Apteen has improve the results of 27%. For life time it has increased to 23%. And in dead node count it has increased to 50%.

Keywords: APTEEN,DAPTEEN,TEEN,EAPTEEN.

Introduction
Wireless Sensor Networks (WSN) is the innovation that comprises of expansive number of small sensor hubs disseminated in a specially appointed way.

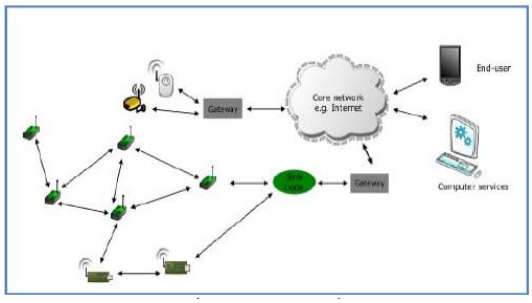

Fig. 1.1: Sensor Network

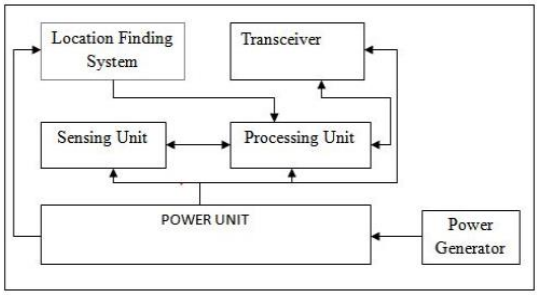

Fig. 1.2: Architecture of a Wireless Sensor Node

Nowadays, agriculture needs tools and technology to improve the efficiency and quality of production and reduce the environmental impact on the crop. The wireless sensor network is primarily used in precision agriculture. The precision agriculture deals with the application

the required quantity of water, fertilizer, pesticides etc at the required time in order to enhance improve quality and productivity, while ensuring zero damage to the environment.

TEEN

In TEEN, sensor nodes sense the medium continuously, but data transmission is done less frequently. A CH sensor sends its members a hard threshold, which is the threshold value of the sensed attribute, and a soft threshold, which is a small change in the value of the sensed attribute that triggers the node to switch on its transmitter and transmit.

APTEEN

APTEEN (Adaptive Periodic Threshold Sensitive Energy Efficient Sensor Network Protocol) is a change to TEEN to beat its deficiencies and goes for both catching intermittent information accumulations (LEACH) and responding to time discriminating occasions (TEEN). Subsequently, APTEEN is a crossover grouping based directing convention. APTEEN permits the sensor to send their sensed information intermittently and respond to any sudden change in the estimation of the sensed property by reporting the relating qualities to their CHs.

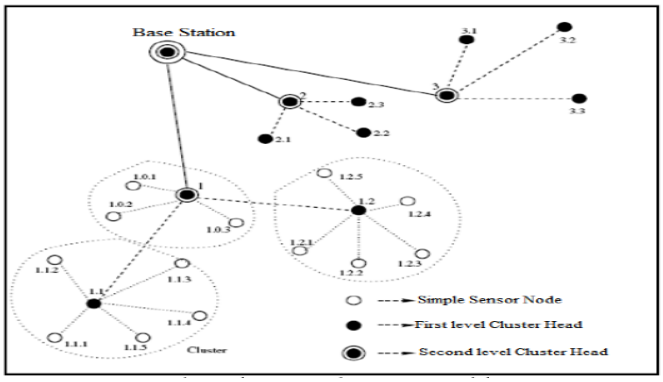

Fig. 1.3: DAPTEEN NETWORK

DAPTEEN

In DAPTEEN, data redundancy is removed by using adaptiveness measure on the basis of distance between nodes within a cluster. When the sensor nodes sense the data from their region; then first of all distance
between every two nodes is evaluated. As closer nodes senses the almost same data.
Therefore, among two nearer nodes on the basis of evaluated distance, only one node sends the data.

