EVALUATING THE PERFORMANCE OF GSTEB

Manpreet Kaur[1], Er. Varinderjit Kaur[2], Dr. Naveen Dhillon[3]
[1] P.G Student, Department Of CSE, RIET, Phagwara
[2]HOD, Department Of M.TECH CSE , RIET, Phagwara
[3]Principal Of RIET, Phagwara

Abstract--- **WSN is becoming key subject of research in computational basic principle because of its great deal of applications. General Self-Organized Tree-Based Energy-Balance routing protocol (GSTEB) constructs the redirecting or routing tree via a method by which, for every single circular or round, Base Station (BS) chooses the root node in addition to shows the following substitute for every node. The main objective associated with GSTEB is usually to boost network lifetime of several applications. GSTEB has shown fairly major success more than the available WSNs protocols. However the use of the three issues are completely ignored:- the effect of the mobile sink, compressive sensing - one can offer level wise clustering to enhance the results further. and the effect of the reactivity has been specifically ignored as the GSTEB can be proactive routing protocol.**

Index Terms--- **wireless sensor network, applications of WSN, LEACH, GSTEB**

I. WIRELESS SENSOR NETWORK

In Wireless Sensor Network, sensor nodes entire life's the absolute most important parameter. Quite a few research with these kinds of life span ext will be inspired by LEACH scheme, that by getting turning or rotating of cluster head role among the sensor nodes tries to help propagate the vitality utilization in excess of all nodes in the actual network. Collection of cluster head for such turning influences the vitality proficiency from the network. Distinct interaction standards and algorithms will be looked at to figure out ways to relieve power consumption. Through the co-operation of sensor nodes, the actual WSNs collect and give various types of information in regards to the checked ecosystem (e.g. heat, humidness, etc.) towards sink (base) node that processes the information and reports the item towards user [9].Wireless sensor networks have the following characteristics:

a) It gives two forms of nodes:
   1. Sensor nodes with modest energy can certainly sense the residual energy and get the equivalent structure;
   2. One Base Station (BS) without having vitality cap can be a long way on the region of sensor nodes.

b) All of sensor nodes really are immobile. They will use the direct transmission or multi-hop transmission to get in touch with a BS.
c) Sensor nodes sense surrounding with a hard and fast cost and will have data to transmit to the BS.
d) Sensor nodes can certainly change a transmission power of wireless transmitter in accordance with the distance.
e) Cluster head perform data aggregation and BS receives compressed data.
f) The lifespan of WSN is the total timeframe before the first sensor node runs out of power.

II. APPLICATIONS OF WSN

In WSN nodes may often be mailed in unmanned area. Furthermore a big measure of fields of WSN application like agriculture, property analysis, location keeping track of, health keeping track of, heavy producing keeping track of, as well as safety measures monitoring **[10]**.

a) Area monitoring
Spot noticing is definitely a regular using WSNs. With region keeping track of, the WSN is routed over a location where by many sensation is going to be observed. Military situation would be the utilization of sensors recognize foe dysfunction; an exclusive representation would be the geo-fencing connected with fuel or petrol pipelines. Region keeping track of is definitely nearly all sharp part.

b) Healthcare monitoring
The particular therapeutic uses might represent a pair of styles: wearable along with implanted. Wearable things are utilized on the body surface of a person's and also effectively in close up vicinity in the client. The implantable beneficial things are people who tend to be embedded within man body. There are various different applications too e.g. system location appraisal along with precise area individuals, typical looking at of sick affected individuals throughout doctor's features and also at homes. Body-range programs can certainly obtain information with regards to any singular's health and wellbeing, health and fitness, along with stamina use [11].

c) Air pollution monitoring

Wireless sensor systems possess nowadays been disseminated in several metropolitan neighborhoods (Stockholm, Manchester along with Brisbane) to help display screen the particular collecting of hazardous gasses regarding natives. These could exploit the particular specially appointed remote control contacts as opposed to feeling stimulated establishments, which also make them turn into additional easily transportable regarding examining measurements in different regions [12].

