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An Effective Performance of Smart Sensor Network Using IOT

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Abstract: Wireless sensor networks (WSN) are used to monitor physical or environmental conditions like temperature, sound, pressure, etc. Due to the monitoring process, it requires more energy and power. But the major drawback is energy consumption and it is difficult to maintain the energy level of each sensor node. To overcome these issues, proposed a new algorithm called SSNC (smart sensor network Using Clustering approach). This approach helps to avoid the energy consumption by replacing the dead cluster head for efficient communication between the cluster members. And also scheduling process will be done through this algorithm. Experiment results analyse the performance of SSNC using network simulator version 2.35. Simulation parameters such as packet delivery ratio, control overhead, normalized routing overhead and delay have been analysed. This SSNC (smart sensor network Using Clustering approach) has increased the packet delivery ratio of 80% and reduces the routing overhead, control overhead and delay.

Keywords: Wireless Sensor Network (WSN), Sensor, SSNC, Cluster.

I.INTRODUCTION

The internet of things (IOT) is defined as the network of physical object or things it is enabled as an object or software, sensors, network connectivity. These are used to collect and exchange data. Objects are performed by sensing and remote controlled for existing network infrastructure.it will be created by direct integration between physical world and computer based system. The final results are efficiency improvement, accuracy, economic benefit. For example heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with build in sensors, DNA analysis devices for environmental/food/pathogen monitoring or field operation devices, fire fighters in rescue operations. These devices are collecting the useful data. Autonomously flow of data between other devices. Using RFID, the tagging of things achieved through the communication, bar codes, QR codes, Bluetooth, digital water marking technologies. Complementary technical developments provide capabilities. These capabilities are bridge the gap between virtual and physical world. That capabilities are as follows, communication and cooperation, addressability, identification, sensing, actuation, Embedded information processing, localization, user interfaces. A Wireless Sensor Network consists of many sensor nodes and base station. The number and type of sensor nodes and the type of protocols for any wireless sensor network is application specific. The wireless sensor data in this application may be light, humidity and their variation wireless sensor network is largely adopted for both home/office and industrial application. Wireless sensor network is made up of tiny sensors which are used for monitoring or sensing the data.

II.LITERATURE SURVEY

Zaveri et.al [1] discusses the collaborative service oriented smart grid technology. This helps to adopt the generation of power and proper utilization of power and distribution equally to all things in the internet. Futher leads to the environment, and energy saving and optimal resource of smart cities realization. Yassen et.al[2] it based on Low energy Adaptive Clustering Hierarchical routing protocol (LEACH).The most WSN problems are focused on its battery power limitation that motivates the Hierarchical routing protocol to be used. The hierarchical routing they used to reduce the network energy and it increased lifetime then used on security challenges. Martínez et.al [3] it's suggested that threats, challenges, attacks to detect.

Table 1: Comparison of related techniques

AUTHORS	PUBLISHINGYEAR	ISSUES	METHOD	OVERCOME
1.A.Flammini, E.Sisinni	2014	Trade-off between latency and life time	Cloud computing	Non linearity and improving noise immunity
2. Charith Perera,Arkady Zaslavsky,Peter Christen, Dimitrios Georgakopoulos ;	2014	Technological and economical issues	Xaas model;	Data fusion and filtering,security and privacy.
3. Mohamed Younis,Izzet F.Senturk,Kemal Akkaya,Sookyoung Lee,Faih Senel	2015	Node failure	Proactive and reactive method	Topology management techniques.
4.Fei Hu,Jim Ziobro,Jason Tillett,Neeraj K.Sharma	2014	Cryptographic algorithm	Secure routing, denial of service prevention	Pebbles net, hybrid key based protocol
5.Qingping Chi,Hairong Yan,Chuan Zhang,Zhibo Pang,Li Da Xu	2014	Relatively complex dedicated electronic boards	Interface sensor protocol	CPLD is a core controller can be used for restrication

The great challenges of maintain the security and privacy on mobile device. The main purpose to reach all over people using mobile and connected to IOD. Wagle et.al [4] this is based on Machine to Machine communication and to interface of network WLAN. Application of MQ Telemetry Transport (MQTT).To develops the Machine to Machine communication, data extraction and cloud computing services. Ahmed et.al [5] discusses the healthcare monitoring of heart attack.it most widely used for ECG patient.

