Compression on Data Packets in Body Area Network

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Abstract **- In WBAN (wireless body area network) for better arrangement of sensor nodes and better and more data transmission among nodes determines the lifetime of network. The data losses during the data transmission if extra burden is put on nodes. In this paper we proposed model having advance nodes and smart node, and LZW compression techniques are applied on smart node and advance nodes, which transfers more data on less power consumption. The major benefit using compression on smart nodes and advance nodes is to increase the network lifetime by enhancing the throughput, by minimizing the path loss or data loss and maximum packet delivering to the sink from the nodes.**

Index Terms **- Body area network, smart node, sensor node, compression, LZW compression, forward node**

I.INTRODUCTION

Body area network (BAN), also known as a wireless body area network (WBAN) or a body sensor network (BSN), is a wireless network of wearable computing devices on human body. BAN devices may be embedded inside the body or implants or may be surface mounted on the body in a fixed position with some Wearable technology or may be accompanied devices which humans can carry in different positions, in clothes pockets, by hand or in various bags. The origin of WBAN was early started in 1975, after then number of wearable devices are developed and are used to monitor the activities on human body ranging from simple pulse monitoring to expensive sensors. A typical body area network kit will consist of sensors, a Processor, a transceiver, and a battery. Physiological sensors, such as ECG and SpO2sensors, have been developed [1][2]. Other sensors such as a blood pressure sensor, EEG sensor and a PDA for BSN interface are under development. The devices are used to detect some chronicle diseases like asthma, heart attack, blood pressure, diabetes etc. The function of these sensors is to monitor the human body activities by collecting particular data depending upon the node type, and then send the collected data to the sink. There is number of which are used in that body area network to accomplish monitoring activity by collecting different data at different stages. The goal of the protocols is to enhance the network life by enhancing the throughput, by minimizing the path loss or data loss, by maximum packet delivering to the sink. In this paper we proposed model having in this paper we proposed model having advance nodes and smart node, and LZW compression techniques are applied on smart node and advance nodes, which transfers more data on less power consumption. The major benefit using compression on smart nodes and advance nodes is to increase the network lifetime by enhancing the throughput, by minimizing the path loss or data loss and maximum packet delivering to the sink from the nodes.

The objectives of the work is,
To design and simulate the proposed approach for achieving the minimum energy consumption with minimum path loss and maximum network stability by relocating the position of forward node with respect to sensor nodes.
To transfer data based on minimum distance from forward node and cost-effective ness using LZW compression technique before sending data to base station.

II.RELATED WORK

Q. Nadeem [2] in their paper defines a new method for Body Area Network called SIMPLE (Stable increased-throughput Multi-hop protocol for link efficiency in wireless body area network). This paper purposes a cost function for the selection of Parent node or forward node,

$$C.F(i) = \frac{d(i)}{R.E(i)}$$

Where di is the distance from the Node i to Sink and R. Ei is Residual Energy of node i. The cost function

selects the Parent node which has higher residual energy and minimum energy. The protocol is designed to increase the stability of the network. The system model consists of eight nodes deployed on the human body; sink is placed at the center of the body. The two node (node1 ECG node) and Node2 called (glucose node) sends data direct to the sink and other nodes through the forward node then to the sink.

The different parameters calculated are throughput and

The working of this model is in phases:

In phase first the sink and sensor nodes location are defined in deployed network.

In second phase the selection of forwarder nodes based on cost function is done using the multilevel multihop scheme. Which divides the load among two forwarder nodes [1][2].

