ENHANCED RASER PROTOCOL MODEL FOR HYBRID WIRELESS NETWORK USING QOD-ROUTING ALGORITHM

Author : Ms. M.S.KOKILA, M.Sc(CS).,M.Phil., **Co-Author : S.KOWSALYADEVI, M.C.A .,**

ABSTRACT

Sensor networks are a crucial device for monitoring physical phenomena in the present day international. The nodes potential to speak wirelessly gets rid of the want for long wires and allows them to be disbursed in an advert-hoc way wherever and whenever required. One of the principal demanding situations in those WSNS is the routing protocol, which goals to move the facts generated by means of the sensors to the server. a constantly changing topology manner that a set path from a sensor to the sink cannot be guaranteed. The more traumatic applications also require the regular transport of real-time information in particularly cell eventualities. Strong ad-hoc sensor routing (RASER) protocol is designed to be a dependable answer, in spite of the excessive frequency topology changes of a cellular community. It makes use of a easy hop-count gradient to allow sensor nodes to blindly ahead records toward a single server. A key problem with this form of routing is in keeping the gradient metric up to date, for this reason RASER makes use of a design that combines a international time department multiple get entry to (GTDMA) medium access control (MAC) scheme with the routing protocol. This paper proposes a QOS-orientated allotted routing protocol (QOD) to beautify the QOS aid capability of hybrid networks. In this paper gain of fewer transmission hops and any cast transmission capabilities of the hybrid networks, QOD transforms the packet routing hassle to a resource scheduling hassle. In guarantee neighbor hop choice algorithm, the broadcasting nodes pick out a subset in their acquaintances to ahead the message. The proposed approach is the one of the high-quality slices-based totally broadcasting algorithms that makes use of 1-hop information. in that system, endorse a broadcasting set of rules that reduces the wide variety of broadcasts and achieves neighborhood optimality through choosing the minimal variety of forwarding nodes with minimal time complexity the accuracy of the system is evaluated the use of the execution time, packet Shipping ratio as well as strength of each node involve in the network.

I. INTRODUCTION

1.1 Wireless Sensor Network

Wireless device Networks ar heterogeneous systems containing several little devices known as device nodes and actuators with general computing components. These networks can comprises a whole bunch or thousands of low value, low power and self-organizing nodes that are extremely distributed either within the system or terribly near it. These nodes comprise 3 main parts - sensing, processing and communication. 2 different parts are there known as, aggregation and base station[8].Aggregation point's gathers knowledge from their neighboring nodes, integrates the collected knowledge and then forwards it to the base station for any process. varied applications of WSN includes environs watching, producing and supply, environmental observation and forecast systems military applications, health, home and workplace application and a range of intelligent and sensible systems.

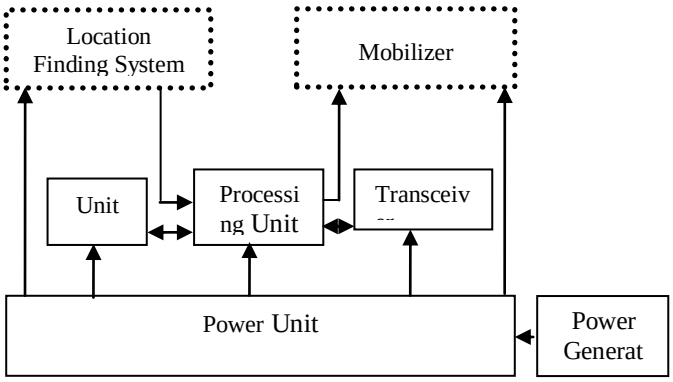

Fig. 1.1 Sensor Node Components

Advances in wireless networking, micro-fabrication and integration (for examples, sensors and actuators factory-made victimization micro-electromechanical system technology, or MEMS), and embedded microprocessors have enabled a brand new generation of massive-scale sensing element networks appropriate for a spread of economic and military applications. The technology guarantees to revolutionize the manner we have a tendency to live, work, and act with the physical setting.

A wireless unintended network (WANET) or Edouard MANET could be a decentralized style of wireless network. The network is unintended as a result of it doesn't admit a pre-existing infrastructure, like routers in wired networks or access points in managed (infrastructure) wireless networks. Instead, every node participates in routing by forwarding information for alternative nodes, therefore the determination of those nodes forward information is formed dynamically on the premise of network property and therefore the routing algorithmic rule in use. Wireless mobile unintended networks area unit self-configuring, dynamic networks during which nodes area unit liberal to move. Wireless networks lack the complexities of infrastructure setup and administration, facultative devices to make and be a part of networks "on the fly" – anyplace, anytime.

