Anchal Sharma et al. International Journal of Recent Research Aspects ISSN: 2349-7688, Vol. 2, Issue 4, December 2015, pp.149-153

A Hybrid Approach to Increase Efficiency and Performance of WSN

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Abstract- **Wireless Sensor Networks are becoming one of the most successful choices for the development and deployment of applications in a range of scenarios, from intelligent homes to environment monitoring. Nowadays, there is a growing demand for programming large-scale wireless sensor networks. In this paper the working of distance with the collaboration of data rate enhancement in order to fasten the data transfer rate and delay reduction is introduces. Although these protocols have not been designed with security as a goal, it is extremely important to analyse their security properties.Results are presented to demonstrate the effectiveness of system. The projected mechanism is implemented with MATLAB.**

Keywords **– WSN Network, Security Management, Routing in WSN, Efficiency etc.**

I. INTRODUCTION

Wireless Sensor Networks are those networks in which communication is carried out through a wireless channel. In a wide area there are multiple users say as an example: mobile users. Numbers of towers in area act as sensors are called as nodes in wireless sensor networks. Thus from one node to other, communication is carried out without any physical link. A network consists of numbers of nodes with one as a source and one as a destination [1].

One of the advantages of wireless sensor networks is their ability to operate unattended in harsh environment in which manually human monitoring schemes are inefficient and risky. Communication efficiency depends on the distance between communicating nodes. In short distance and efficiency are inversely proportional to one another i.e. if distance is large then it will consume a large amount of energy and thus efficiency decreases and vice versa [2].

Wireless sensor networks are formed by small devices communicating over wireless links without using a fixed networked infrastructure. Because of limited transmission range, communication between any two devices requires collaborating intermediate forwarding network nodes, i.e. devices act as routers and end systems at the same time. Communication between any two nodes may be trivially based on simply flooding the entire network. However, more elaborate routing algorithms are essential for the applicability of such wireless networks, since energy has to be conserved in low powered devices and wireless communication always leads to increased energy consumption [3].

In recent years, location awareness (i.e. nodes know their physical location) has been investigated as a possible solution to the inherent limitations of topology-based methods. Several novel geographic (also termed position-based) routing algorithms have been proposed, which allow routers to be nearly stateless since packet forwarding is achieved by using information about the position of candidate nodes in the vicinity and the position of the destination node only. Information of physical location might be determined by means of a global positioning technique like GPS, or relative positioning based on distance estimation on incoming signal strengths.

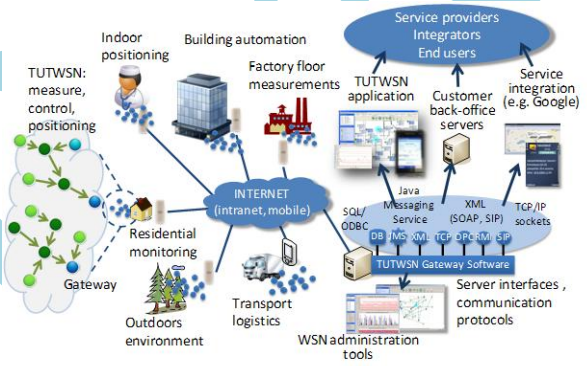

Figure 1: Wireless Sensor Network [1]

WSN are typically made up of gigantic sensor nodes which in most cases driven by battery sources. Thus, a typical WSN transceiver must have characteristics to make the system cost cheaper, completely incorporated WSN transceivers must be design with direct conversion structure [4]. For this, the advancement of the size and power are very crucial area under discussion for various blocks of transceiver. Sensor networks are being deployed in situations where it is important to protect the message communication from eavesdropping or tampering. Wireless Sensor network (WSN) consists of sensor nodes which are deployed in versatile and often potentially hostile environment, responsible for sensing, processing, and transferring environmental information on the sensor field towards the sink node that is often referred to as BS (Base Station).

The rest of paper is ordered as follows. In section II, it discusses related work of WSN System. In Section III, it describes proposed work plus implementation of system. Results are given in section V. Finally, conclusion is explained in Section V.

