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Energy Efficient Routing Protocol in BAN using Distributed Cut Detection (DCD) Algorithm

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Abstract*: *In Body Area Network the role of communication plays a vital role. All communication is done by means of nodes. There will be several nodes in a communication. Each node communicates with other nodes irrespective of the task achieved by it. During nodes communication some nodes will become a failure node and it is technically termed as "cut" in the field of wireless communication system. This failure nodes actually disturbs the entire communication which will result in the loss of data which in-turn lowers the efficiency of the entire system. So at any cost such type of failure node activity should be eradicated in order to improve the efficiency of the entire system. So to solve this problem we are going to follow the cut detection and eradication algorithm in order to improve the efficiency and life time of the communications. Here this algorithm will find out the failure nodes that are found during the communication. This failure node is found out by means of acknowledgement of each node which will be given back to the corresponding server. So in particular time we wont get the acknowledgement from certain nodes for a longer time that means that particular node will be a failure node and this failure node will be eradicated from the communication. A new route will be discovered by the other nodes in order to carry out the entire communication process without any delay.

Index Terms*: *Transceiver, Wireless Personal Area Network, OTCL, Training, Manipulation, Node failure.

I. INTRODUCTION

In today world wireless sensor networks plays a vital role in the field of medical science. It is normally nominated by the technical term called WBAN (Wireless Body Area Network). As we discussed each communication is done by means of nodes. Failure of nodes in communication plays a vital role that disturbs the entire communication process which in-turn lowers the efficiency of the system. The reason for failure of nodes is of many reasons mostly the reasons are battery backup, mechanical problems, environmental criteria's. in general node failures main reason will be small battery backups. When such nodes have such small backups the problem of multi-hop in network arises. Such type of nodes are generally termed as the cut nodes in this concept. Here we are going to propose an algorithm called as the Distributed Cut Detection (DCD) algorithm. This algorithm during communication will check for the acknowledgement of each and every nodes. It will maintain a routing table of all the acknowledgement values. If there is no such acknowledgement from any node it is termed as failure node. When the failure node is confirmed immediately an alternative path will be taken with the help of our proposed algorithm. This alternative path will be the shortest path in the communication which will have less packet loss in the entire Body Area Network.

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II. LITERATURE SURVEY

The BAN is an accumulation of remote hubs that work in a decentralized foundation. Despite the fact that some improper directing conventions were executed, the overhead because of rare utilization of data transfer capacity, and Cell control isn't unimportant. The analysts dabbed the elements which influences the throughput of the transmission. In these variables, the most dull overhead is the blockage. The clog is the unsustainable overhead caused because of the absence of the limit in cradles of the collectors. Yet, the blockage won't influence the directed conventions in view of their unwavering quality. The layers which are engaged with this blockage are generally the information connect layer. The gigantic edges utilized in the transmission are generally influenced by this clog in light of its absence of blunder checking bit present in it. This will thus cause the postponement in transmission. To defeat these issues, the clog control instruments have been presented. In any case, the clog control system will decrease the effectiveness of the general system. In a correspondence organize blockage happens when there are more bundles present in a subnet. At the point when the heap on the remote system is more than its taking care of limit then clog exists. The restriction or disadvantage of clog in a system is the wastage of time, channel data transmission and bundle misfortune. This corrupts the execution of the system. BAN utilizes a mutual mode for correspondence so when clog happens, it influences the whole system. Directing Protocols are the choosing expert and they are in charge of building up appropriate correspondence. In the event that the conventions don't know about the clog it results in Long Delay. At the point when clog happens it is smarter to search for a substitute way, however the disadvantage is that the on interest directing convention expends additional time in finding a steering way.

III. EXISTING SYSTEM

In case of existing system only the linear cut detection method is been used. The major drawback of this system is only the straight line detection of nodes
is been examined.