Heart replacement the use node based smart intensive care unit. Then doctor to monitor the through internet on patient. Ojuroye et.a l [6] introduces the smart homes for safety and stability with the help of sensor network. Considering the cloud technology for commercial application and this technique will provide the data prediction for the network performance improvement. Aguirre et.al [7] presents the WSN and WLAN platform for android based applications. This techniques provide the scalable and stability conditions. Major drawback is this will be suitable for limited number of users. Suryadevara et.al [8] proposed the prototype for real time data which helps to adopt the IoT and big data analytics.

This wireless sensor network is mainly focus on the conceptual data model for correlating data stream. Boonsong et.al [9] discusses the smart power meter for monitoring the data in wireless sensor network. This was generated in real time application using embedded and RFID for multi hop communication. Lee et.al [10] suggests the mobeyes for vehicle sensor network. This will monitor the vehicles with different speeds. To manage the vehicle mobility in urban area is difficult task. That will be overcome mobeyes approach.

III.RESEARCH ISSUES

The major issues in wireless sensor network are listed below:

- Hardware and Operating System for WSN
- Wireless Radio Communication Characteristics
- Medium Access Schemes
- Deployment
- Localization
- Synchronization
- Calibration
- Network Layer

- Transport Layer
- Data Aggregation and Data Dissemination
- Database Centric and Querying
- Architecture
- Programming Models for Sensor Networks
- Middleware
- Quality of Service
- Security

By improving energy efficiency in wireless Sensor network through scheduling and routing. Any scheduling protocol will keep only a subset of nodes to be active state and keeping others in in-active or sleep mode. There are so many scheduling protocols are available .for the WSN should use narrow band modulation techniques .the TDMA based the node to be in inactive mode. The TDMA based protocols are designed for only short path communication When the scheduling algorithm is implemented it gives a good improvement in the reduction of time delay as well as overall energy consumption.it helps to reduce energy consumption by reducing number of times a node has to wake up during a time slot to be in a active mode the time delay also used.

IV.METHODOLOGY

This algorithm helps to improve the energy efficiency in wireless sensor networks through scheduling and routing. A wireless sensor network consists of many sensor nodes and a base station. The number and the type of data for any wireless sensor network is application specific. The sensor data may be temperature, humidity, pressure and their variations. For a routing technique in wireless sensor networks provide power management and power dissipation. We present a survey of state of the art routing technique in survey of different routing technique. We also get the energy tradeoff based coherent system. Also get advantages and performance of routing technique. If the number of nodes are connected in distributed form the node can be divided into many groups. Each group assigned many nodes, which nodes has high power is can be called as a clustering head. Clustering head which is always active for sensing the unwanted node if the node is coming it can give the alert of other clustering member of group. Then the clustering member will not receive the signal. Other members should be in inactive position. Suppose clustering head is fail other high power node can be take the position of clustering head. In case of two members have a same power then we find the shortest distance of clustering member.