1.2 Hybrid Wireless Networks

Hybrid wireless device networks accommodates wireless networks (such as cellular network) and wireless device networks and such network is vital to beat the restrictions of standard device network wherever transmission vary and rate area unit quite restricted. the main focus of this special issue is on the hybrid wireless device network shaped by wireless device nodes and base stations (cellular networks)[3]. In hybrid wireless device networks, the nodes exchange info over a typical wireless channel. below completely different completely different traffic eventualities and different constraints, e.g., information measure and power, the number of information changed among these nodes might vary. below such challenges, new theory and style ought to be studied for hybrid wireless device networks with completely different completely different network setup and different channel conditions.

1.3 RASeR Protocol

RASeR (Robust Ad-hoc detector Routing) could be a fresh, high overall performance routing protocol, that is supposed to be wide applicable to several next generation hybrid (Wi-Fi) wireless community improvement. The layout of this protocol helps the low latency transport of facts with minimal packet loss. The profit is within the discount of the length of timeslots, which suggests that nodes ought to wait a way shorter time before being capable of transmit. the consequences of this area unit among the fact that facts will be another abundant faster and also the protocol is capable of deal with even the best levels of quality.

1.4 Qos in Hybrid Wireless Network

The Quality of Service (QoS) needs is nothing however it's like information measure, end-to-end delay, energy for the economical routing. the standard of service is taken into account for locating the possible path for the communication within the hybrid wireless detector networks. A substitute to multifarious Quality of Service technique is to supply prime quality communication by munificently over the wireless networks so capability relies on peak traffic load estimates of the detector network nodes. This approach is straightforward for networks with expected peak masses. The performance is cheap for several applications like video streaming in on-line, downloading giant size files from the net servers. It includes exigent applications that may complete variations in information measure and delay with giant receive buffers, that is usually potential for instance in video streaming.

1.5 QoD Routing Protocol

In QoD routing protocol, the supply node generates the packet sporadically. It sends the packet on to the destination node if it's at intervals the coverage of access points. Otherwise the supply node needs to send the request to nearest neighbor nodes to succeed in the destination. The neighbor node compares the house utility with the edge and reply to the supply node. supported the replies from the neighbor nodes the supply node calculates the queuing delay and packet size then determines the qualified neighbor nodes. The neighbor nodes get sorted within the declivitous order supported the queuing delay [2]. Relying upon the work of neighbor node, the supply node chooses the most effective neighbor. QOD intends to offer QoS ensured routing systems. QOD fully takes favorable position of the typically sent Access purpose, regards the packet transmission issue as a resource planning supply between hubs and Access purpose .

LITERATURE SURVEY

G.Santhosh Kumar et.at describes however the LEACH protocol is increased to handle quality modulation. This paper makes use of the proposals in

LEACH-M protocol wherever nodes isolated attributable to quality from the cluster are reconnected to a brand new cluster through acceptable mechanism. The planned LEACH-ME protocol follows a similar reconnection mechanism for the isolated node. It uses the construct of remoteness for electing the cluster head [15].This paper additionally concludes that this planned system helps to attain the amount of additional performance energy dissipation must be sacrificed at a tolerable level.

Jamal N. Al-Karaki Ahmed E. Kamal et al describe a comprehensive survey of routing techniques in wireless sensing element networks that are bestowed within the literature. This author concludes that the routing techniques are classified supported the network structure into 3 categories: flat, gradable, and placement based mostly routing protocols,these protocols are classified into multipath-based, query-based, negotiation-based or QoS-based routing techniques reckoning on the protocol operation [10]. They additionally highlight the look tradeoffs between energy and communication overhead savings in a number of the routing paradigm, similarly because the benefits and downsides of every routing technique.

Jaideep Lakhotia, Rajeev Kumar et al describe the detector nodes and mobile sink will be mobile or there will be mixed detector nodes i.e. mobile similarly as static detector nodes in the network based mostly on the application needs. Routing in mobile wireless detector network poses analysis problems as nodes area unit mobile, thus it has to send the information according to the routing protocol whereas it is moving. that the routing protocols are planned considering mobile nodes within the network that specialize in analysis problems like packet loss, energy consumption, and delay [9].Hence, this paper concludes that the routing protocols isn't solely to enhance the network life time however additionally to scale back finish to finish delay, cut back packet loss and link management.