II. RELATED WORK

Authors proposed power and delay-aware multi-path routing protocol for Ad Hoc Networks Mobile Ad Hoc Networks (MANETs) also called mesh networks, consist of a large number of mobile nodes that communicate with each other in the absence of any fixed infrastructure or centralized administration. The principle characteristics of MANET are the dynamic topology and the limited battery power of mobile nodes. The discharge of the battery causes many problems such as the loss of the packets and the re-initialization of

route discovery which leads to lot of bandwidth consumption, increase in the delay and decrease in the throughput.

Authors proposed multi-level group key management technique for multicast security in MANETS. In Mobile Ad-Hoc Networks (MANETs) and data transmission was speeded up by means of multicasting. Though multicast transmission lessens overhead, collision and congestion, it persuades new challenges towards security management. This challenge must be conquered to bring better throughput of the network. In this paper, a multi -level group key management technique for multicast security in MANE was introduced.

Some proposed a Survey on deployment methods in wireless Sensor Networks. The efficiency of sensor networks depends on the coverage of the target area. Although, in general, a sufficient number of sensors are used to ensure a certain degree of redundancy in coverage, a good sensor deployment method was still necessary to balance the workload of sensors in target area. The deployment deals with moving sensors from an initial unbalanced state to balanced state. Therefore, several optimization problems can be defined to minimize different parameters such as total moving distance, number of moves, communication cost. There was a unique problem called communication holes in sensor networks, areas not covered by any node. In this paper, mainly work was done to detect and remove communication hole in a heterogeneous wireless sensor network.

Some proposed performance guaranteed routing protocols for asymmetric sensor networks where two end nodes may not use the same path to communicate with each other. ASNs can be caused by hardware devices or environment. Different from most of the existing routing protocols in symmetric sensor networks, because of asymmetry, achieving desired routing performance in ASNs poses significant research challenges. To address these challenges, first proposed a general framework protocol called reverse path (RP) to deal with asymmetric links and then present two efficient routing algorithms LayHet and EgyHet built on RP to satisfy performance requirements.

Some proposed step by Step Procedural Comparison of DSR, AODV and DSDV Routing protocol, Mobile Ad hoc network was network where nodes communicate without any central administration or network infrastructure. They are connected via wireless channels and can use multiple hops to exchange data. Routing protocols are needed for communication in such Ad hoc networks, where it targets for efficient and timely delivery of message. There are various performance metrics to compare Ad hoc routing protocols.

III. PROPOSED APPROACH OF SYSTEM

WSNs are resource constrained distributed systems with low energy, low bandwidth and short communication range. The basic features which make WSNs different from the traditional networks are; self-organizing capabilities, short range communication, multi-hop routing, dense deployment, limitation in energy and memory, and also frequently changing topology due to fading and failures. To decrease the overall delay for data transmission and increase the percentage performances of the network, it provides a routing approach in WSN. In this work, an approach is proposed which is solving the coming issues of routing and finding best optimal path on the basis of throughput and distance.

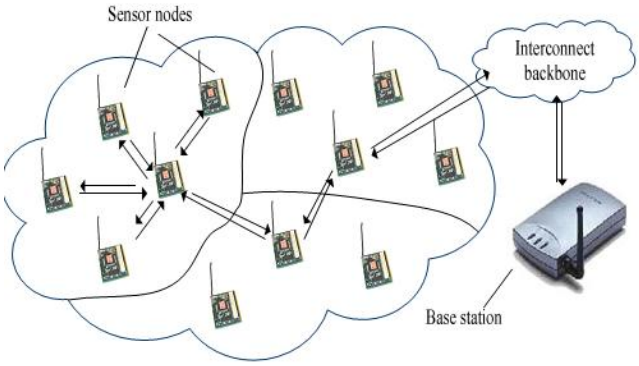

Figure 2: Wireless sensor network configuration architecture [2]

In proposed system firstly source will send the data to the node by detecting the highest throughput of the node and distance among all. Here task is to determine the distance and throughput of the nodes. Now which path has to be followed for accurate /healthy communication is detected. Shortest way to select is determining the throughput of various nodes. After transmitting data to it again note the various factors as distance and throughput of nodes and repeat the process till data reach the destination. An acknowledgment is provided back to the transmitting node as the information regarding whether data is received properly or is lost.

As communication starts total area to be covered by the deployment of the nodes is to be defined. A coverage area is defined with the total numbers of nodes in the area. Then the nodes distance is checked among each and every node and with respect to the source node also.

