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CBR- Contour based routing in Multi Hop Wireless Sensor Network

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Abstract:

In certifiable situation, the desire levels of sensor hubs have become a high effect as far as size, cost, productivity and unwavering quality. In such a case all the sensor hubs are conveyed and current asset usage drives the sensor hubs to forfeit its exhibition level this may happened frequently in sensor medium. Hence to deploy an optimal data packet routing in wireless sensor network was an impact of researchers. In this paper we proposed a new scheme using circular routing called CBR, here the routing scheme is one of the vast advent where the data packets inter arrival was calculated periodically for every hops. For every instance the boundary or contour of the network is evaluated which in turn gives an optimality in terms of finding the shortest contour within the circular boundary of network. Experimental results demonstrate the actual working procedure of the routing scheme in WSN. The proposed method was much better in terms of optimal resource utilization and routing based on the hop to hop in multi hop networks.

Keywords: *CBR; Circular routing; Multi hop; WSN.*

Introduction

Wireless sensor networks[1-4] is advanced cutting edge which was booming day by day.in recent years various researchers and research forums have gone a wide range of research in these areas. Basically sensors are light weight hardware devices used for various application such as military, medical, biological, GIS etc [5]. Recent research which attracts future scope on wireless sensor networks is termed as MEMS combined with computational intelligence called SWARM [8][11]. The sensor device generally has three main systems namely 1) an advent subsystem which sense the environment 2) Computational

November-December 2019
ISSN: 0193-4120 Page No. 5085 - 5090

logic which converts the sensed raw into computational data and third one is message exchange protocol.

Each sensor has large number of sensing region with high compatibility, average power consumption, resources and high computation[9]. Computational complexity has reached a wide range of resource utilization and high intensity of power consumption this may leads to failure of nodes. Energy utilization without degrading the network performance will increase the robustness of the sensor nodes. In this paper, we proposed a strong strategy to trade information bundles with less vitality utilization and with high handling of information trade [4].

Previous work

WSN steering fire up with hereditary methodology which was talked about profoundly in the paper entitled "Redesigning Localization Route Using Particle Swarm-A Genetic Approach". A couple of counts exists recorded as a hard copy, since some are of in basic employment other may not .Since WSN revolve around low power use during package transmission and getting, finally we grasp by consolidating swarm atom based figuring with genetic procedure. From the outset we demand the centers subject to their essentialness standard, and subsequently focusing towards center point way; this should be conceivable using Proactive course computation for discovering perfect route between S-D (Source – Destination) centers. The paper comprises with the clustering setup of each node and how reliably routing takes place within the clusters. The main challenge of the proposed model using K-means and PSO is discovering neighbour nodes and during node failure the clustering algorithm fails to predict the neighbour node.

Snappy dealing with and pre traversal should be conceivable using explicit flooding approach and results are in genetic. We have improved our results with high exactness and optimality in rendering courses. GSO figuring includes in a strong cooperation of GA and PSO, since it keeps up the joining of the two systems for the entire run. In each accentuation, really, the masses is parceled into two areas and they are progressed with the two techniques in a particular request. Next start up with the hybrid model in combining k-means and PSO[16][17].

In multi hop networks, the routing is very critical and node behaviour is not at stable range. Hence we proposed a new routing scheme called straight line routing with ACO (Ant colony optimization algorithm) to find the straight line of the nodes[13][14].The main problem defined here was node discovery in which the following scheme is used to utilize it, RTS/CTS are two reliable request response messages broadcasted to find the neighbour nodes. Initially the root node sends the ARP RTS message to all the nodes. Once the node within the range receives the request, then the node replies with the node identity (PMAC address [9]). The node starts to send the ACK reply/response with CTS message. Once the CTS message is received at the root node, based on common evaluation the neighbour nodes are identified[11][15].

Proposed methodology

In multi hop networks in WSN, the major problem is finding the node adjacency in order to group all the node members, in our previous work; finding the node head and discovering the neighbouring nodes in heterogeneous network is also one of the challenging deals. In this proposed routing scheme the routing is fully based on contours of the nodes which are always assisted by the base

station[10][12]. Such the transmission area and sector of transmission range are clearly defined in the figure 2.