Konrad Lorincz describes a serious concern for wireless communication systems generally, and even a lot of thus in disaster response. A dynamically dynamic population of patients and rescuers at a disaster website needs economical institution of security credentials. Additionally, the safety design can’t assume a pre deployed public key infrastructure (PKI) or that every one devices have sufficient machine power to run pricey cryptanalytic protocols [11]. Given the numerous wireless devices during a disaster website and able to use GPS, RF signals, ultrasound, or another technique to trace patient and rescuer device locations.

Riad Kouah, Mohamed Aissani and Samira Moussaoui describes geographic routing in mobile sensing element networks has attracted attention in recent years. Once a sensing element node incorporates a packet to forward, it selects the highest accessible neighbor to the sink as next forwarder concerning solely location parameter. However, this strategy doesn't take into account the quality of sensing element nodes. To beat this downside, they propose AN economical geographic routing mechanism supported a brand new next hop choice metric. It combines the space to the sink, the moving direction and therefore the moving speed of the forwarding candidate neighbors. This paper concludes that this packet is forwarded to the simplest neighbor node in terms of distance, moving direction and moving speed per the static sink.

Stephan Bohacek examines multihop methods within the presence of variable propagation. Specifically, this paper determines the performance improvement that results once path diversity in multihop networks is exploited as oppose to victimisation discretional or geographically optimum route. Many insights square measure developed. This behavior contrasts intuition that dictates that if the behavior of the links is fastened, then shorter methods square measure higher than longer methods. Stephan Bohacek additionally focuses on developing techniques to calculate or estimate the performance improvement offered by diversity.

PROBLEM DESCRIPTION

3.1. Problem Definition

RASeR is fitted to several uses in MWSNs and is any increased for different application necessities with the addition of a supervene upon mode, which provides precedence to the newest information instead of making an attempt to deliver each packet. Also, reverse flooding is enclosed, that could be a straightforward mechanism to permit the sink to speak with the device nodes. Another vital a part of the protocol is that the energy saving mechanism, that reduces power consumption by introducing sleep

cycles.

Analytical expressions got to characterize the protocol's performance and later the simulated results have shown that RASeR will address terribly high quality levels, with close to good PDR (Packet Delivery Ratio) and low end-to-end delay time's analysis.

The main drawback of the QoS routing protocol is conceive to directly adapt the QoS solutions for infrastructure networks to WSNs usually don't have nice success. Various reservation-based QoS routing protocols are planned for WSNs that make routes shaped by nodes and links that reserve their resources to satisfy QoS necessities. Though these protocols will increase the QoS of the WSNs to an explicit extent, it additionally suffers from invalid reservation and race condition issues. Invalid reservation drawback implies that the reserved resources become useless if the information transmission path between a supply node and a destination node breaks. Due this drawback the qualified neighbor nodes identification is hard in worst case state of affairs (where range of nodes is extremely large).

To overcome the matter, AN application is needed and it ought to be capable of implementing the neighbor nodes identification with efficiency. On this basis, a slicing primarily based approach is chosen to filter the neighbor nodes through that consecutive hop transmission happens. And additionally the surplus transmission is avoided.

3.2 Overview of Proposed Solution

QoS model is support to scale back the end-to-end transmission delay and enhances turnout to ensure the seamless communication between mobile devices and wireless infrastructures. At identical time, hybrid wireless networks (i.e., multi- hop cellular networks) are established to be a far better network structure for following generation wireless networks and may facilitate to tackle the tight finish-to- end QoS necessities of various applications. Hybrid networks synergistically mix infrastructure networks and WSNs to leverage one another. Specifically, infra-structure networks improve the quantifiability of WSNs, whereas WSNs mechanically establish self-organizing networks, extending the coverage of the infrastructure networks.

Direct adoption of the QoS (Quality of Services) routing techniques in WSNs into hybrid networks inherits their drawbacks in packet delivery method. During this work, a QoS-oriented distributed routing protocol (QOD) for hybrid networks is style to supply QoS services during a extremely dynamic situation. Taking advantage of the distinctive options of hybrid networks, i.e., any forged transmission and short transmission hops, QoS-oriented distributed routing protocol transforms the packet routing downside to a packet planning downside. In QoS-oriented distributed routing protocol, a supply node directly transmits packets to associate degree AP (Access Point) if the transmission mechanism will guarantee the QoS of the traffic. In supply node is to pick and schedules the packets to variety of qualified neighbor nodes for QOD method.

