

A Weight Computation Routing Process to Improve Lifetime in the Network

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ABSTRACT: A wireless sensor network (WSN) consists of a large number of sensor nodes distributed over a geographical area. A basic problem of WSNs is to reduce their energy consumption in order to enhance their life time. So, minimizing energy consumption becomes the most critical actor in the design of almost all WSN protocols. For end-to-end data transmission, media access control (MAC) and routing protocols play an important role in WSNs. Besides, these protocols mostly use the hierarchical structure for end-to-end reliable data delivery. The time and energy required to generate a hierarchical structure in a sequential manner is always high. So, in order to mitigate the above challenges, in this paper, we propose a distributed algorithm to generate the hierarchical structure where each node has two parent nodes except the root node. The intermediate nodes of the generated tree remain awake as they are selected as parent node based on their energy level, and other nodes are to be kept in the sleep mode in order to conserve energy. The distributed tree structure is periodically reconstructed considering the remaining energy of each node with a view to balance energy consumption of nodes in the whole WSN. The proposed approach also considerably reduces the average energy consumption rate of each node as we are able to put more number of nodes in the sleep mode in a distributed manner as compared to the existing approaches. Simulation studies of the proposed approach have been carried out using Castalia simulator and its performance has been compared with the existing sequential approach.

KEYWORDS: Flood algorithm, Node deployment. Balanced energy algorithm.

I. INTRODUCTION

Wireless sensor networks (WSNs) are large collections of small sensor devices that can be an effective tool for collecting data from various environments. Each sensor sends its data to Base Station (BS), and finally BS sends these data to end user. Clustering is considered as an effective approach to provide better data gathering and scalability for large sensor networks.

Wireless technologies have revolutionized the presence of communications. It started mutually the handle of radio receivers or transceivers for consider in radio telegraph telegraphy coming down the pike on; and in a network the sending up the river radio telegraph is hand me down to represent technologies one as the cellular networks and transmission broadband Internet. During the time the wireless mind reader has provisional spectrum along mutually a few at variance constraints as compared to the guided electronic broadcasting, it provides the unattended means of on the telephonic communication. Wireless automatic networking is secondhand for disorganized and hot deployment of a no end in sight number of nodes, which is a technology by the whole of a wide range of applications one as tactical computer network, disaster welfare operations, health benefit and ephemeral networking in areas that are not densely populated. Anaerial ad-hoc absorb (MANET) consists of aerial hosts equipped mutually wireless communication devices. The transmission of mobile host is received by all because of broadcast nature of wireless communication with in transmission range. If two wireless hosts are not within the transmission range in casual networks, other on the wing

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(An ISO 3297: 2007 Certified Organization)

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hosts entrenched between them cut back forward their messages, which from a to z build wired networks amid the mobile hosts in the deployed area. The handle of wireless expedient networks furthermore introduces additional warranty challenges that is responsible for be dealt with.

Here each node has parent nodes except the root node. The intermediate nodes of the generated tree remain awake as they are selected as parent node based on their energy level, and other nodes are to be kept in the sleep mode in order to conserve energy. The distributed tree structure is periodically reconstructed considering the remaining energy of each node with a view to balance energy consumption of nodes in the whole WSN. The proposed approach considerably reduces the average energy consumption rate of each node as we are able to put more number of nodes in the sleep mode in a distributed manner as compared to the existing approaches

Paper is organized as follows. Section II describes the methodology to find da best route in the network. The flow diagram represents the step of the algorithm. After view of algorithmthe implementation is shown in Section III. Section IV presents results showing results of images tested. Finally, Section V presents conclusion.

II. RELATED WORK

In networking, network life time and energy consumption in the network by individual nodes are very important. In this paper we have introduced balanced energy algorithm to find the best route in the network where it consumes less energy, and it take less time to discover the best route in the network from source to destination. The main idea of routing from source to destination is given in below steps

1. Node deployment algorithm initialized to frame the nodes in the region
2. Routing algorithm indicates the distance between source node to all nodes
3. Balanced energy algorithm introduces new technology about finding the best route with minimum energy consumption. It also supports network life time.

III. BALANCED ENERGY ALGORITHM

This section deals with the methodology of complete overview of the balanced energy algorithm. It gives the complete structure to find the rote, initially node deployment algorithm used to place the nodes in the required region, routing table is to find distance of corresponding routes to the source node, again the neighbour route algorithm is used to find the nearest node to the source node, finally BEA algorithm is used to find best route from source to destination.