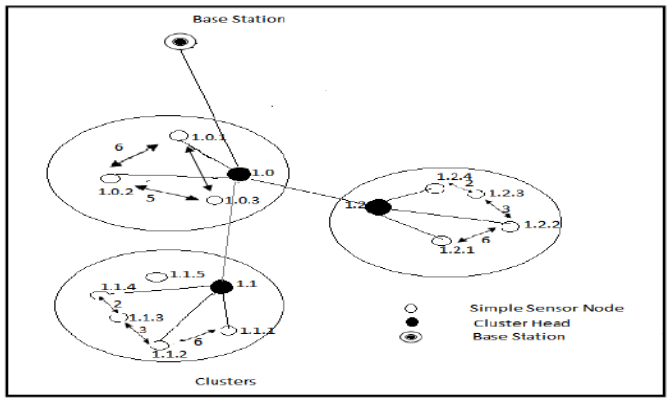

Fig. 1.4: DAPTEEN NETWORK

Related Work

Anjali (2015) Wireless sensors are small devices that have the functions of sensing, communicating, and information processing. The critical issue among Wireless Sensor Networks is energy efficient utilization of sensor nodes in order to enhance the network survivability. This paper proposes a protocol i.e. (Distance Adaptive Threshold Sensitive Energy Efficient Sensor Network) DAPTEEN based on Threshold-Sensitive Energy Efficient Sensor Network Protocol (TEEN) and Adaptive Periodic TEEN (APTEEN) hierarchical protocols for removing data redundancy and hence to enhance energy efficiency[1].S. Bhagyashree (2015) WSN to address precision agriculture problems in India. Since farming involves a vast area of land to be covered the deployment of sensor nodes includes a few barriers. Sensor nodes are battery powered and improvement of the lifetime of these nodes is important particularly when the nodes collect real time data and assist farmers towards proper cultivation. Here they propose a WSN protocol named APTEEN protocol that helps to increase network lifetime of the nodes by periodic monitoring of the sensor nodes and communicating the necessary parameters to the farmers for taking action [2].Xin Tan(2015) The wireless sensor networks can enable the real time monitoring in the pipeline environments, which can facilitate important applications such as structure identification and fault diagnosis. The magnetic induction (MI)-based techniques provide efficient and reliable wireless communications among sensor nodes in such challenging environments[3]. M. R. Ghafouri Fard (2015) Several control and monitoring solutions for commercial and industrial applications are introduced in the literature. Many of them use wireless networks or GSM cellular data to find the physical location of an object or a wireless node with respect to a reference point. A new line-of-sight technique for passive localization based on a transmitting multi frequency antenna array and a receiver. Objects equipped with an appropriate receiver are enabled to discover their location within a certain area dictated by the transmitted signal. Ravi chander Janapati(2015) Localization is one of the challenges in achieving reliable communication in Wireless Sensor Networks (WSN). Estimating a sensor's node's position is known as Localization. Nonlinear version of Kalman filtering is known as the Extended Kalman Filter which deals with the case governed by the nonlinear stochastic differential equations, Extended kalman filter is nonlinear filter having their own problem of consistency. In this paper proposed efficient localization algorithm that enables sensor nodes to estimate their location with high accuracy. The purpose of this paper is to develop the particle swarm optimization assisted Extended Kalman Filter (PSO-EKF) for Localization in WSN. Performance evaluation for the PSOEKF as compared to the conventional KF could be better for time critical applications[5]. Kai Yik Tey(2015) Localization is becoming increasingly important. It can be used in navigation, social media, and various economic activities. Outdoor localization is well established through the usage of GPS. However, indoor localization is still an active research area. Indoor localization has become increasingly important over the years as more people tend to spend time in indoors. It is possible to train a location's Wi-Fi data based on its density distribution [6]

Algorithm

Step1: Build a network for specific number of nodes working in the small area.

Step2: distribute the network in two level of hierarchy. At one level there is a communication in sensor node and the cluster head. On second level there is communication between cluster head and the base station.

Step3: data sends from sensor node to the cluster head rather than be transferred immediately will be aggregated at the cluster head. From the aggregated few data will be send to the base station.

Step4: evaluate the energy and life time of the nodes.

Step5: compare it will the Apteen.