$$C.F(i) = \frac{d(i)}{R.E(i)}$$

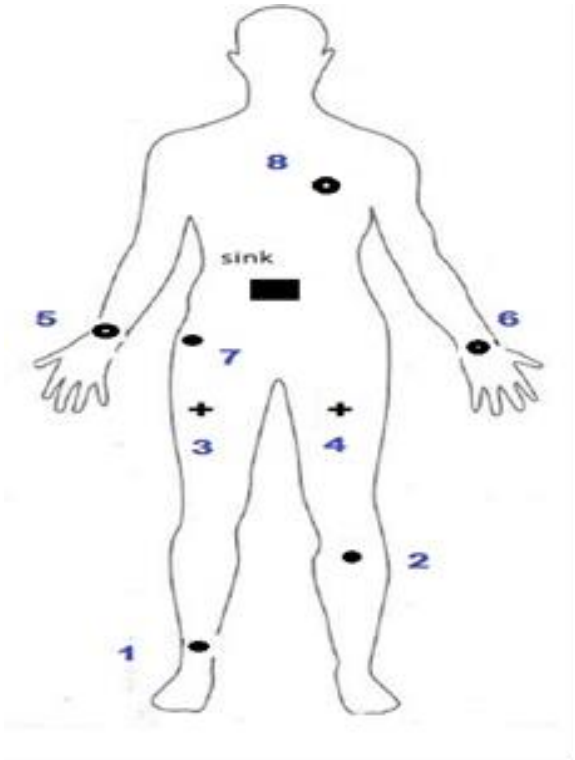

Figure 1. Deployment Model [1]

III. METHODOLOGY

The our proposed model is designed with 8 sensor nodes in a Heterogeneous mode and a sink which is deployed above the waist, nodes 1,2,3 and 4 are deployed at lower part of body and nodes 8(ECG node), 7(glucose node) at upper part of the body. Node 7 is Glucose node which are fixed and acts as smart node as shown in figure 2.

Nodes 1,2,3 and 4 are advance nodes, nodes 5 and 6 are normal nodes. Node 8 send direct data to sink and uses LZW compression on data before forwarding the data similarly node 7.

LZW Data compression which is used during the data transfer is a Technique used to reduce the number of bits required of particular information. The main function of data compression is to eliminate the redundancy in a data set which reduce its size[3].

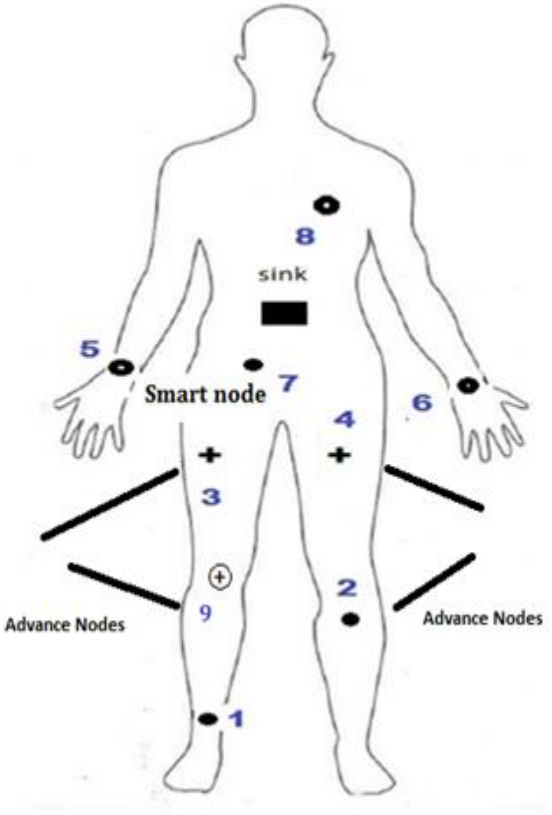

Figure 2. Proposed Deployment Model

In wireless body sensor networks LZW compression technique is used for compression of data packets of sensor nodes which improves the energy levels of sensor nodes by less utilization of energy and helps in transmission of more data in less energy. It also helps in selecting the cluster head which have efficient energy and increases lifetime of network.

The different performance parameters calculated to increase the performance of network are:

Network lifetime: This defines the time during till last node dies and keeps the nodes alive.

Throughput: To transfer all the data packets during communication without loss is another challenge for a protocol. This parameter defines the total number of packets delivered successfully.

Path loss: To keep the power of transmitting node and receiving node same is the key factor for any protocol, this defines the loss of the network power of transmitting and receiving node.

IV.RESULTS AND DISCUSSION

The implementation of this proposed method is done using MATLAB and is used as test bed to obtain the objectives of proposed work. The different parameters are calculated and are compared with previous technique as show in figures.