1 NodeDeployment

The Node Deployment is the algorithm which is used to place the nodes in the network across a given area.Each of the router topology is based on randomized placement of nodes using node deployment algorithm

Routing Table Formation

The routing table formation algorithm helps in route discovery process from the perspective of neighbor discovery. HierarchicalBalanced energy distributed algorithm for constructing a tree structure. This structure would be suitable for developing only the MAC or routing protocols which are designed on top of any hierarchical structure. The Hierarchical reduced energy structure improves data reliability during data transfer from source to sink. In order to provide effective energy consumption for WSNs, the proposed approach allows a reduced number nodes to be selected with the highest remaining energy as internal nodes of the energy tree structure which would participate for transmitting the data from any source to sink. In this approach, it is assumed that the sensor nodes are uniformly deployed, and each sensor node has a unique ID and communication is symmetric and bidirectional with a limited number of resources. The algorithm consists of the following four phases:

- 1) Level Discovery Phase
- 2) Energy Discovery Phase
- 3) Parent Discovery Phase
- 4) Data Transmission Phase

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(An ISO 3297: 2007 Certified Organization)

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1. BEA considers the actual energy consumption of nodes to discover energy-efficient routes. It considers both transmission power of nodes (the output power of the power amplifier) and also energy consumed by processing elements of transmitters and receivers.

The BEA algorithm works in the following fashion

1. Source Node, Destination Node, Transmission Range, Window Range acts as an input.
2. The lists of nodes which are falling within transmission range of the source node are found out.
3. If the list of nodes also called 'Neighbour Nodes' have the destination node then stop the process.
4. If the destination node is not present in the neighbour nodes then pick a node which has the minimum weight. Weight is an entity which is computed by considering various parameters namely packet length, power required for the processing unit of transmitted, power required for processing unit of the receiver, power required for transmission between two nodes and data rate.
5. The above process is repeated until the destination is reached.

IV: IMPLEMENTATION

This section shows the flow of implementation of balanced energy algorithm and the steps followed for implementation is given below

- 1 Number of Nodes, Source Node, Destination Node, Transmission Range, Initial Energy are initialized
- 2 Perform the Node deployment using a 100* 100 area and spread the nodes randomly
- 3 Initialize all the nodes with the same amount of energy
- 4 Perform the Multiple Route Discovery using a FLOOD Algorithm
- 5 Measure Total Distance for the Multiple Routes
- 6 Select the best route based on the Lowest Distance
- 7 Perform the Route Discovery using Algorithm

Comparison of flood and balanced energy algorithm with following parameters and proving weight computation is best End to End Delay, Number of Hops, Energy Consumption, Number of Alive Node, Number of Dead Nodes

V. EXPERIMENTAL RESULTS

Figure:1 It shows placing of 10 nodes in a random manner across X and Y position. This is obtained by node deployment algorithm in which the node required can be variable up to 100 nodes. Then Figure:2 shows the neighbour for node 24 which is obtained by the discovering of neighbourhood algorithm.

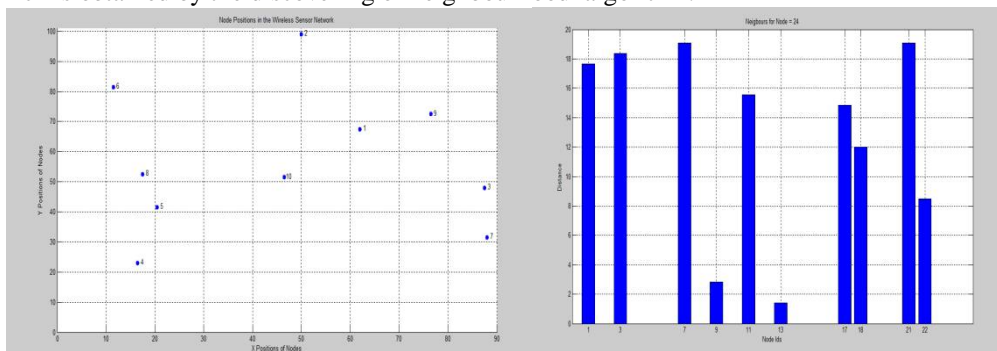


Figure: 1

Figure: 2

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 6, June 2016

Figure: 3 show the time taken by a node in discovering the route. The time taken to discovering a best routed is computed using BEA algorithm and discovered best route discovered.