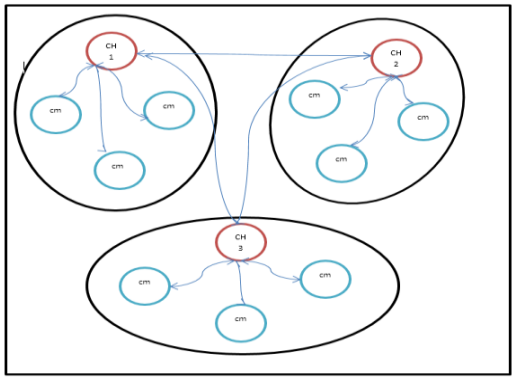

Figure 1. SSNI Architecture

Figure 1: shows that CH (CLUSTER HEAD) to transfer the data through CM (CLUSTERMEMBER).CH to form one of CM.CH (CLUSTER HEAD) does not allow the any detected data to CM.CLUSTER HEAD is detected or dead to form one CM act asCH.CM is selected for that data transfer distance is minimum and low power to maintain node is select the CH (CLUSTER HEAD). Fig shows that CH is the cluster head which is connected with multiple CM (cluster members).cluster member of one cluster can able to communicate with its cluster head only but the communication between each of the cluster head is possible. To improve the network lifetime, require large number of sensor nodes are used in network management. It has the Capable of sensing data and transferring data to the base station. CLUSTER is used to divide sensor nodes as several groups. Cluster information required in certain region with network topology. Cluster head is elected to availability of nodes with in the cluster. Cluster is the one head to act as the leader and responsible to gather data from all nodes. Then promote into base station. Enhanced cluster performance based on using multiple cluster head to maximum battery efficiency and prolongs the life time of network. Our proposal is to reduce the task of cluster head by transaction of data with another cluster head and maximize battery life time.

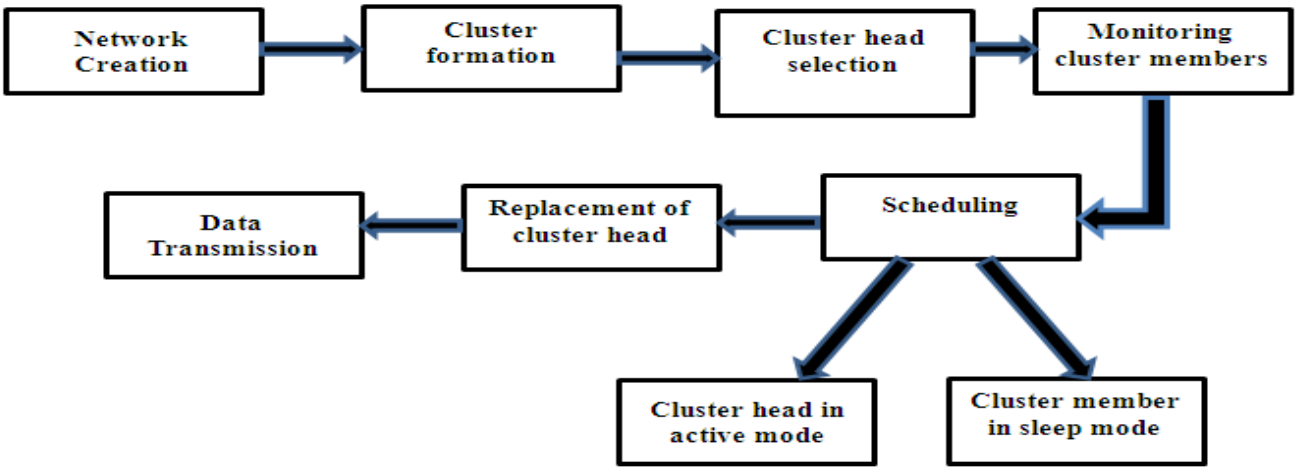

Figure2. Blockdiagram

Figure 2 shows that to create the network and forming the cluster and selecting the cluster head in a cluster family. To monitoring the cluster member to identified the nodes for transmitting or not to received signal. For scheduling the nodes .when the cluster head in active mode at the same time cluster member in sleep mode suppose cluster head is fails when continue the process we can choosing the cluster head .when the cluster member is high power it is a cluster head. In case when the cluster member has same power then we take a short distance path then the data was transmitted.