Flowchart

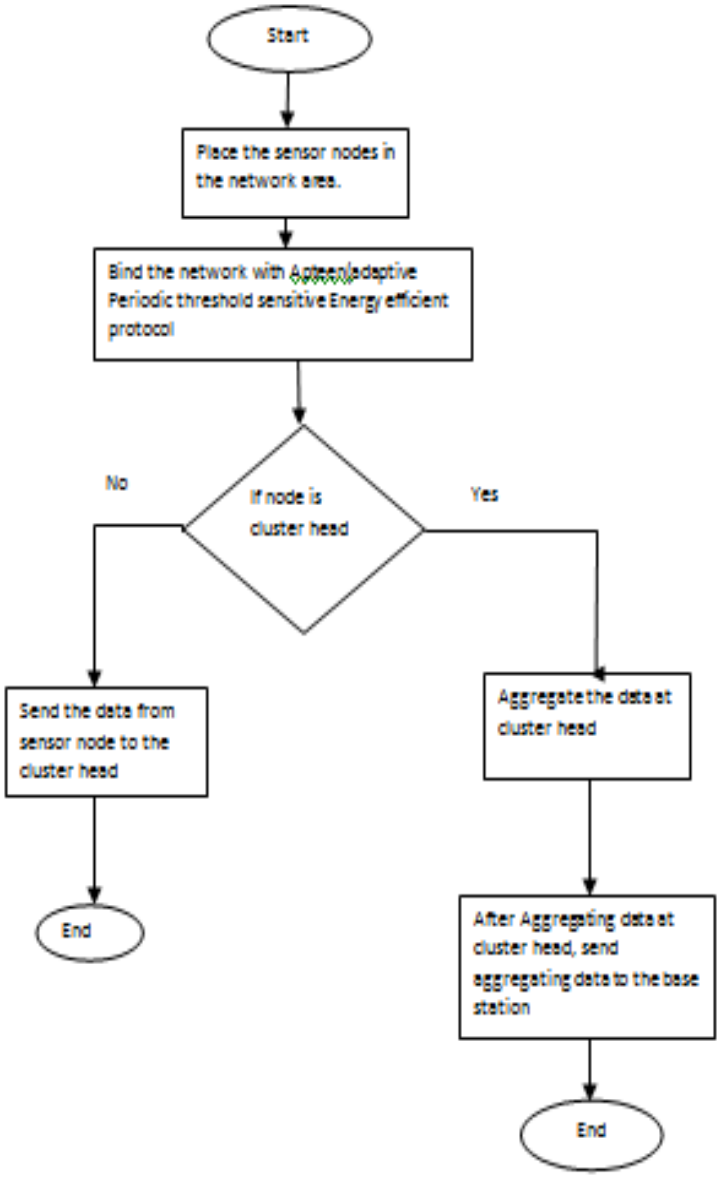

Fig. 1.5: Flowchart

Result and Discussion

In this project the three protocols like TEEN,APTEEN,DAPTEEN has been compared. These are clustering based energy efficient algorithms. As one is better than the other in one or other aspect. Now issue is to develop the algorithm such that we can compare the three protocols on different aspects like energy and second is number of dead nodes.

As these are implemented over matlab.

Network Configuration

```
xm=100;
ym=100;
InitEn=0.5;
sink.x=1.5*xm;
sink.y=0.5*ym;
Elec=50 * 10^(-9);
Eamp=100*10^(-12);
n=200;
AreaR = 100 ;
p=0.2;
TDMA=1;
Eo=0.1;
ETX=50*0.000000001;
ERX=50*0.000000001;
Efs=10*0.000000000001;
Emp=0.0013*0.000000000001;
EDA=5*0.000000001;
```

```
h=100;
s=2;
sv=0;
tempi=50;
tempf=200;
```

Comparative Graph of Teen, Apteen, Dapteen

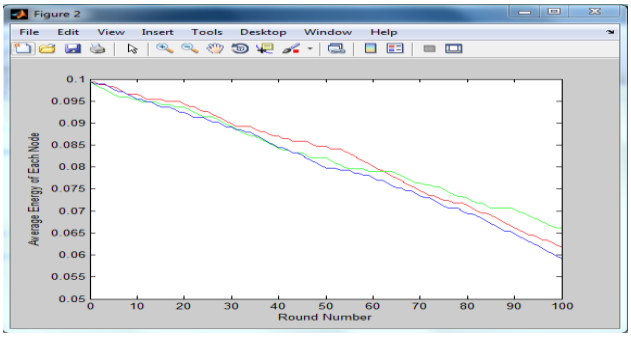

Fig. 1.6: Energy Comparative graph for Teen, Apteen, Dapteen

Energy Comparison of Apteen and Enhanced Apteen

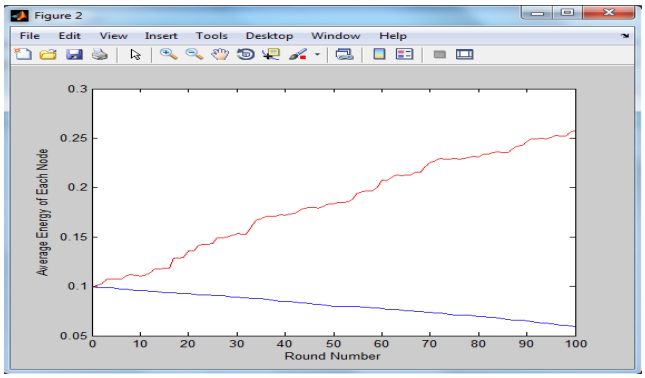

Fig. 1.7: Energy Comparative graph for Apteen and enhanced Apteen

Comparison Table of Residual energy for Hieratical Based Techniques

Energy for Teen	Energy for Apteen	Energy for Dapteen	Energy for Enhanced Apteen
0.062012	0.057969	0.053153	0.514678

Table 1.1

Comparison table of Remaining Life Time for Hieratical Based Techniques

Life Time for Teen	Life Time for Apteen	Life Time for Dapteen	Life Time for Enhanced Apteen
0.065646	0.060143	0.060146	0.474029

Table 1.2

Comparison table for dead node Count

Dead Node for Teen	Dead Node for Apteen	Dead node for Dapteen	Dead Node for Enhanced Apteen
2	2	12	1

Table 5.3

Percentage Improvement for Different Factors

For Energy	27%
For Life Time	23%
For Dead Node	50%

Table 5.4

Conclusion

In current research which is based on comparative analysis for various hierarchy based protocols. We have compared these protocols on the basis for three parameters like number of dead nodes, life time of node, residual energy of each Node. Apteen has outperform the all three protocols. In enhanced Apteen we have mentioned the data selection based technique, which will aggregate the data rather than submitting all the data will submit only partial data. Because in a cluster the factor change will be minimal. So only few sensor node data will be transmitted to the cluster head and then to the base station. Will automatically save the energy and life time of the node. Also produces less no of dead nodes. For energy the enhanced Apteen has improve the results of 27%. For life time it has increased to 23%. And in dead node count it has increased to 50%.

Future Work

In future this enhanced Apteen can be compared with location based protocol.

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