QoS-oriented distributed routing protocol incorporates 5 algorithms specified neighbor choice, packet planning, packet transmission, duplicate path detection and traffic path detection rule. The QoS-guaranteed neighbor choice rule chooses qualified neighbors for packet forwarding. The distributed packet planning rule schedules the packet transmission to any scale back the packet coordinated universal time. Throughout transmission of information, the prevailing system couldn't manage the traffic overhead. It doesn't implement any style of approaches for path discovery. Dynamic packet capture for IDS's supported the traffic profile. To boot, projected work can explore implementing RASeR on a work to any verify its capabilities and suitableness for varied applications. It doesn't support QoS as once packet transfers from one finish of the network to a different finish as a result of this transmission involves loss of packet and increase delivery time.

PROPOSED METHODOLOGY

4.1 RASeR protocol

In RASeR, every node is appointed one time interval, that is massive enough to transmit one packet. The order during which the node's time interval s occur is mounted and loops cyclically. As such, a cycle is that the length of your time it takes for every node to transmit and a slot is that the time it takes to transmit one packet. This is often illustrated in Fig.4.1, that shows however every cycle is formed up n time slots, wherever n is that the range of nodes within the network.

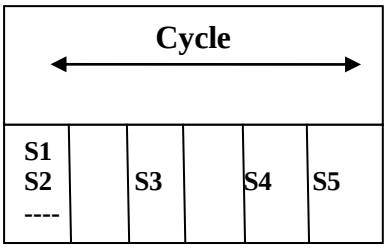

Fig 4.1 RASeR Protocol Cycle Structure

The use of diversity packets is implementing to extend the route diversity of the protocol while not preventative the delay times of the priority packets. So, the range packets can increase the amount of methods a chunk of information might desire the sink, however priority packets can continuously be transmitted 1st. supported this, the oldest priority packets within the queue are transmitted 1st, followed by the range packets; this is often referred to as traditional mode.

- If the node's hop-count is below that within the received packet, then the packet ought to be forwarded with constant priority because it was received.
- If the node's hop-count is more than that within the received packet, then the packet ought to be born despite its priority.
- If the node's hop-count is that the same as that within the received packet and therefore the packet has priority standing, then the packet ought to be forwarded with diversity standing.
- If the node's hop-count is that the same as that within the received packet and therefore the packet has diversity standing, then the packet ought to be born.

4.2 QOD Protocol Model

Usually, a hybrid network has widespread base stations.The information transmission in hybrid networks has 2 options. First, Associate in Nursing AccessPoint are often a supply or a destination to any mobile node. Second, the amount of transmission hops between a mobile node associate in nursing an AP is tiny. The primary feature permits a stream to possess any cast transmission on multiple transmission ways to its destination through base stations, and also the second feature permits a supply node to attach to Associate in Nursing Access purpose through Associate in Nursing intermediate node. Taking full advantage of the 2 options, QOD transforms the packet routing downside into a dynamic resource planning downside.

The neighbors then forward packets to base stations,that additional forward packets to the destination. The projected system is target the neighbor node choice for QoS-guaranteed transmission. QOD is that the initial work for QoS routing in hybrid networks. This thesis work makes 5 contributions.

- QoS-guaranteed neighbor choice formula. Distributed packet planning formula.
- Mobility-based section resizing formula.
- Soft-deadline primarily based forwarding planning formula.
- Data redundancy elimination primarily based transmission.

Neighbor Selection Algorithm

This selection algorithm is employed to pick qualified neighbors and employs deadline-driven programming mechanism to make sure QoS routing. Since short delay is that the major period QoS demand for traffic transmission, QOD incorporates the Earliest point in time initial programming formula (EDF), that may be a point in time driven programming formula for knowledge traffic programming in intermediate nodes. during this formula, associate degree intermediate node assigns the very best priority to the packet with the nighest point in time and forwards the packet with the very best priority initial.