A. ALGORIHM

- Create the Network
- Cluster Formation
- Cluster Head Selection
- Monitoring cluster member
- Scheduling
  - Cluster head in active mode
  - Cluster member in sleep mode
- Cluster head replacement
- Data transmission

This algorithm states that the formation of a network by using clustering technique. Each clusters comprises of a cluster head (CH) and two or more cluster members (CM).

Cluster head monitors the cluster members after the existing of cluster head, one of the cluster members are made as cluster head by using scheduling method then the data transmission is done through the new cluster head.

V. RESULTS & DISCUSSIONS

Network Architecture is the design of a communication network. It is a framework for the specification of a network's physical components and their functional organisation and configuration, its operational principles and procedures, as well as data formats use.

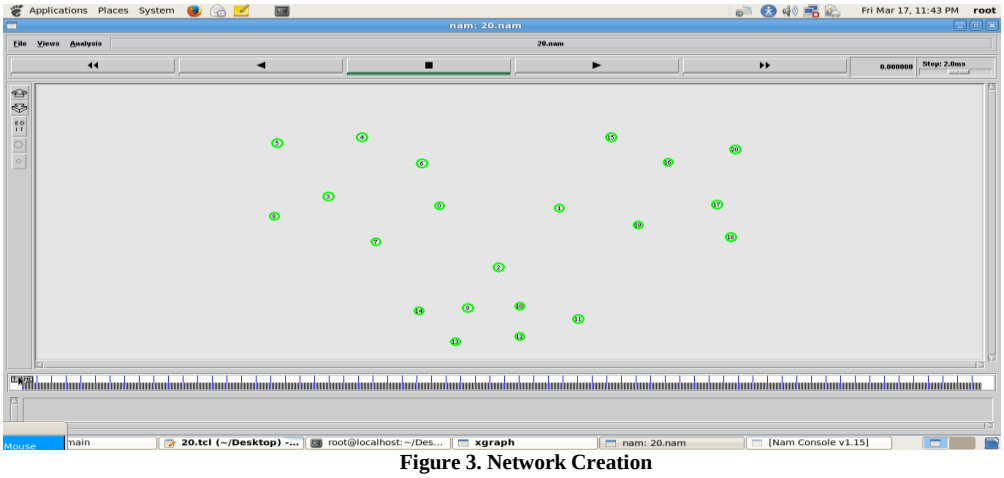

Figure 3. Network Creation

Figure 3 shows that network creation of 20 nodes. Let as consider S is source node and D is destination node. Source to the destination node is linked with other nodes. RTS (Request to send) and CTS (Clear to send) is transmitted to all of 20 nodes.

A sensor node it is responsible for collecting data from member nodes inside the cluster .it is also responsible for aggregating and delivering data to base station. The role of cluster head usually rotates between nodes in the cluster.