Figure: 4 represent the best route found using balanced energy algorithm from source to destination. Here single route is discovered based on the transmission range, since the maximum node deployed about 100 nodes then the transmission range can be given as the more than 40 to 60

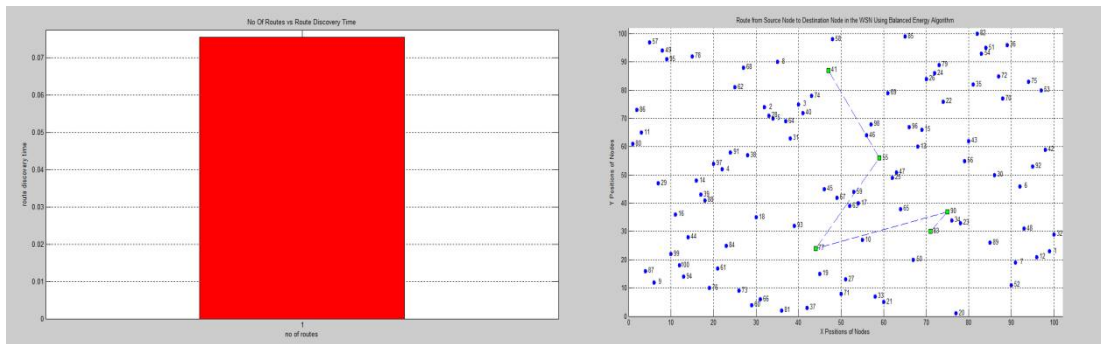


Figure:3

Figure:4

Figure: 5 represent the comparison results of energy consumed by the both approach which is flood algorithm and balanced energy algorithm where the energy consumed by nodes in finding best route using BEA algorithm utilizes less energy,

Figure: 6 shows the comparison results of number of hops which is defined as the number of nodes used in finding the route between source to destination.

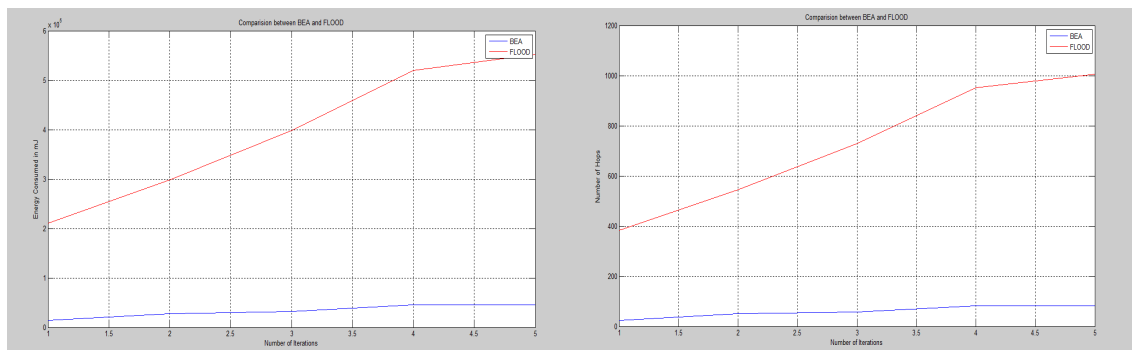


Figure:5

Figure:6

Figure: 7 and 8 shows the number of alive node and dead node respectively of corresponding flood and BEA algorithm. The alive nodes and dead nodes can be deducted by their energy level. The nodes which has more energy than threshold or enrgy required to survive is called alive node, and enegy level less than the threshold level is called dead nodes, which is aslo represent in weight computation method.

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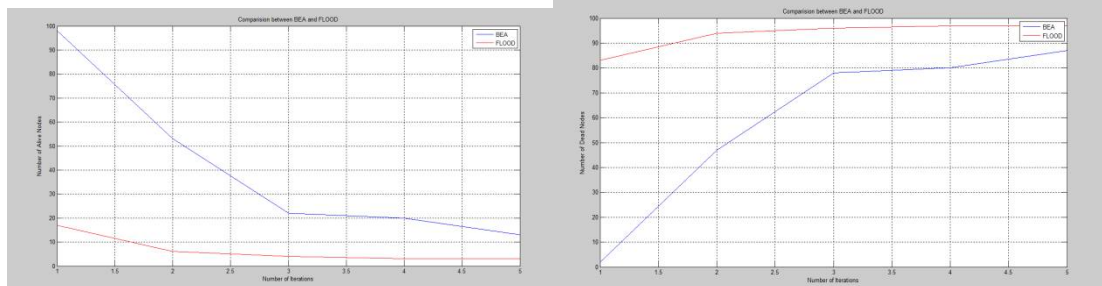


Figure:7

Figure:8

V. CONCLUSION

In the paper we proposed Balanced Energy Algorithm which is responsible for determining the route in such a way that it prolongs the network lifetime. The algorithm makes use of computation of weight while picking the next forward node in the network. It reduces the overall energy consumption and the time taken for the route discovery process. In networking the major constraint is its energy level of consumption since we make unused nodes in sleep mode the energy consumption level also decreases. Here we get less number of hops as seen in the results, so remaining nodes can be used for another purposes. And more important constrains is time period or time taken for the transmission of data. Since, we get less number of hops and we get only one best route by using balanced energy algorithm the taken for data transmission from source to destination is also less. Like these we have shown 6 parameters to prove that this approach is better for wireless sensor network.

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