So when following this type we may leave the clustering group of nodes. Here if we do so all the failure nodes will not be identified only certain amount of failure nodes can be identified. Here the concept of checking the acknowledgement is not followed here and routing table is not maintained here. Because of this identification of failure nodes is not done properly. The main disadvantages of existing system are as follows

1. No checking of acknowledgement.
2. Not maintaining routing table.
3. Not checking for power backup of each node.

IV. RESEARCH METHODOLOGY

Here we are going to propose a distributed cut algorithm which will find the failure node in the communication. By following this method it is very easy to detect the failure nodes then and there with the help acknowledgement that is been maintained in the corresponding routing table. The main advantages of proposed system are as follows

1. This algorithm will help out in finding the failure nodes in the communication.
2. After finding the failure nodes it eliminates completely the failure nodes from the system in order to stop the time delay.
3. A new connection path is been found here in order to continue the communication without any loss of data in WBAN.

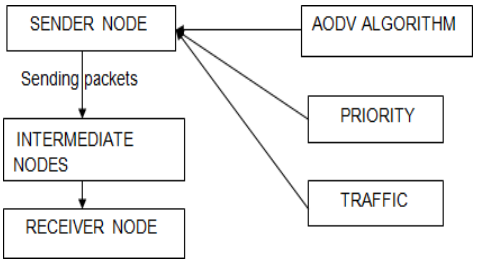

Fig.1 Proposed Block Diagram

A sensor network is modeled as a graph G = (V, E) whose node set V correspond to the wireless sensors and whose edges E consists of pairs of nodes (u, v) that can communicate directly with each other. Now the nodes are been declared. Then after declaring the nodes the process of clustering takes place. Clustering is nothing but dividing the nodes into groups. Then first half communication takes place and acknowledgement of each nodes are stored in database. After the first half communication the routing table is searched for the corresponding acknowledgement values. If any nodes ACK value is been lost it is termed that node will be a failure node. The process of communication is been repeated again and again for the confirmation of the failure nodes. If the node is been found failure node that corresponding node will be eliminated from the entire system and new routing path is taken is taken in order to start the communication process without stopping the process.

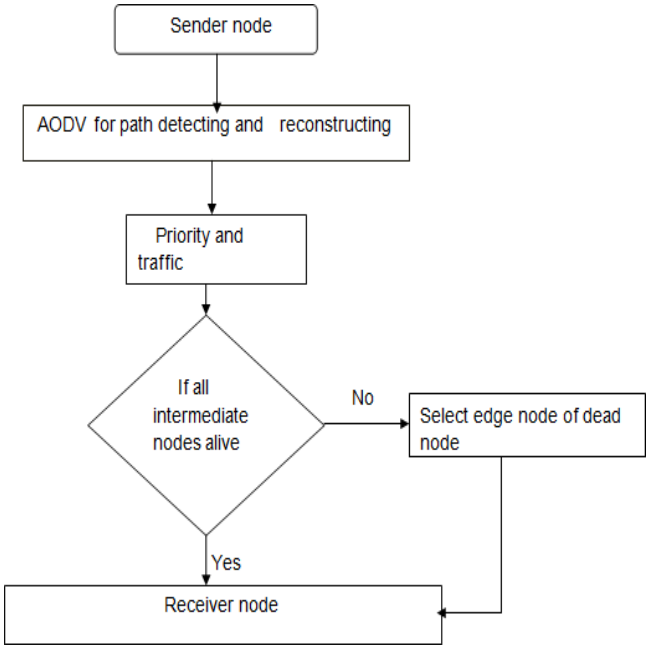

Fig.2 Flowchart

V. MODULE DESCRIPTION

Identifying Cut Detection

This algorithm will help us to find out the nodes that are been active in the communication. Here the nodes size, structure, length and many other parameters have been taken into account. All such information's are been stored up in the routing table for future use.

CUT

In case of *WBAN* communication between the nodes plays an vital role in order to carry out the messages from source to destination in a high efficient manner. During communication of nodes some nodes will become a failure node due to many external parameters as discussed above. Such type of failure noses are termed as 'cut' here.