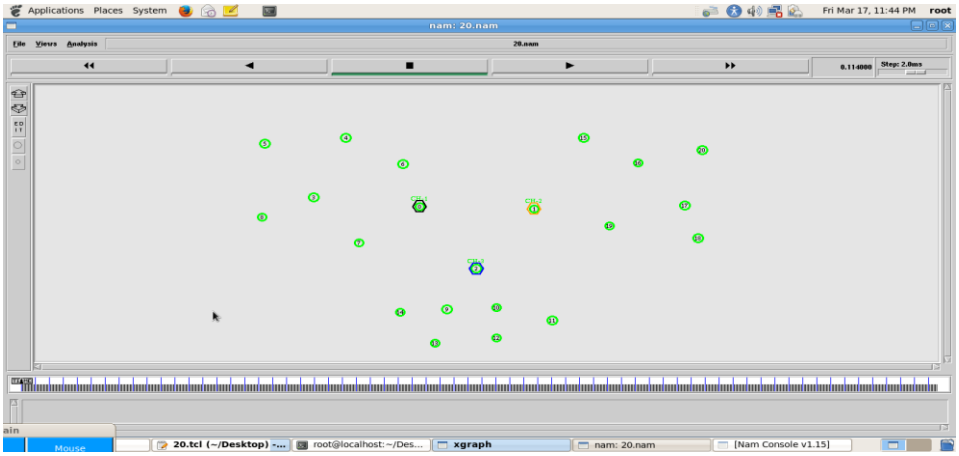

Figure 4 Assigning Cluster Head

Figure 4 shows that Cluster Head assigned to node 0, node 1, and node 2. Cluster Member differentiated as Cluster Head is the hexagonal shape and different colourused.CM is always like the green colour. This CH are communicated to neighbor node like CM nodes are nodes 3,4,5,6,7,8,9,10, 11, 12, 13, 14, 15, 16, 17, 18 and 19. CH is simultaneously transmitted the packets send to CM.

Data transmissions are the transfer of data over a point to point or point to the multipoint communication channel. Sending and receiving radio signals through wireless networks involves two devices, the transmitter and the receiver.

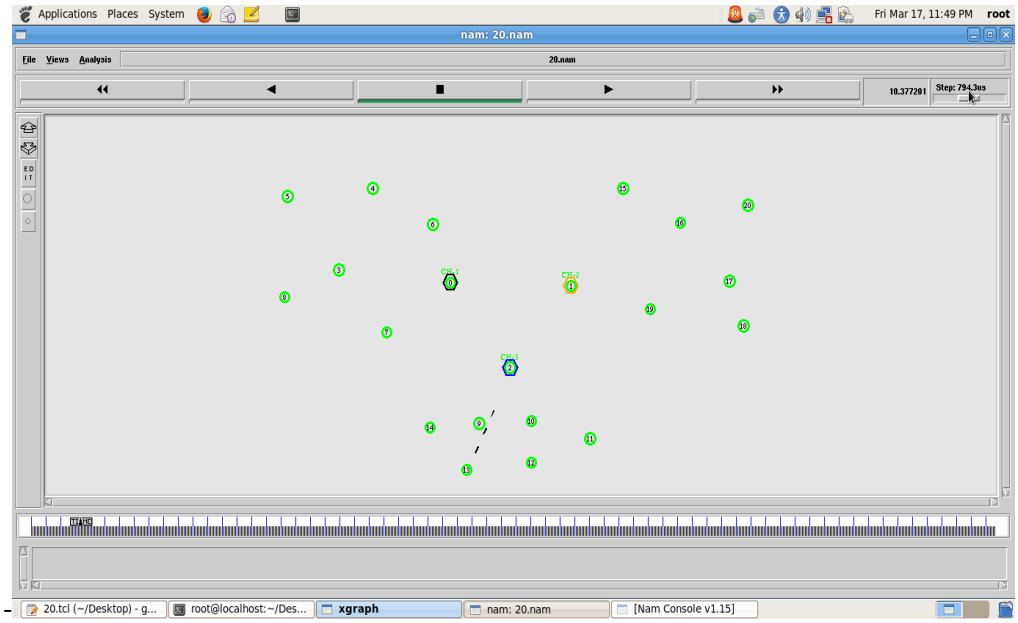

Figure 5 Data transmission

Figure 5 shows that the transmission of data from node 2 to node 13. The source node 2 is packets are sent to destination node 13. Source node act as CH and destination is act as CM. The source is communicated with the destination node. Cluster head which is always active for sensing the unwanted node if the node comes it can give the alert of another cluster member of the group. Then the cluster member will not receive the signal it means cluster head dead. Scheduling allocated at each node in Cluster Head and Cluster Member. Cluster Head is always acting in active mode and CM is sleep mode.

