Energy Efficient Smart Home Monitoring System using WSN

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Abstract— Recent advances in wireless sensor networks have led to many new routing protocols specifically designed for sensor networks. Almost all of these routing protocols considered energy efficiency as the ultimate objective in order to maximize the whole network lifetime. However, the introduction of video and imaging sensors has posed additional challenges. Transmission of video and imaging data requires both energy and QoS aware routing in order to ensure efficient usage of the sensors and effective access to the gathered measurements. In this paper, we propose an energy-aware QoS routing protocol for sensor networks which can also run efficiently with best-effort traffic. The protocol finds a least-cost, delay-constrained path for real-time data in terms of link cost that captures nodes' energy reserve, transmission energy, error rate and other communication parameters. Moreover, the throughput for non-real-time data is maximized by adjusting the service rate for both real-time and non-real-time data at the sensor nodes. Simulation results have demonstrated the effectiveness of our approach for different metrics.

Key words: Sensor Networks, WSN, QoS

I. INTRODUCTION

Recent advances in miniaturization and low-power design have led to active research in large-scale, highly distributed systems of small-size, wireless unattended sensors. Each sensor is capable of detecting ambient conditions such as temperature, sound, or the presence of certain objects. Over the last few years, the design of sensor networks has gained increasing importance due to their potential for some civil and military applications such as combat field surveillance, security and disaster management. These systems process data gathered from multiple sensors to monitor events in an area of interest. In a disaster management setup a large number of sensors can be dropped by a helicopter. Networking these sensors can assist rescue operations by locating survivors, identifying risky areas and making the rescue crew more aware of the overall situation. On the military side, applications of sensor networks are numerous. For example, the use of networked set of sensors can limit the need for personnel involvement in the usually dangerous reconnaissance missions and can provide a more civic alternative to landmines. Security applications of sensor networks include intrusion detection and criminal hunting.

II. SYSTEM ARCHITECTURE WSN

This section discusses how data classified, maintain of queue of priority to the CD and select optimal path to transmit CD.

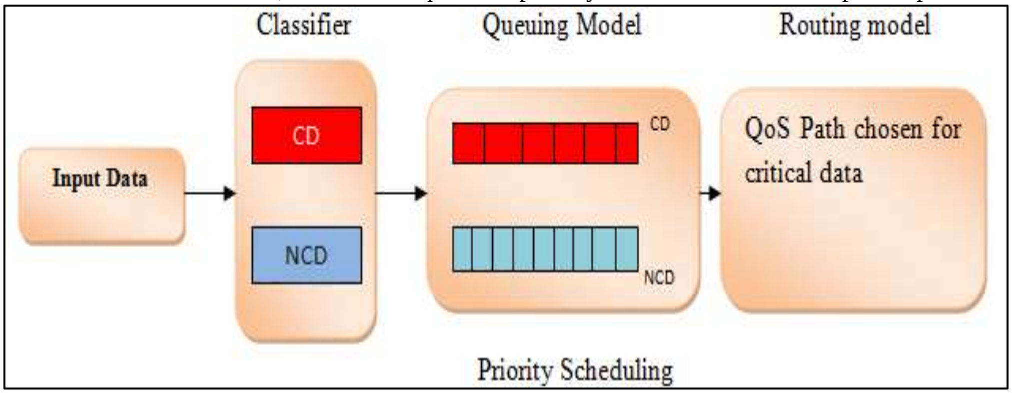

Fig.1: Operation of Scheduling Data

Where
CD: -Critical Data
NCD: - Non Critical data

A. Classifier

It persistently got data from the info information, handle the data in view of edge esteem and groups the detected information I, e CD or NCD then it forward the lining model. While transmitting gives the security to CD i.e. in view of RSA security calculations.

B. Queuing Model

The need assigner in the lining model gathers the information from classifier and its dole out need to CD and NCD, it gives the most elevated need to the CD over the NCD. It forms the NCD in light of First Come First Serve (FCFS).

C. Routing Model

This model chooses the ideal way to course the information in light of QoS parameter. In view of QoS parameter, the steering model checks every single accessible way to choose ideal way for CD. Ways are ordered on their availability of advantages. Qualified ways are chosen for information transmission, the occasion observed likelihood of the CD is less contrasted with NCD subsequently at whatever point CD, it gets high likelihood of transmission on high need way.