Currently there is a great deal of research in the area of low energy radios. Different assumptions about the .radio characteristics [5], including energy dissipation in transmit and receive modes, will change the advantages of different protocols. In this work, it assume a simple model where the radio dissipates Eelec= 70 nJ/bit to run the transmitter or receiver circuitry and ∈amp = 120 pJ/bit/m2 for the transmit amplifier to achieve an acceptable Eb/N0.

A. Network Components of WSN

The main components of a general WSN are the sensor nodes, the sink (base station) and the events being monitored.

1. Sensor Node and its Functional Units

In WSN, every sensor node has capabilities of sensing, processing and communicating data to the required destination. The basic entities in sensor nodes are sensing unit, power unit, processing unit and communication unit and memory unit to perform these operations.

i) Sensing Unit

Sensors play an important role in sensor networks by creating a connection between physical world and computation world. Sensor is a hardware device used to measure the change in physical condition of an area of interest and produce response to that change. Sensors sense the environment, collect data and convert it to fundamental data (current or voltage etc) before sending it for further processing. It converts the analogue data (sensed data from an environment) to digital data and then sends it to the microcontroller for further processing. There are different categories of sensors which are available and can be

used depending on the nature of the intended operation. A typical wireless sensor node is a micro-electronic node with less than 0.5 Ah and 1.2 V power source. Sensors size and their energy consumptions are the key factors to be considered in selection of sensors.

ii) Memory Unit

This unit of sensor node is used to store both the data and program code. In order to store data packets from neighbouring (other) nodes Random Only Memory (ROM) is normally used. And to store the program code, flash memory or Electrically Erasable Programmable Read Only Memory (EEPRM) is used.

iii) Power Unit

For computation and data transmission, the corresponding units in sensor node need power (energy). A node consist a power unit responsible to deliver power to all its units. The basic power consumption at node is due to computation and transmission where transmission is the most expensive activity at sensor node in terms of power consumption. Mostly, sensor nodes are battery operated but it can also scavenge energy from the environment through solar cells.

iv) Processing Unit

Sensor node has a microcontroller which consist a processing unit, memory, converters (analogue to digital, ATD) timer and Universal Asynchronous Receive and Transmit (UART) interfaces to do the processing tasks. This unit is responsible for data acquisition, processing incoming and outgoing information, implementing and adjusting routing information considering the performance conditions of the transmission.

First step is to initialize all the parameters of the network such as antenna coverage area, bandwidth and throughput. Now determine total numbers of nodes and define them according to the coverage area. To find the efficient path of transmission total region is to be covered and nodes in the network are determined. To determine the distances between the nodes which is performed using the throughput of the each and every node and prepare a set of database only Distance Vector Routing algorithm in full network. Next step is to check needed containing throughput in the network.

Among the total numbers of nodes, select source and destination node in the given coverage area. Finally find the exact path of transmission with following of threshold distance and the proposed methodology of high bandwidth. Later on a key management or matching based approach is applied in which nodes selected in route match keys for link creation. Dedicated link creation for data transmission up to defined time interval. Secured data is transmitted from source to destination with fulfilling all objectives and parameters.

IV. RESULTS & DISCUSSION

As main objective of work is to find the final route for transferring the data from source to destination is founded on basis of distance calculated and the bandwidth table created initially on basis of max bandwidth and the less distance the objectives are achievedin this step after finding the best route in network the security for data transmission is to provide which will work on the key concept that is firstly initially two nodes will generate their keys and will regenerate up to when the keys does not match between them once the keys matched the keys after that an dedicated key is assigned by transmitter to receiver for data transmission dedicated link creation.