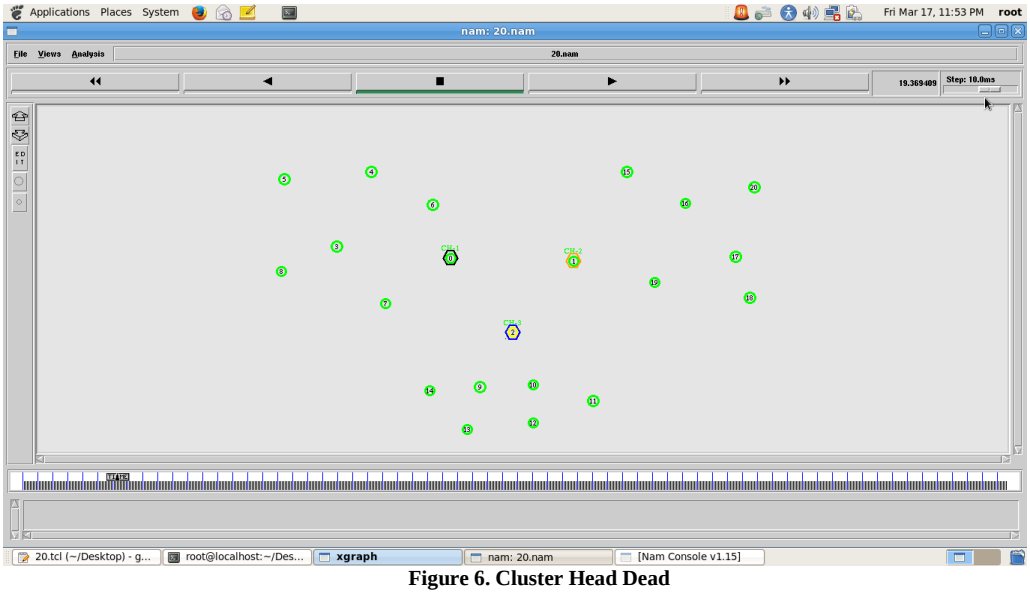

Figure 6. Cluster Head Dead

Figure 6 shows that cluster head dead process. Due to the continuous transmission of Cluster Head are dead.CH is assigning high energy and CM is an initial state is lower energy. The source node 2 is packet simultaneously transmitted to node 13.This node2 are dead is denoted in yellow colour. Cluster member will not receive the signal then also other members should be in inactive position. Suppose clustering head is failinganother high power node can take the position of clustering head. In the case of two members have the same power, and then we will find the shortest distance of clustering member.

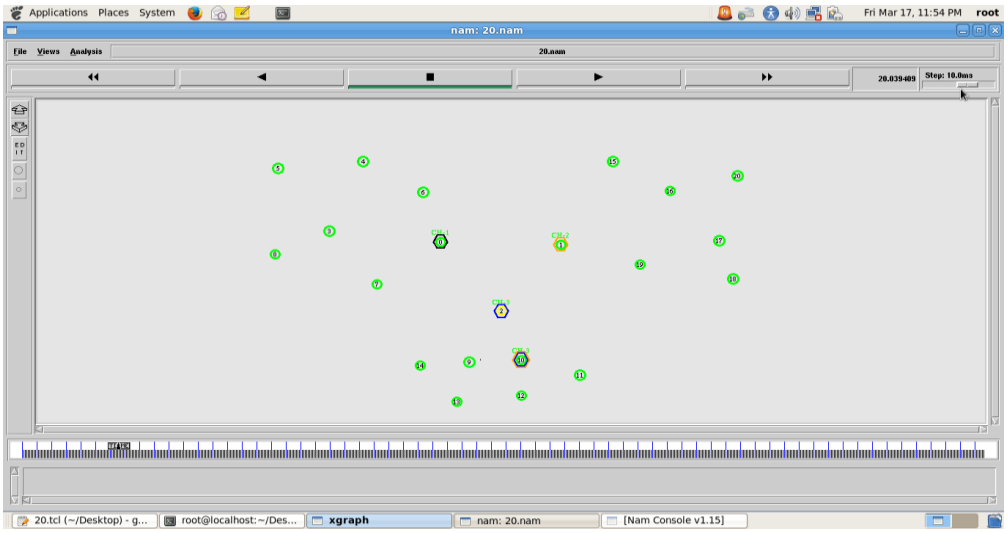

Figure 7. Replacement of Cluster Head

Figure 7 shows that replacement of cluster head 10 is the next cluster head. Replace the CH is based on CM energy and shortest distance of neighbor nodes. Unnecessary head selection may dissipate limited battery power of the entire sensor networks. Packet delivery ratio is defined as the ratio of the number of data message to the number of packets

$$Packet\ Delivery\ Ratio = \frac{number\ of\ data\ message}{number\ of\ packets}$$