D. Proposed Algorithm

The calculation is "Need based Scheduling Optimal Path Routing"(PSOPR) recommended that follows the stream of work is introduced.
Algorithm: Algorithm for proposed procedure
Step 1: Start
Step 2: Deployment of sensor
Step 3: Network instatement
Step 3.1: Each hub instate steering.

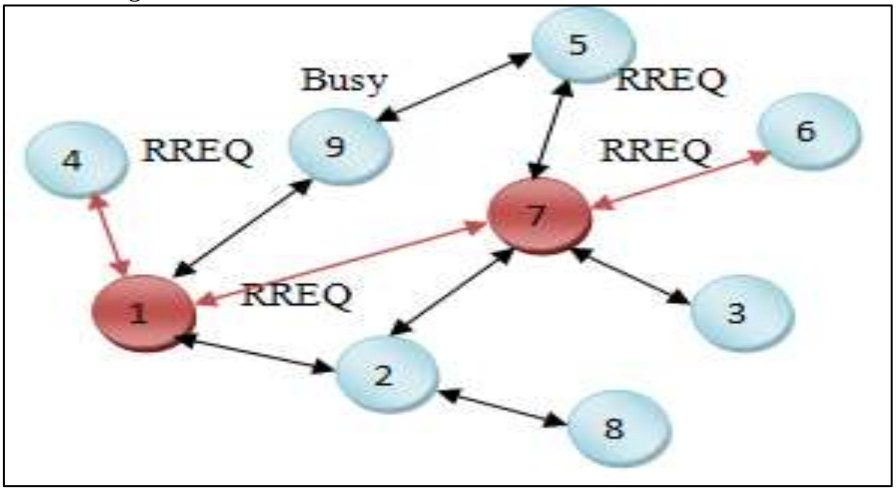

Fig. 2:

The fig. shows routing table initializing and exchanging routing table each other, as we know in WSN each sensor have a certain parameter based on that it will work (choose path) i.e. communication range 200m, Bandwidth (BW) 10Mbps, initial energy 100J, present status of each sensor and hop count. In figure considering only two nodes (Node 1 and Node 7) these two nodes exchanging routing tables.

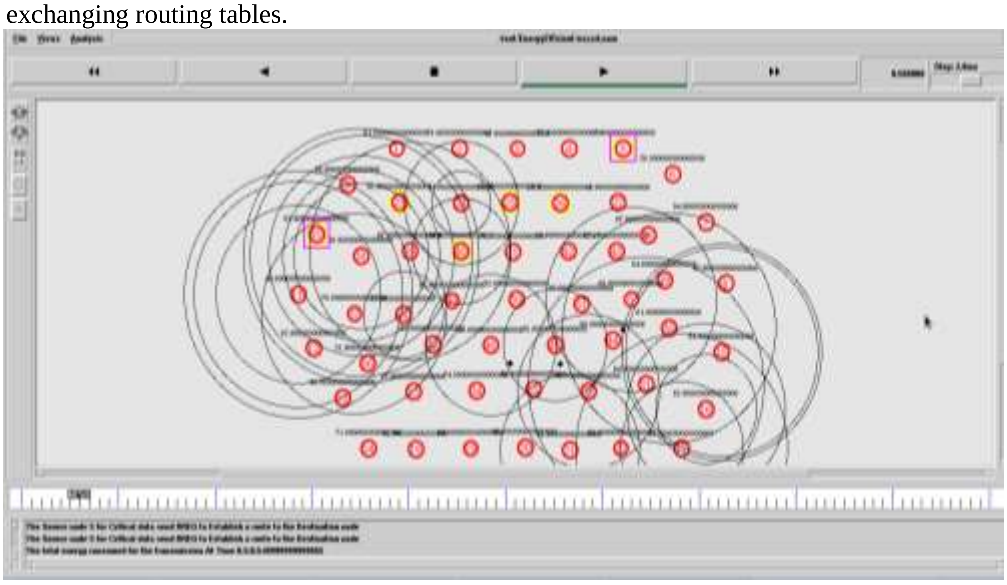

Fig. 3: Data transmission phase

Shows in the above figure source and destination node indicated by per pale color square box around the source and destination ID also presented discovered optimal path indicated by the yellow circle for an optimal path through this path data are transferred between source and destination. After finishing transferring of sense data it represented output results by the graph.