d) Forest fire detection

Something associated with Sensor Nodes may possibly be presented in a hardwoods to distinguish at whatever place the flare provides begun. The nodes may possibly be designed with sensors so that you can calibrate temps, stickiness in addition to gasses which can be manufactured by flare inside woods and also vegetation. Very early recognition is essential for just a practical task associated with the fire warriors; in consideration of Wireless Sensor Networks, the fire detachment can have the proportions to recognize at whatever place a hearth is commenced in addition to what it is covering.

e) Landslide detection

Any landslide detection method makes use of a wireless sensor network to acknowledge the actual moderate improvements associated with earth in addition to adjustments in a number of factors which may come about prior to and also interior of a strong avalanche By way of the data put together it might be imaginable to adopt in case there is avalanches much faster pc genuinely happens [13].

f) Water quality monitoring

Water good quality consists of analyzing water components inside dams, pathways, wetlands and seas, and also underground water saves. The consumption of varied distant published sensors empowers the development connected with a lot a lot more precise information connected with the water status, and enables the continuous firm connected with paying attention to stations in aspects of problematic admittance, without the need for handbook information recovery.

g) Natural disaster prevention

Wireless sensor networks can properly act to keep affects connected with typical fiascos, akin to surges. Remote nodes have proficiently ended up submitted streams the place alterations connected with the water levels should make sure progressively [14].

h) Machine health monitoring

Wireless sensor networks have finally ended up created for devices condition-based servicing (CBM) as they quite simply present essential expense reserve funds and encourage brand new usefulness. In wired frameworks, the adequately launching sensors are usually often constrained by simply the money necessary for wiring. Beforehand isolated regions, turning electronics, dangerous or even minimal areas, and extremely versatile resources could certainly be come together with distant or remote sensors.

i) Data logging

Wireless sensor networks might also be part of the range of data to get verifying associated with environmental data, this kind of is usually as fundamental because observing of temperature in the chiller to the stage water throughout flooding tanks throughout atomic force plants. The main priority associated with WSNs more than classic lumberjacks would be the "survive" data reinforce that is conceivable [15].

j) Water/Waste water monitoring

Monitoring the quality of item as well as measure of mineral water incorporates many exercises, one example is, verifying the character associated with undercover and also surface area mineral water as well as insuring the place's mineral water structure to get the key benefit from either people as well as creature.

k) Structural Health Monitoring

Wireless sensor networks could possibly be employed to screen the issue associated with popular structure as well as connected geo-physical techniques nearby continual, and over extended periods by way of data visiting, employing fittingly interfaced sensors [16].

III. EXPERIMENTAL RESULTS

The proposed compressive sensing based reactive GSTEB routing protocol and Proposed GSTEB for mobile sink shows better results than the existing technique as shown below:
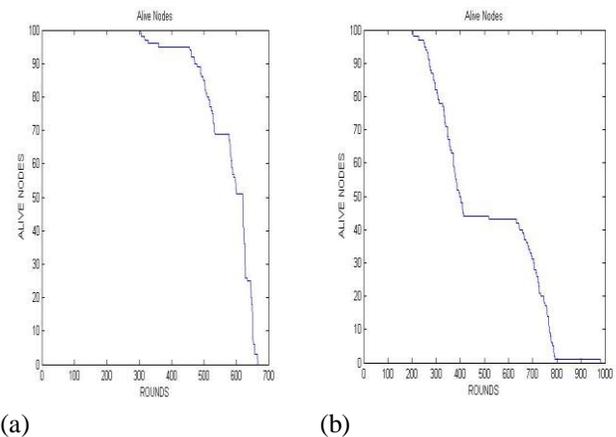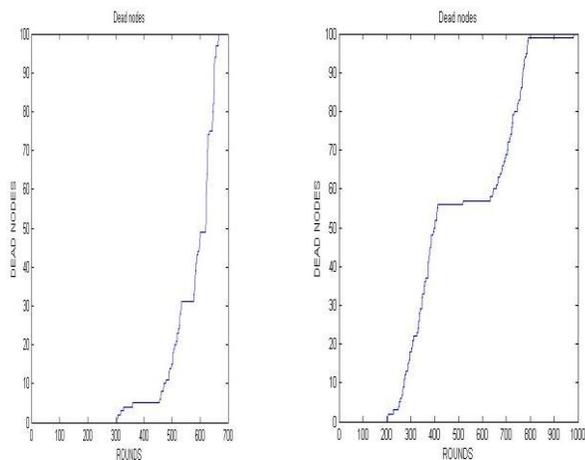

(a)   (b)

Figure 1. Alive Nodes

Figure 1 (a) is demonstrating alive nodes for proposed compressive sensing based reactive GSTEB routing protocol. Y-axis represents alive group of nodes and X-axis represents the number of rounds. And Figure 1 (b) is demonstrating alive nodes in proposed GSTEB for mobile sink. Y-axis represents alive group of nodes and X-axis represents the number of rounds.