The contour range is defined with the radius of the nodes. The radius clearly denotes the node range and its transmission sector. Since the transmission of each sensor can directly receive the response message from the base station. To determine the neighbouring node and availability of the node within the tower range the base station scans the entire frequency based on angle value of sensors. This type of scanning is fully built on various energy levels of the nodes. The nodes location is found by means of the last RTS transmission message and its positive reply sequence (Sector level – denoted in Figure 2b).

Contour based Data exchange

In this section the basic protocol scheme for routing and data exchange has been discussed. Whenever the RTS message is broadcasted from the base station, the particular event is recorded and CTS message is acknowledged to send the packets from the sensors to base station. The event detection is fully accomplished by means of setting the timer interval to receive the broadcasting RTS packets. When two or more sensors receive the same broadcasting request, the sensor with highest energy level takes the first bonding required to the base station. The basic sensor identities are

Sensor ID – defines the sensor identity

Source ID – source station identity

Basestation_addr_id – base station unique identity MAC address

Timer – Timer to monitor the event occurrence

Signature_id –channel identifier(base station)

Multiple Base

A senor node which receives two or more RTS message from multiple base stations, the identity of sensors will select the unique identifier of the base station(MAC address). The sensor node's frame header is checked for the base_station_mac to define its legal identity to exchange data between nodes to the base station[6][7].

Simulation result and performance analysis

The proposed scheme was simulated in the MATLAB environment with 150m nodes and 500 nodes. The performances of the two active networks are compared. The node with higher range performs with the desired output results with less number of deviations in the packet loss. We have tested the previous protocol scheme of with the proposed protocol model, the model have high compatibility. The contour based routing schemes have higher identity for the sensor nodes in terms of power consumption, reliability, robustness etc. the comparison stats of the proposed protocol with the previous protocol [1-3] is clearly defined in the figure 1.