Distributed Packet Scheduling Algorithm

Once qualified neighbors square measure glorious, this rule schedules packet routing. It assigns earlier generated packets to forwarders with higher queuing delays, whereas assigns plenty of recently generated packets to forwarders with lower queuing delays to decrease total transmission delay. so as to more cut back the stream coordinated universal time, a distributed packet programming formula is planned for packet routing. This formula assigns earlier generated packets to forwarders with higher queuing delays and programming practicableness, whereas assigns additional recently generated packets to forwarders with lower queuing delays and programming practicableness, in order that the transmission delay of a whole packet stream is reduced.

Mobility - Based Segment Resizing Algorithm

The supply node adaptively resizes each packet in its packet stream for each neighbor node in line with the neighbor's quality therefore on extend the programming practicableness of the packets from the supply node. In an exceedingly extremely dynamic mobile wireless network, the transmission link between 2 nodes is often de-escalated. The delay generated within the packet retransmission degrades the QoS of the transmission of a packet flow. On the opposite hand, a node in an exceedingly extremely dynamic network has higher chance to satisfy completely different mobile nodes and Access purpose that is helpful to resource programming.

Soft-Deadline Based Forwarding Scheduling Algorithm

In this formula, associate degree intermediate node initial forwards the packet with the smallest amount time allowed to attend before being forwarded bent attain fairness in packet forwarding.

Data Redundancy Elimination Based Transmission Algorithm

Attributable to the broadcasting feature of the wireless networks, the Access purpose and mobile nodes will catch and cache packets. This formula eliminates the redundant information to boost the QoS of the packet transmission.

QoD Algorithm

if receive a packet forwarding request from a source node then

if this. Space Utility < threshold then

Reply to the source node.

end if

end if

if receive forwarding request replies for neighbor nodes then

Determine the packet size Sp(i) to each neighbor I based on

$Sp(new) = \frac{\gamma}{vi}$ S_p(unit)

Estimate the queuing delay Tw for the packet for each neighbor based on

$$T_w^{(x)} = \sum_{j=1}^{x-1} \left(T_{I \to D}^{(j)} \cdot \left\lceil T_w^{(x)} / T_a^{(j)} \right\rceil\right)(0 < j < x)$$

Determine the qualified neighbors that can satisfy the deadline requirements based on Tw

Sort the qualified nodes in descending order of Tw

Allocate workload rate Ai for each node based on

$$\mathbf{A} = \begin{cases} W_g = \sum_{i=1}^{N_q} A_i \\ A_i \le U_{as}(i) * W_i. \end{cases}$$

for each intermediate node ni in the sorted list do

Send packets to ni with transmission interval Sp(i) / Ai.

end for

end if

FINDINGS

PARAMETER	VALUE
Simulation tool	.Net
Simulation Time	100ms
Number of Nodes	100
Routing Protocol	RASeR , QoD and GNHSA
Performance Metrics	Execution Time Analysis, Packet Deliver Ratio, Energy of Each Node involve in the network

Table 5.1 Environment creation setup

Due to the wide diversity of mesh nodes, the time consumption of mesh nodes varies greatly. For passive wireless mesh node, power consumption is negligible as compared to different devices on a frequent mesh node wireless mesh node. On the opposite hand, for active mesh nodes (such as measuring device, soil and gas mesh nodes) time consumption may be vital. every wireless mesh node will embrace many node, and every of those mesh node generally has its own energy consumption characteristics and, in some cases, its own frequency (Table 5.1). During a mesh node, i, can have the subsequent sensing time consumption.

$$E_{Tm}=Vdc*Ii*Tk$$

Where T_i is the time required for obtaining a single sample from mesh node *i* and I_i is the current draw of mesh node *i*. T_i depends on the start-up (T_s), response (T_r) and measurement (T_m) times of the mesh node. As T_m is small in comparison to T_s and T_r for most mesh

node, we consider only T_s and T_r in calculating T_i. Consider the value $\mathbf{V_{dc}= 0.6}$

NODE (i)	I_i (sec)	T_m (ms)		T_i (ms)	E_{Tm} (ms)
		T_s (ms)	T_r (ms)		
L1	0.10	0.015	0.017	0.05	0.003
L2	0.20	0.025	0.029	0.07	0.006
L3	0.30	0.035	0.044	0.06	0.011
L4	0.40	0.042	0.046	0.08	0.016
L5	0.50	0.050	0.063	0.08	0.024
L6	0.60	0.064	0.076	0.13	0.034
L7	0.70	0.076	0.089	0.14	0.043
L8	0.80	0.081	0.095	0.15	0.058

Table 5.2 Execution Time Analysis of Raser-QOD Protocol

The startup time (T_s) is the time required for a mesh node to reach the ready state after time is engaged, upon which the mesh node can give the correct value. It is a well-known factor in the time management of mesh nodes. If a sensing task does not wait for the T_s after the micro controller unit (MCU) requests the mesh node to turn on, the task will receive the wrong value. T_s vary significantly between mesh node types.The fig 5.1 describes a execution time analysis for Raser and QOD protocol model.

