Efficiency Increase in WSN using Modified Multi-hop Routing Protocol Assisting IoT

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Abstract–a modified multi-hop routing protocol supported WSN and IoT. within which transmission range is that the main issue to resolve. By using multi-hop techniques, transmission range will be increased. together with transmission range this thesis also focuses on the parameters like energy consumption, delay. After analyzing the parameters the information are send to cloud with the assistance of internet. The result a part of this approach is demonstrated using SenseNuts platform, it's hardware-software platform, which consists of GUI and various sensor nodes, radio and gateway modules, within which parameters are verified by comparing with existing techniques i.e. MBR, LBR, AODV. By using modified approach we are going to improve the parameters. the information sending on cloud will done using Thingspeak software with the assistance of Wi-Fi module.

Keywords-Internet of Things (IoT), MBR, LBR, AODV. **1.**

1.INTRODUCTION

Wireless sensor network may be a willingly fast evolving area of research because it includes sizable amount of applications for various domestic and mission critical tasks and therefore the deployment of WSN isn't so expensive to line up. Wireless sensor networks (WSNs) have attracted a good range of disciplines where close interactions with the physical world are essential. Wireless sensor network have some limitations like energy consumption, delay, Transmission range, throughput etc. The computation in addition because the communication processes within a node consumes energy. The sensor capabilities of the sensor nodes are extremely tormented by the energy limitation. Transmission range is additionally one among the foremost issue of wireless sensor network. there's also problem of delay during transmission of information from source to destination. it's a good challenge for the real-time and reliability requirements. Hence efficient energy consumption techniques are required. The thesis presents comparison of Single hop Multi-hop routing protocol and analyzing them in terms of parameters like energy consumption, delay etc

Various existing routing approaches are shown within the thesis, that a number of them are efficient in controlling the energy consumption but at the identical time delay is high and in a number of transmission range is a difficulty, in single hop the space between source to sink is large so energy requirement is more and also packet also can be lost while travelling over longer distance.

Extensibility: Routing scheme used must deal with the multiple sensor nodes scattered in sensing region.

Energy Consumption: Energy of sensor nodes is very limited also has very limited storage capacities.

Application Specific: WSNs are application specific. The network designing is done for specific applications. The design requirements of a network change with its application.

Frequent Topology Change. There are various reasons due to which the Network topology changes frequently i.e. node failure, damage, addition, energy depletion, or channel fading.

No Global Identification: It is not possible to built a global addressing scheme, as there are large numbers of nodes in WSN.

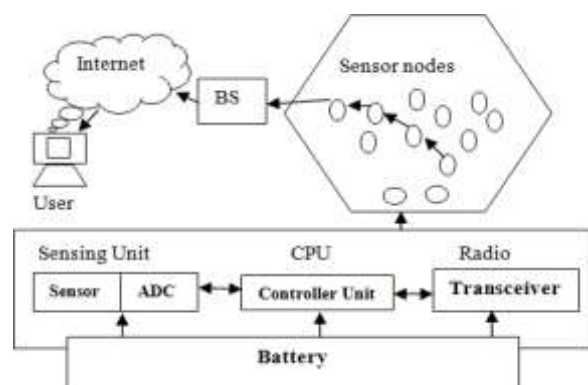It would introduce a high overhead for the identification maintenance

Figure. 1: Interconnection of wsn with IoT

2.RELATED WORK

This Paper on focuses on the parameters of WSN, and proposed to improve the parameters by using modified multi-hop routing protocol fand further this sensor data are carried forward to internet where it is stored and reviewed using cloud. The key goal is to overcome the limited range among the sensor nodes. The thesis comprises the study of various routing protocol and comparing the results of parameters like energy consumption, delay and transmission range.

The summarized and systematic approach of this paper are as follows:

➢ A Comparative analysis of various routing protocol for WSN environment.
➢ Optimization of energy consumption, delay and range increment of WSN using multi-hop approach.
➢ Cloud interfacing of proposed protocol and its performance analysis.

The simulation results environment is using the Sensenuts platform to display the data and parameter values on GUI and ThingSpeak cloud for storing the data values with the help of internet.

3.METHODOLOGY

The main aim this paper is to overcome the problems below shows Fig 3.1 the performance parameters MBR protocol in terms of energy and delay. The performance parameters are calculated using 10 no. of nodes.

Table3.1Performance parameters of MBR protocol

On the basis of parameters shown in Table.3.1, the delay vs. node id graph is plotted in fig. 4.1. Here the graph plotted is based on the arrangement of nodes chosen during simulation i.e. 7DBB, 7DC5, 0BD6, 0BD9, 0BF0, D0B4, 0B91, 7DDF, 0BC2, 0BDC. First node is 7DDB, second is 7DC5 and so on. The analysis is done for short range i.e. around 20 m, each node at approx 2m of distance. In MBR, the data transmission takes place in hop by hop manner like node1 forwards data to node 2, node 2 to node 3 and so on. We can observe from the graph, that delay is increasing with the node id as physical distance increases as node 0BDC shows the maximum delay. So, the delay depends on the physical distance as well as no. of packets received. Fig. 3.1 shows the energy consumption vs. node id graph. The energy consumption is calculated by adding etx and erx values of each node as shown in table 3.1. The energy consumed by each node depends on the no. of bits transmitted and received and also on the communication distance. So, each node shows different values for energy consumption.