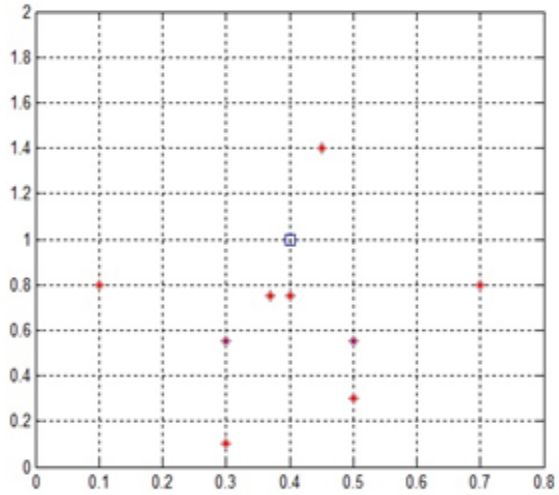

Figure 3. Network Model Layout

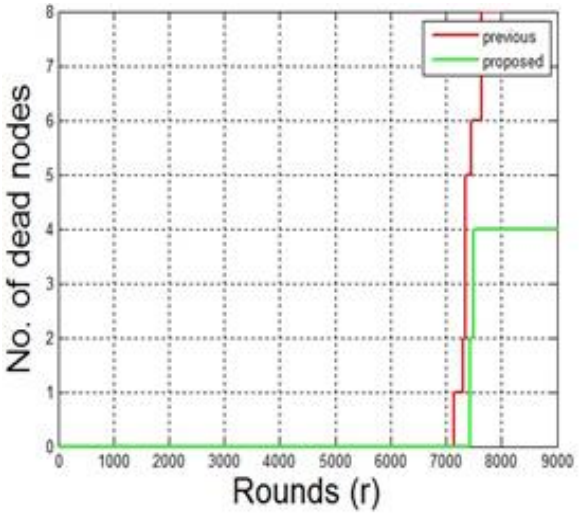

Figure 4. Analysis of Network Lifetime

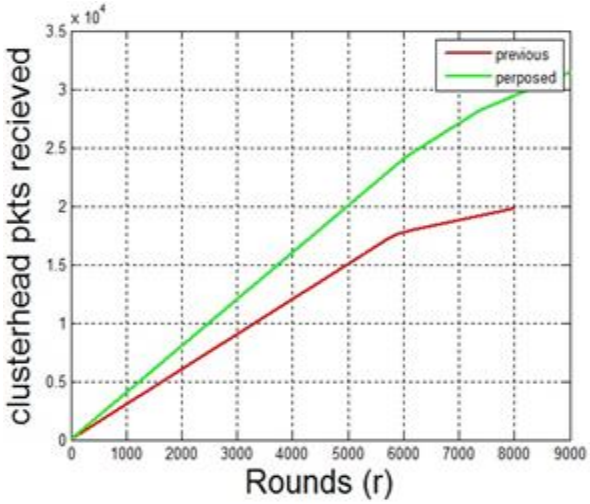

Figure 5. Analysis of Throughput

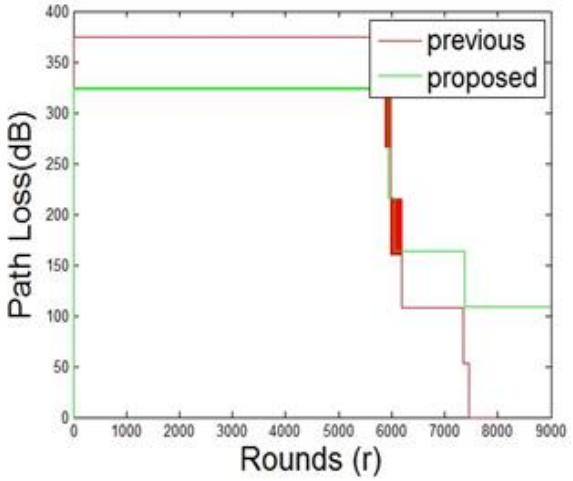

Figure 6. Analysis of Pathloss

V. CONCLUSION

By implementing the advance nodes and smart node, and LZW compression techniques on smart node and advance nodes helps transfers more data on less power consumption. The major benefit using compression on smart nodes and advance nodes increases the network lifetime by enhancing the throughput, by minimizing the path loss or data loss and maximum packet delivering to the sink from the nodes.

VI.ACKNOWLEDGMENT

The above contents and survey we mentioned is true to my knowledge.

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