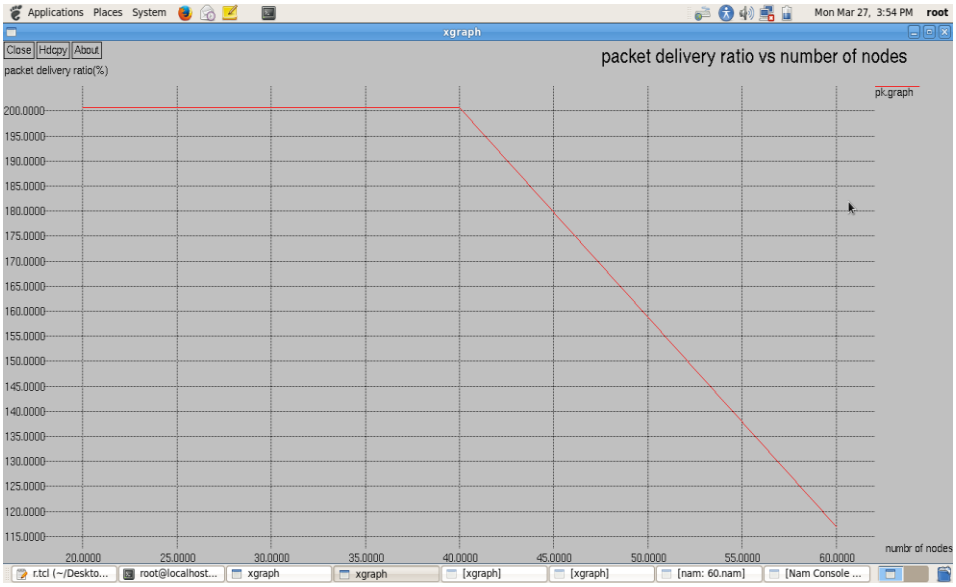

Figure 8. Packet Delivery Ratios

Figure 8 shows that graph comparison between the packet delivery ratios. When the number of node is 20 the packet ratio is 200.When the number of nodes is 40, the packet ratio is 400.When the number of nodes is 60, the packet ratio is 580 from the graph observed results is the number of node is increasing the packet ratio is also increasing.

Normalizedrouting overhead is the ratio of number of data message received to the number of control message received

$$Normalizedrouting\ overhead = \frac{number\ of\ data\ message}{number\ of\ control\ message}$$