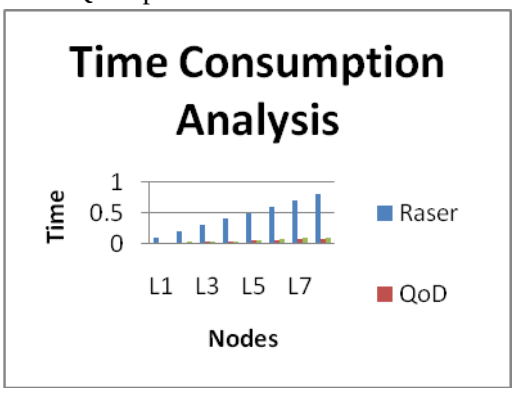

Fig 5.1 Execution Time Analysis

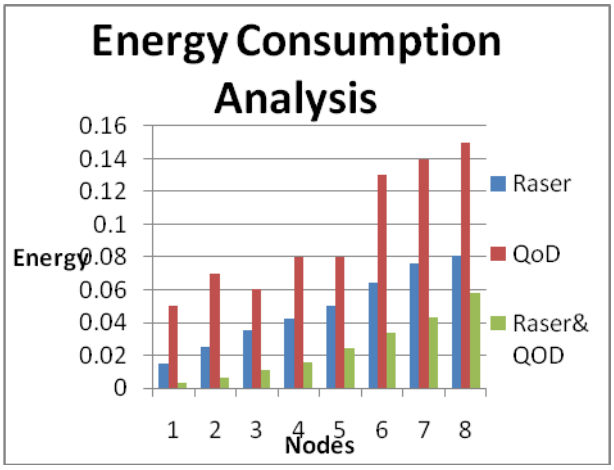

Fig 5.2 Energy Consumption Analysis

The Table 5.3 describes packet delivery ration analysis for Raser and QOD protocol model. The table contains number of node, no of packet delivery for Raser and QOD protocol details are shows.

Node	**No.of Packets Deliver (Raser)**	**No.of Packets Deliver (Raser & QoD)**
L1	10	12
L2	8	12
L3	14	17
L4	12	14
L5	7	11
L6	9	13
L7	13	15
L8	6	10

Table 5.3 Execution Time Analyses of Raser-QOD Protocol

The Fig 5.3 describes packet delivery ration analysis for RASER and QOD protocol model. The figure contains number of node, no of packet delivery for Raser and QOD protocol details are shows.

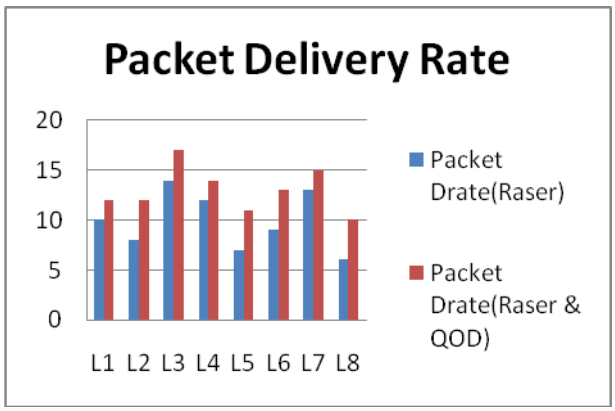

Fig 5.3 Representation of Raser & QOD with Packet Delivery Rate

CONCLUSION

The behavior of nodes within the network varies supported the utilization of protocols. In RASeR protocol, nodes can drop the packets. however in QoD protocol, nodes can alter the packet transmission path. In RASeR, the nodes won't adjusted supported the quality different nodes within the network. however the QoD protocol can alter the quality of nodes supported the opposite nodes position. The advantage of QoD is to supply discriminatory delivery service for the applications that require it by guaranteeing decent information measure, dominant latency and reducing information loss. Hence, RASeR protocol is increased with QoD for higher performance. This new model was tested and therefore the findings show the enhancements within the time consumption, energy consumption and in packet delivery quantitative relation. In future, cross-correlation of monitored traffic below quality situations is studied. The developed application is designed as an internet website so it is accessed across the platforms. The route discovery application if developed as internet service, then several applications will build use of it. Future work includes cross-correlation of monitored traffic below quality situations to be thought of. The new system becomes helpful if the higher than enhancements square measure created in future. The new system is meant such those enhancements is integrated with current modules simply with less integration work.