(a)   (b)

Figure 2. Dead Nodes

Figure 2 (a) is expressing dead nodes in planned compressive sensing based reactive GSTEB routing protocol. Y-axis represents dead nodes together with X-axis shows the number of rounds. And Figure 2 (b) is expressing dead nodes in planned GSTEB intended for mobile sink. Y-axis represents dead nodes. X-axis shows the number of rounds.
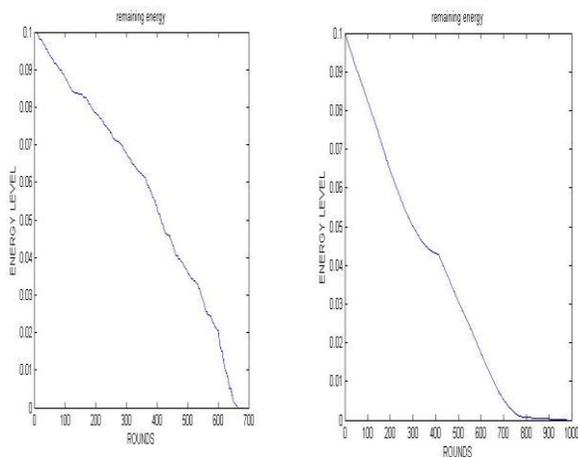
(a)   (b)

Figure 3. Average Remaining Energy

Figure 3 (a) is demonstrating the average remaining energy in proposed compressive sensing based reactive GSTEB routing protocol. X-axis is symbolizing the number of

rounds and also Y-axis is symbolizing the energy in joules. Figure 3 (b) is demonstrating the average remaining energy in proposed GSTEB for mobile sink. X-axis is symbolizing the quantity of rounds and also Y-axis is symbolizing the energy in joules.
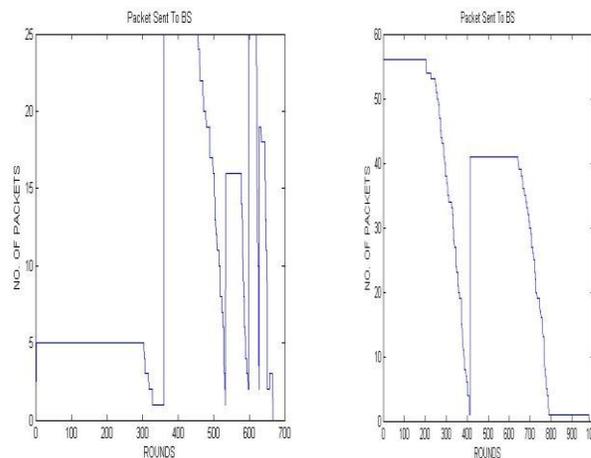
(a)   (b)

Figure 4. Packet Sent To BS

Figure 4 (a) is showing total number of packet sent to base station in proposed compressive sensing based reactive GSTEB routing protocol. Y-axis is representing number of packets. X-axis is representing the number of rounds. Figure 4 (b) is showing total number of packet sent to base station in proposed GSTEB for mobile sink. Y-axis is representing number of packets. X-axis is representing the number of rounds.

The proposed protocol is undoubtedly carried out using various performance parameters like First node dead time i.e. Stable period , Half node dead time, Last node dead time i.e. Network lifetime, Packets sent to base station (Throughput),Residual energy i.e. average remaining energy . As well as some sort of relative research usually are manifested in this chapter. This section provides the cross validation amongst existing and proposed techniques.