November-December 2019
ISSN: 0193-4120 Page No. 5085 - 5090

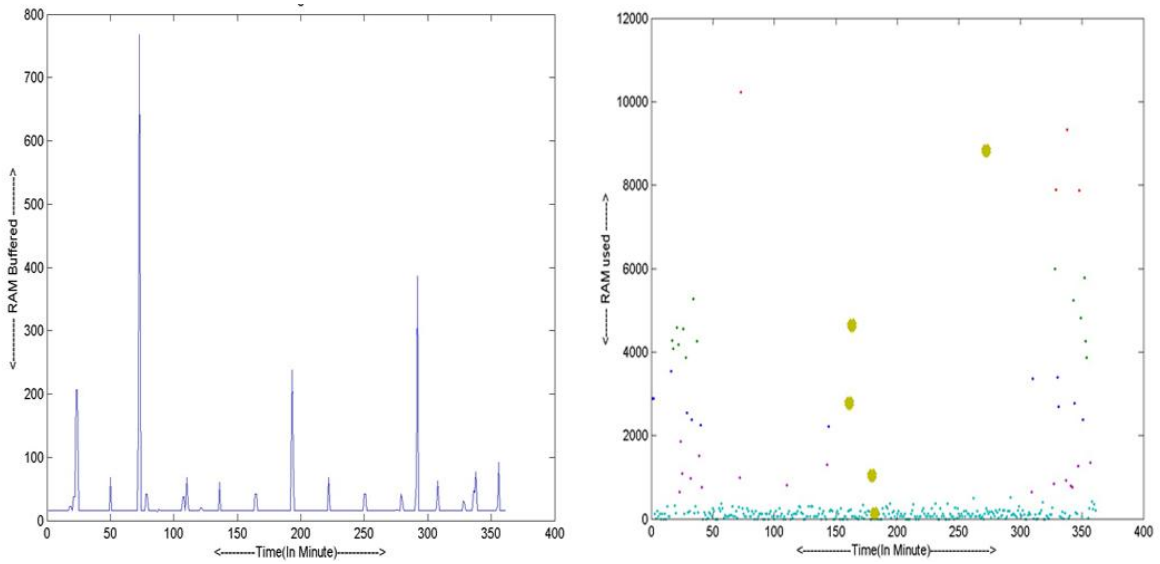

Figure 1: Simulation model of the Contour based routing

a) Rate of data transmission (timer) *b) Contour level and node identity (WSN)*

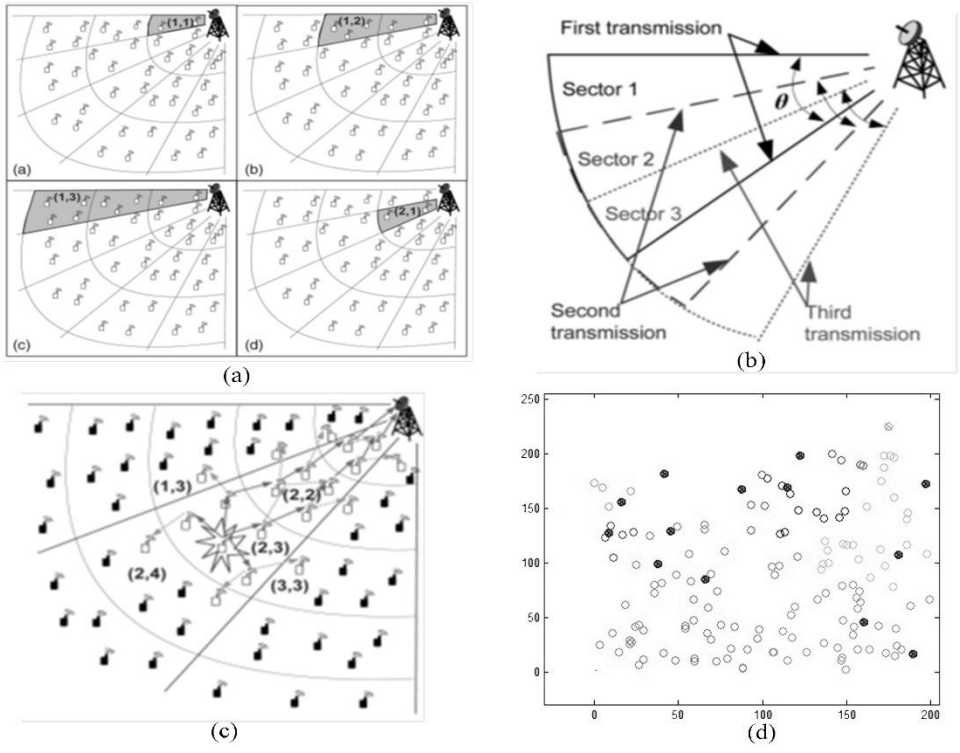

Figure 2: Implementation of proposed Routing Scheme

a) Actual nodes connected to base station
b) Value of data transmission with angle
c) Routing scheme
d) Simulation results in MATLAB R2013b

Conclusion

Hence we conclude this paper with a robust routing protocol for wireless sensor networks. The proposed protocol is robust in

nature and highly compatible to adopt the entire existing protocol scheme. The fundamental witticism of the work is to move the information solid in setting to hearty conveyance of information transmission without corrupting system execution. The exploratory outcomes are obviously signified in the figure 2. In figure 1 chart characterizes the obvious edge level plan for the proposed model. Subsequently by the last guarantee we accomplished that the CBR has high similarity and dependability over information transmission and finding ideal way dependent on shape. The directing presentation was additionally analyzed in figure 1 which expresses the proposed convention beats the current convention with better execution and better unwavering quality.

Future Enhancement

The proposed plan "CBR" accomplishes the preferable execution over the current convention, since the hub revelation and root hub distinguishing proof at shape level was as yet a difficult arrangement in WSN. In future we might want to improve our work by methods for half breed steering convention (consolidating two ideal directing conventions) regarding directing execution with neighbor hub personality and root hub character. Different half breed plans of examinations will be made on the future directing convention.

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November-December 2019
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