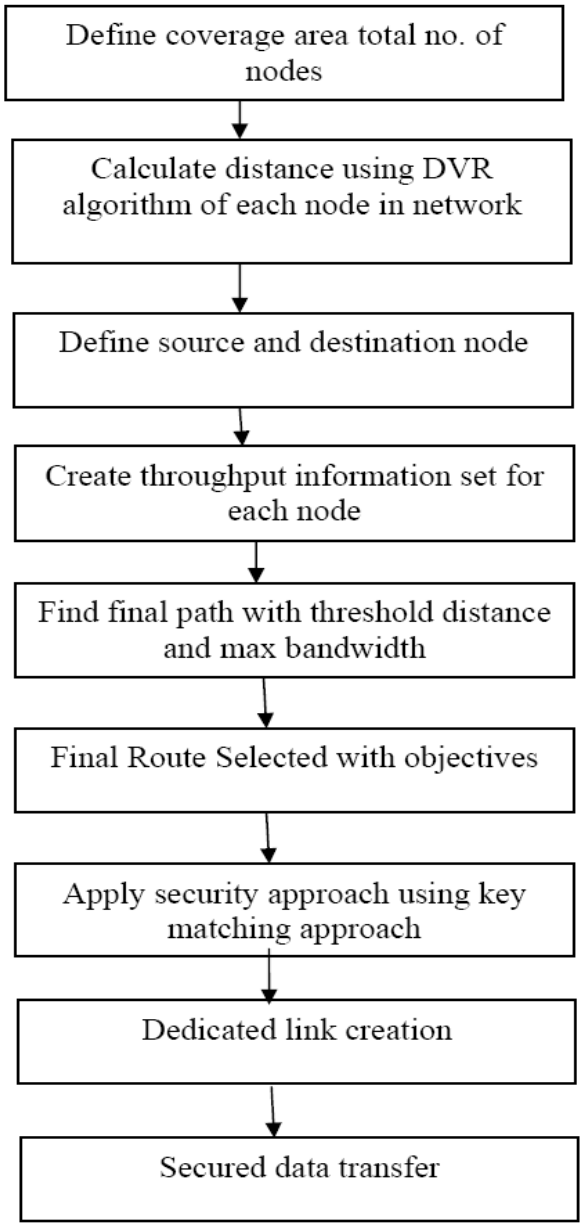

Figure 3: Flowchart of Proposed System

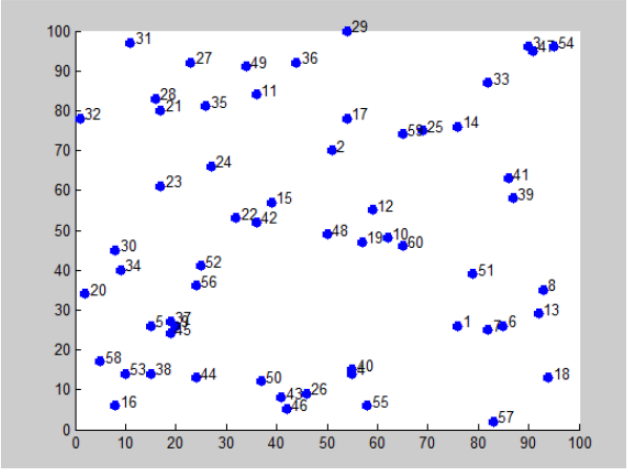

Figure 4: Placement of Nodes in Network

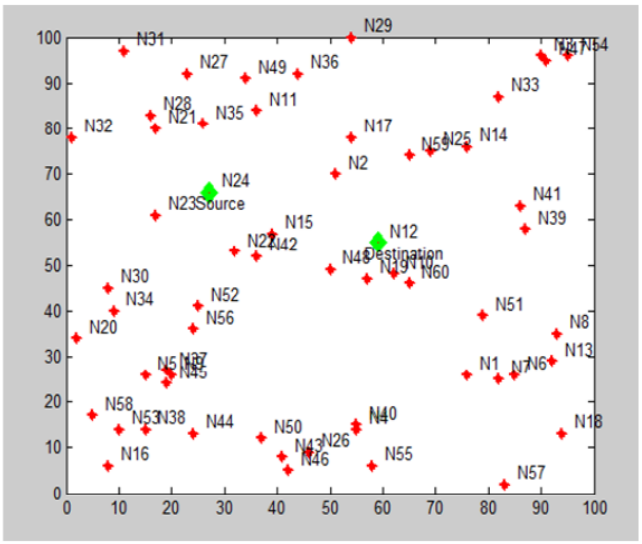

Figure 5: Sender & Receiver Selection

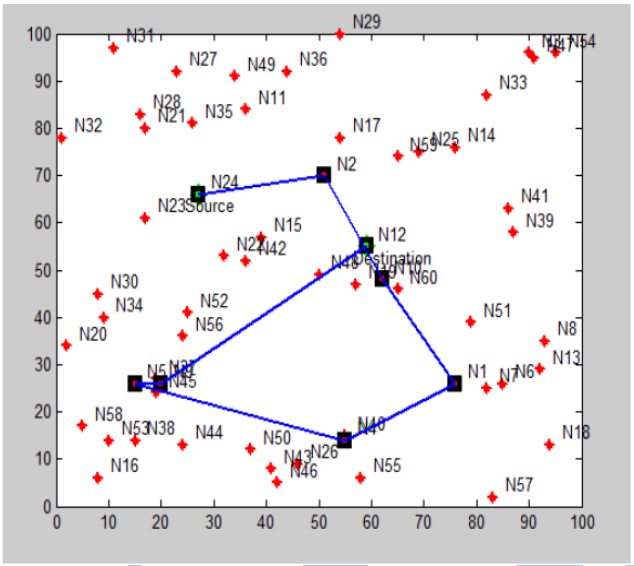

Figure 6: Route Finding in Network

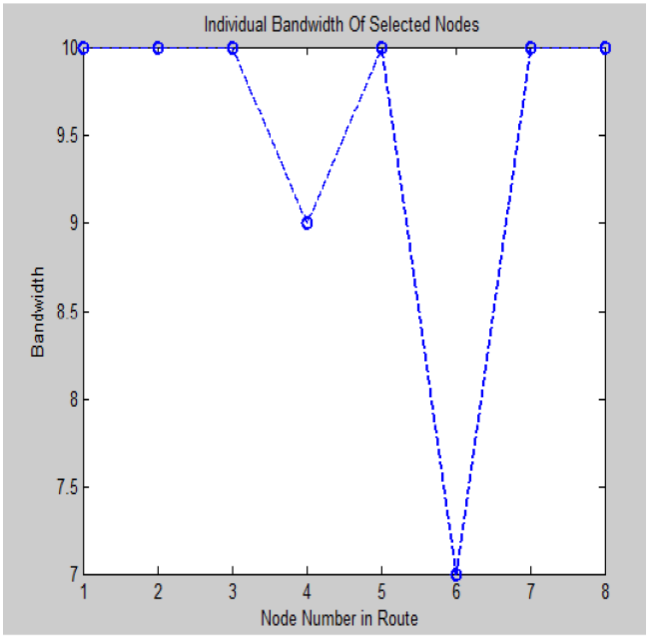

Figure 7: Bandwidth of Selected Nodes

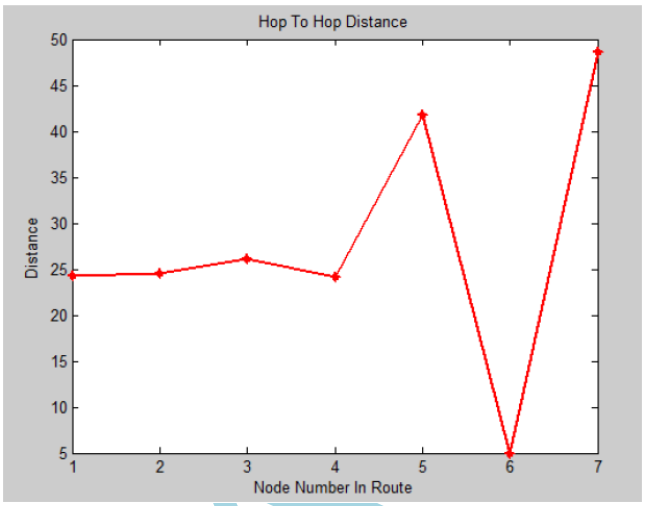

Figure 8: Hop to Hop Distance in Network

V. CONCLUSION

To increase efficiency and performance of the network and find the best optimal short path a new approach is developed. We had implemented a new approach in keeping the distance concept constant with an introduction of throughput of nodes. Reduction in the delay for the transmission of data with a hand increment in the efficiency of the network this proposed methodology is implemented. This provides a network which is faster than earlier proposed energy and distance approaches. Including this as security is main concern in today networking so this thesis provide security for data transmission which make it an hybrid approach of fast secured data transmission.

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