IV.   RESULT IN TABULAR

TABLE I: Residual Energy

Node	Existing	Proposed	Mobile Sink
100	18.925596	35.136646	50.994107
120	16.039157	35.433136	50.631454
140	14.656070	30.777258	32.622249
160	19.534072	26.200997	24.066798
180	18.467404	37.188664	39.235852
200	17.374610	33.155106	17.486370
220	16.680107	30.776184	23.376812

240	14.981422	32.657368	21.054157
260	14.552627	29.401711	17.379033
280	13.562011	27.937973	26.079025
300	12.471258	25.150053	20.183117
320	12.117258	26.982727	16.415131
340	11.531423	23.605893	16.617486
360	10.888318	23.602796	16.322609
380	10.824473	20.501246	16.369673
400	9.946840	19.669355	16.802835

Table I shows the comparison among Existing GSTEB, Proposed compressive sensing based reactive GSTEB routing protocol and Proposed GSTEB for mobile sink with respect to residual energy or average remaining energy. It clearly shows that in case of proposed the residual energy is more than the Existing GSTEB.

TABLE II: Packet Sent to BS

Node	Existing	Proposed	Mobile Sink
100	3137	4710	33615
120	5384	10317	38350
140	5341	13016	45581
160	5201	15429	51419
180	6392	12089	57723
200	7163	13259	63595
220	8200	18088	71188
240	10875	19887	76903
260	10921	22975	82646
280	12036	24687	89039
300	15535	24154	97823
320	15859	31014	104164
340	16318	29723	105873
360	17653	34778	118180
380	18484	37096	122434
400	20310	38113	127260

Table II demonstrate the comparison among Existing GSTEB, Proposed compressive sensing based reactive GSTEB routing protocol and Proposed GSTEB for mobile sink with respect to packets sent to BS. It clearly shows that in case of proposed the number packets sent to BS are more than the GSTEB.

V. ANALYSIS OF RESULTS

A) Residual Energy (Average Remaining Energy)

Figure 5 shows the comparison among Existing GSTEB, Proposed compressive sensing based reactive GSTEB routing protocol and Proposed GSTEB for mobile sink with respect to residual energy or average remaining energy.
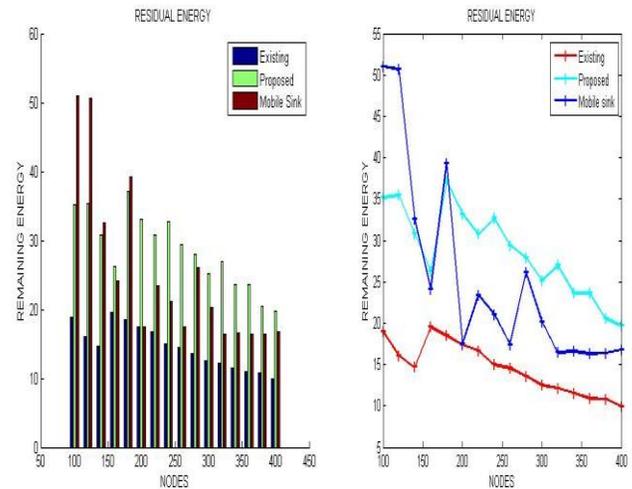

(a)   (b)

Figure 5. Residual Energy

It clearly demonstrate that residual energy in case of the proposed are more than the Existing GSTEB. It is confirmed that the proposed algorithm is comparatively better than the existing techniques.

B) Packets Sent to Base Station (Throughput)

Figure 6 exhibits the comparison among Existing GSTEB, Proposed compressive sensing based reactive GSTEB routing protocol and Proposed GSTEB for mobile sink with respect to packets sent to BS. It clearly reveals that the number packets sent to BS by sensor nodes in case of the proposed are more than the GSTEB. It is confirmed that the proposed algorithm is comparatively better than the existing techniques.
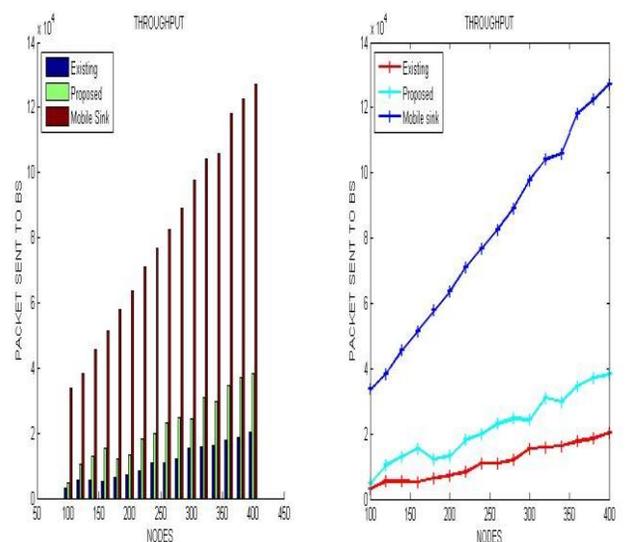
(a)   (b)