BIBLIOGRAPHY

[1].J. Al-Karaki, A. Kamal, “Routing techniques in wireless sensor networks : A Survey”, IEEE WirelessCommun.11(6) (2004) 6–28.

[2].Asha P Rajapurohit,Asha,G. Mahadevan,”Data Transmission Protocol for Hybrid Wireless Networks with QoS Assurance”, Issue 4, Volume 2 (April2015) .

[3].Christian Tchepnda, Hassnaa Moustafa, Houda Labiod, ”Hybrid Wireless Networks: Applications, Architectures and New Perspectives”, 22 January 2007

[4].D.Ganesan, B. Krishnamurthy, A.Woo, D. Culler, D. Estrin, and S. Wicker. “An empirical study of epidemic algorithms in large scale multihop wireless networks”, Technical Report IntelIRP-TR-02-003, Intel Research, March 2002.

[5]. D.Ganesan, R. Govindan, S. Shenker, and D. Estrin. “Highly resilient, energy efficient multi path routing in wireless sensor networks”, MC2R, 1(2), 2002.

[6]. T. Hayes, F.H. Ali,” Proactive Highly Ambulatory Sensor Routing (PHASeR) protocol for mobile wireless sensor networks”,Volume :21,August ,2015.

[7].W. Heinzelman, A. Chandrakasan and H. Balakrishnan, ”Energy-Efficient Communication Protocol for Wireless Microsensor Networks,” Proceedings of the 33rd Hawaii International Conference on System Sciences (HICSS ’00), January 2000.

[8]. Astt prof. Jagtar Singh, Anu Arya ,” A Review on Wireless Sensor Networks “,Vol. 4 Issue 1 June 2014

[9]. Jaideep Lakhotia, Rajeev Kumar,” Cluster Based Routing Protocols For Mobile Wireless Sensor Network: A Review”, Volume :3, Issue: 7, July 2014.

[10]. Jamal N. Al-Karaki Ahmed E. Kamal,” Routing Techniques in Wireless Sensor Networks: A Survey”, Volume: 11, Issue: 6, Dec. 2004.

[11]. Konrad Lorincz, “Sensor Networks for Emergency Response: Challenges and Opportunities”, Volume: 3, Issue: 4, Oct.-Dec. 2004.

[12]. J. Kulik, W. R. Heinzelman, and H. Balakrishnan, ”Negotiation-based protocols for disseminating information in wireless sensor networks,” Wireless Networks, Volume: 8, pp. 169-185, 2002.

[13].G. S. Kumar, M. V. Vinu, P. G. Athithan, K. P. Jacob, Routing protocol enhancement for handling node mobility in wireless sensor networks, in: Proceedings of IEEE Region10Conference(TENCON), 2008,pp.1–6.

[14]. Riad Kouah, Mohamed Aissani and Samira Moussaoui,” Mobility-based Greedy Forwarding Mechanism for Wireless Sensor Networks”, 2013. ISBN: 978-1-61208-256-1.

[15]. G. Santhosh Kumar “Routing Protocol Enhancement for handling Node Mobility in Wireless Sensor Networks”, 27 January 2009.

[16].C. Schurgers and M.B. Srivastava, “Energy efficient routing in wireless sensor networks”, in the MILCOM Proceedings on Communications for Network-Centric Operations: Creating the Information Force, McLean, V A, 2001.

[17].Simerjeet Sharma and Navpreet Kaur," Dynamic Reliable Location Aware Routing Protocols for Mobile Wireless Sensor Network", Volume 137 ,No.8, March 2016.

Author
Ms. M.S.KOKILA, M.Sc(CS).,M.Phil.,
Assistant Professor,
Department of Computer Applications
Kongu Arts and Science College (Autonomous),
Erode ,
TamilNadu-638107,
India.
Co-Author
S.KOWSALYADEVI, M.C.A .,
Research Scholar,
Department of Computer Science,
Kongu Arts and Science College(Autonomous),
Erode,
TamilNadu-638107,
India.