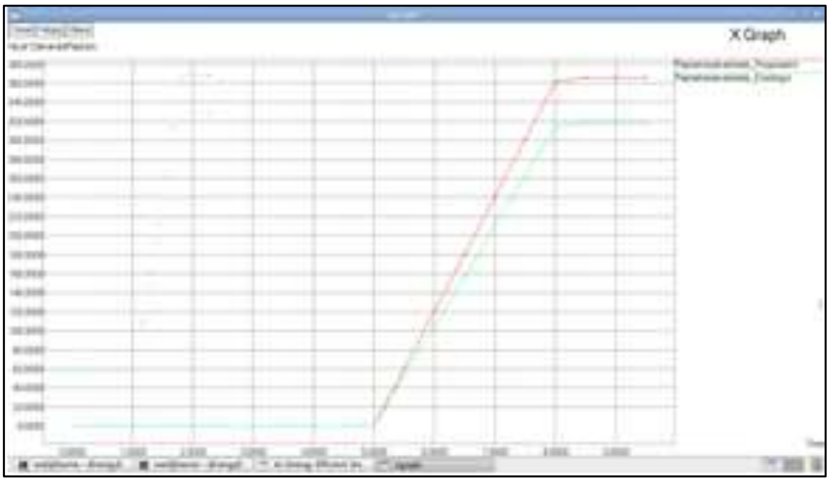

Fig. 4:

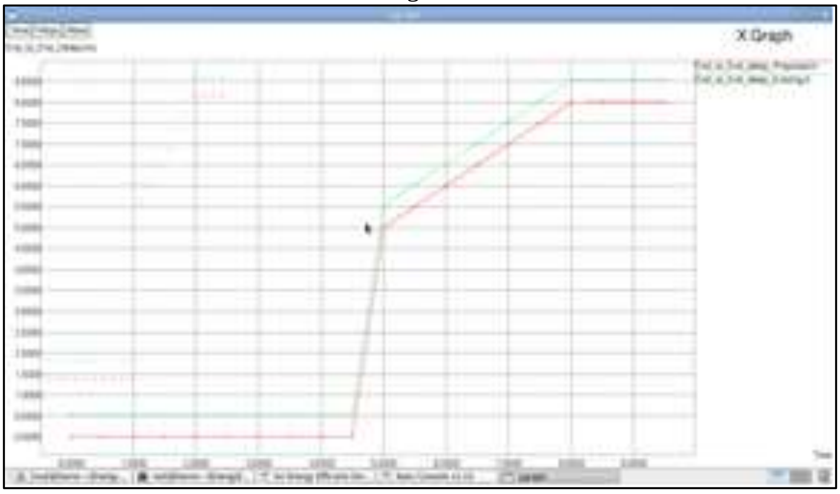

Fig. 5:

Y-axis represent the number of delivered packet, and X-axis shows time in a minute, the proposed work that indicates more packets delivered successfully to the destination. PDR has achieved high compared to the existing system. In proposing work the path selected has all packets should be reach the desired location in critical condition, each sensor node in WSN maintains a routing table if anyone node to transmit packets collect all available paths to desired location among that selected one optimal path to reach the destination without loss packer there is no chance to node failure and conjunction on a link.

III. CONCLUSION

The new energy-aware QoS routing protocol for sensor networks "PSOPR" presented in this work achieves performance improvement by choosing high quality paths based on optimal path cost considering residual energy, available bandwidth and packet loss on the paths, and also employing priority based packet scheduling method to give preference to critical data over non critical data in presence of heterogeneous traffic of the application. The data security using RSA algorithm makes the protocol more robust. The effectiveness of the protocol is validated by simulation. Simulation results show that proposed protocol consistently performs well with respect to QoS metrics, e.g. throughput and average delay as well as energy-based metric such as average lifetime of a node.

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