Figure 6. Packet Sent to BS

123

VI. CONCLUSION

GSTEB shows significant outcomes over possible WSNs protocols. Nevertheless it has ignored the use of three factors:- (a) The consequence of mobile sink has been overlooked through majority of present researchers (b) The compressive sensing or detecting has been overlooked, one can possibly offer level wise clustering to increase the final results further. (c) The consequence of reactivity has been overlooked because GSTEB is proactive protocol.

REFERENCES

[1] Liang, Weifa, and Yuzhen Liu. "Online data gathering for maximizing network lifetime in sensor networks." *Mobile Computing, IEEE Transactions on* 6.1 (2007): 2-11.

[2] Manzoor, Basit, et al. "Q-LEACH: A New Routing Protocol for WSNs." Procedia Computer Science 19 (2013): 926-931.

[3] Kumar, Dilip, Trilok C. Aseri, and R. B. Patel. "EEHC: Energy efficient heterogeneous clustered scheme for wireless sensor networks." Computer Communications 32.4 (2009): 662-667.

[4] Qureshi, T. N., Nadeem Javaid, A. H. Khan, Adeel Iqbal, E. Akhtar, and M. Ishfaq. "BEENISH: Balanced Energy Efficient Network Integrated Super Heterogeneous Protocol for Wireless Sensor Networks." *Procedia Computer Science* 19 (2013): 920-925.

[5] Han, Zhao, Jie Wu, Jie Zhang, Liefeng Liu, and Kaiyun Tian. "A General Self-Organized Tree-Based Energy-Balance Routing Protocol for Wireless Sensor Network." pp. 1-2, 2014.

[6] Jain, Aarti, and B. V. R. Reddy. "Optimal degree centrality based algorithm for cluster head selection in wireless sensor networks." in Recent Advances in Engineering and Computational Sciences (RAECS), pp. 1-6, 2014.

[7] Nitesh, Kumar, and Prasanta K. Jana. "Relay node placement algorithm in wireless sensor network." in IEEE International Advance Computing Conference (IACC), pp. 220-225, 2014

[8] Samanta, Moumita, and Indrajit Banerjee. "Optimal load distribution of cluster head in fault-tolerant wireless sensor network." in IEEE Students' Conference on Electrical, Electronics and Computer Science (SCEECS), pp. 1-7, 2014.

[9] Rani, Shalli, Jyoteesh Malhotra, and Rajneesh Talwar. "Energy efficient protocol for densely deployed homogeneous network." in International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT), pp. 292-298, 2014.

[10] Saxena, Madhvi, Neelam Phate, K. J. Mathai, and M. A. Rizvi. "Clustering Based Energy Efficient Algorithm Using Max-Heap Tree for MANET." in fourth IEEE International Conference on Communication Systems and Network Technologies (CSNT), pp. 123-127, 2014.

[11] Xu, Yingqi, and Wang-Chien Lee. "On localized prediction for power efficient object tracking in sensor networks." in 23rd IEEE International Conference on Distributed Computing Systems Workshops, pp. 434-439, 2003.

[12] Wirjawan, Ingwar, Joel Koshy, Raju Pandey, and Yann Ramin. "Balancing Computation and Communication Costs: The Case for Hybrid Execution in Sensor Networks." Proceedings of IEEE SECON'06, 2006.

[13] Younis, Ossama, and Sonia Fahmy. "Distributed clustering in ad-hoc sensor networks: A hybrid, energy-efficient approach." in INFOCOM 2004. 23rd Annual Joint Conference of the IEEE Computer and Communications Societies, vol. 1, 2004.

[14] Tahir, Muhammad, and Ronan Farrell. "Optimal communication-computation tradeoff for wireless multimedia sensor network lifetime maximization." in IEEE Wireless Communications and Networking Conference (WCNC 2009). pp. 1-6, 2009.