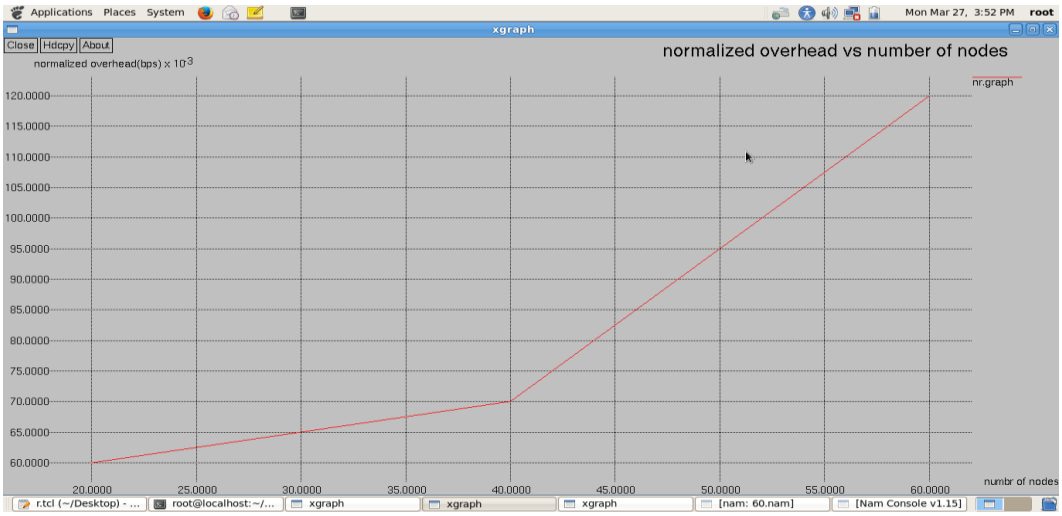

Figure 9. Normalized Routing Overhead

Figure 9 shows that the normalizedrouting overhead comparing with a number of nodes. When the node is 20,thenormalizedrouting overhead is 64%.when the number of the node is 40, thenormalizedrouting overhead is 70% when the number of nodes is 60,thenormalizedrouting overhead is 118%.From the graph observed the results increasing a number of a node increases the normalizedrouting overhead.

Control overhead is the ratio of the number of control message received to the simulation time

$$Control\ overhead = \frac{number\ of\ control\ message}{simulation\ time}$$

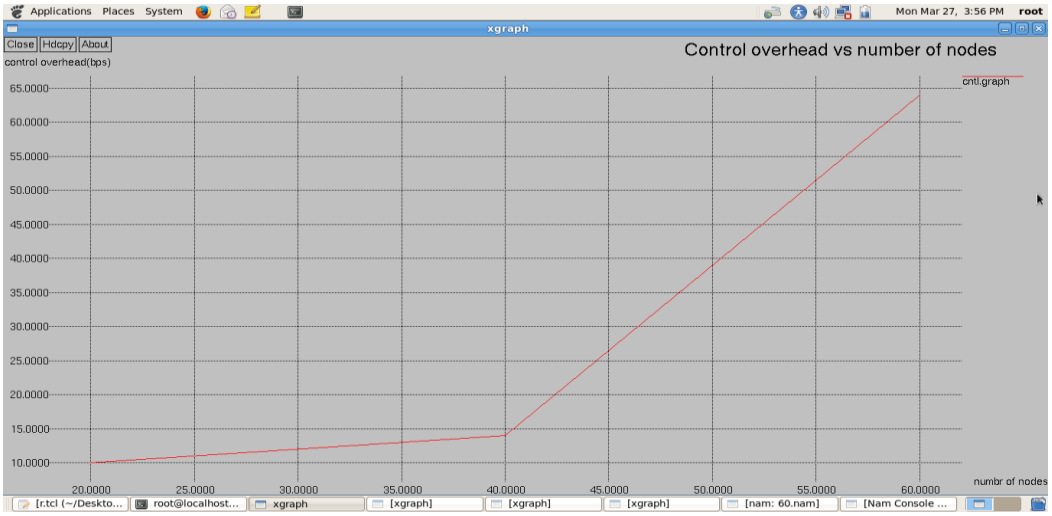

Figure 10 Control Overhead

Figure 10 shows that the control overhead comparing with increasing number of nodes. When the number of the node is 20, the control overhead is 10.when the number of the node is 40, the control overhead is 46.when the number of node is 60, the control overhead is 60.From the graph observed the results increasing a number of the node increases the normalised routing overhead.

CONCLUSION

The issues of wireless sensor network is hardware and operating system for WSN, wireless communication characteristics, medium access scheme, deployment, localization, network layer, transport layer, quality of service, security. it can be overcome by SSNI(smart sensor network algorithm by internet of things) algorithm.it can be eliminated by using of two methods like clustering, routing. In future we can implemented in NS2 (NETWORK SIMULATOR) tools and we have generated the results.

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