4.RESULTS

The total energy consumption (T.E.C.) comparison of existing protocols with modified multi-hop routing protocol. On the basis of results shown in fig.4.14 and table 4.6, it was observed that the total energy consumption of proposed protocol reduced to 61 % when compared with existing MBR protocol. The total energy consumption recorded in MBR protocol was 4.73 J/bit.m^2 whereas in proposed protocol the total energy consumption is 1.81 J/bit.m^2.
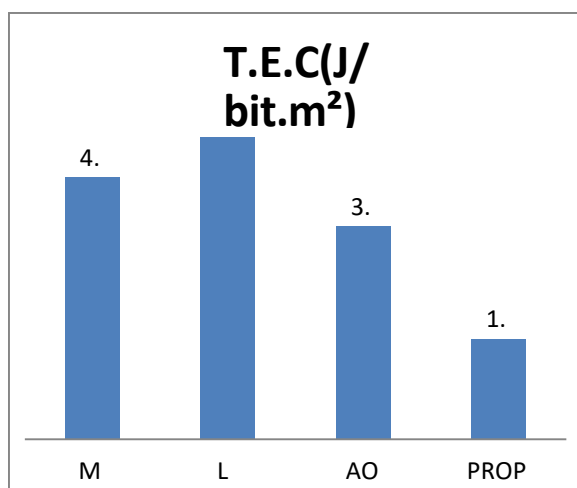
Fig4.1 **Fig. 4.18: T.E.C. comparison of existing protocols with proposed protocol**

The fig. 4.1 shows the overall comparative analysis of 3 existing protocol with proposed protocol in terms performance parameters. So, the overall performance of proposed protocol in terms of energy consumption and delay at range of 20m proves to be better as compared to existing protocols.
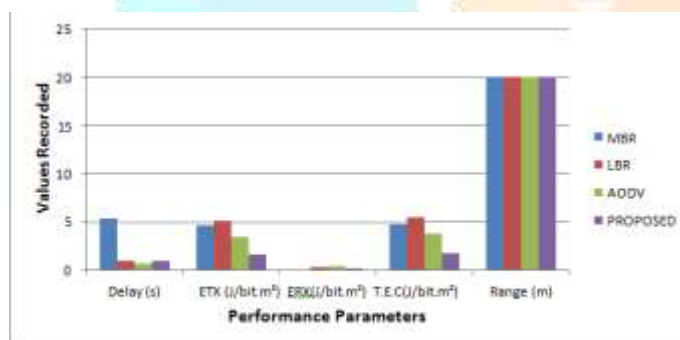

Fig. 4.1   Graphical representation of 3 existing protocol with proposed protocol

4.2 Results of sending and storing real time data on cloud

The Fig. 4.2 represents the real time light and temperature data on the cloud based on interfacing of sensors and cloud through Wi-Fi module. The monitored sensor data and its values are stored on the cloud with the date and time details. This monitoring is done using Thingspeak cloud with the help of Wi-Fi module. Here light intensity is measured in terms of Lux and temperature in terms of degree Celsius.

Field 1 shows the temperature data with respect to date and time. The date wise values of temperature are shown in the above result. Field 2 shows the light data with respect to date and time. The date wise values of light are shown in the above result. The above results were taken from cloud. We can store data date and time wise for future reference and with the help of this cloud we can share the information through Email, twitter etc.
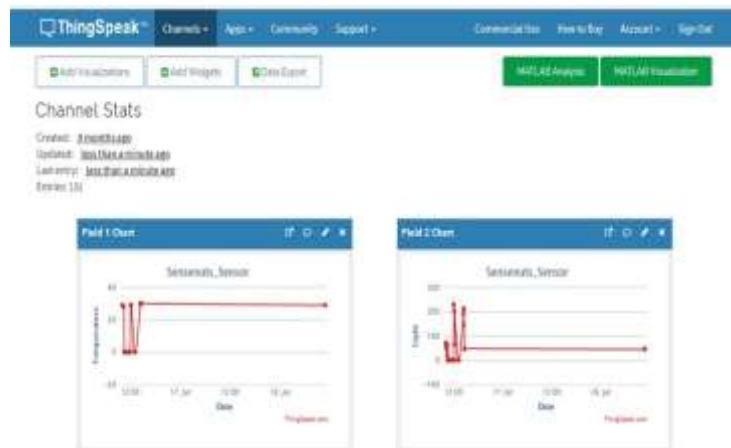
V. CONCLUSION

After putting rigorous efforts some of the important conclusions from protocols mentioned above were obtained based on energy consumption, delay and transmission range.In this experiment, we have used energy consumption model for energy analysis using modified multi-hop routing protocol, here results thus obtained establishes that modified approach played a fair enough role in terms of parameters.

Also on observing and comparing the parameter values of all the protocols (MBR, LBR, AODV, Modified) it is clearly seen that performance parameter for modified protocol i.e. total energy consumption is reduced drastically and delay is also improved for minimum range when compared with existing protocols at the same range.

Also here in the present research work, we have classified modified approach on the basis of two different power levels. Here after analyzing results at these power levels we can say that approach at -20 dBm is better in terms of energy consumption as energy is important factor for increasing network lifetime.

As per the results obtained, it was observed that, the delay at -20 dBm power is increased but this was at the cost of better energy consumption. The range of transmission is also increases from 8 meters to 90 meters using shorter no. of hops. Also in modified approach we have reduced the packet size and packet length. This implies that as the packet size and packet length decreased, our parameters gets better, on the other side range of transmission also increased with optimized energy consumption.

Thus for packet size 4, packet length 6 and power level -20dBm with modified approach we got better results in terms of energy consumption and transmission range.

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Ranjeet kumar dubey is a PG Scholar doing research in the Efficiency increase or performance enhancement of multi-Hop Routing Protocol to consumption of energy Delays we are using Wsn with the help of IoT. Interested in anomaly detection and MBR, LBR, AODV learning techniques. Completed her B.Tech in computer Science and Engineering.