Source Node

In order to find out the problem of detecting failure nodes in WBAN special nodes are been created these special nodes are called as the source node. These source nodes are generally called as the base station which act as a connecting link between the network and the users.

CCOS and DOS

When a node is been disconnected from the main source node, we call that node as DOS (Disconnected frOm Source). And when a cut is been occurred in the network that does not separate a node from the source node, we say that CCOS (Connected, but a Cut Occurred Somewhere).

Network Separaton

The failure node that is been detected will create a multi-hop paths in the network. So in order to safe guard the entire communication system the process of network separation is been carried out.

Here the failure nodes are been removed and a new path is been established to continue the entire process without any lag and disconnection.

VI. RESULTS AND DISCUSSION

Simulation Process

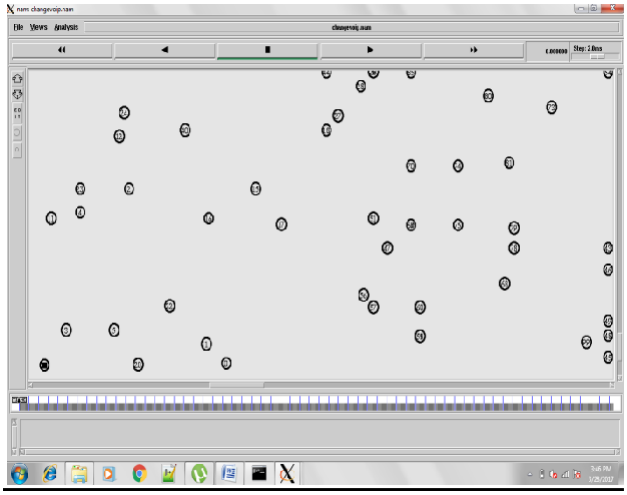

Fig.3 Node Creation

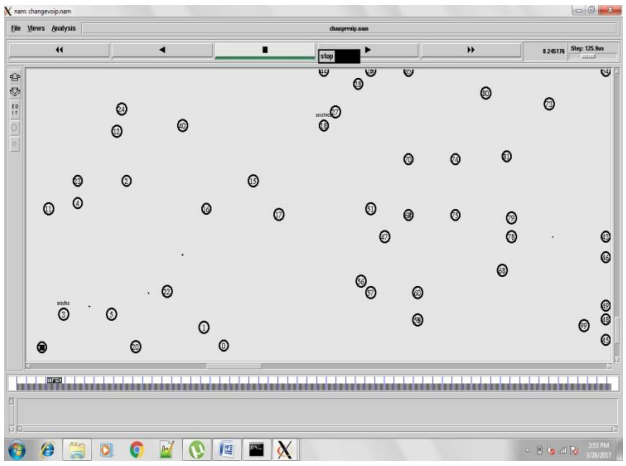

Fig.4 Sending Packets

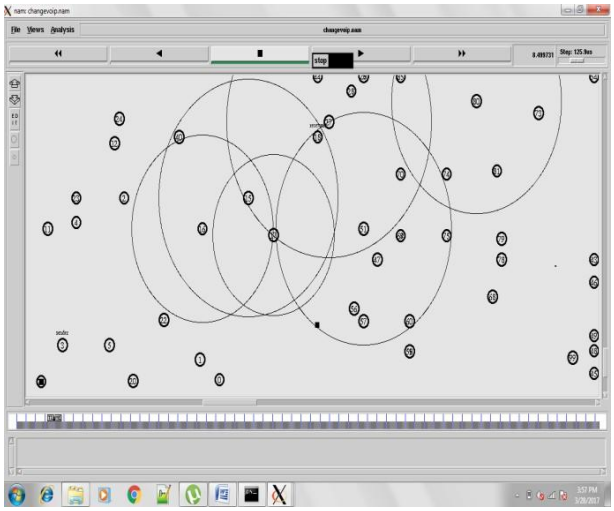

Fig.5 Communication

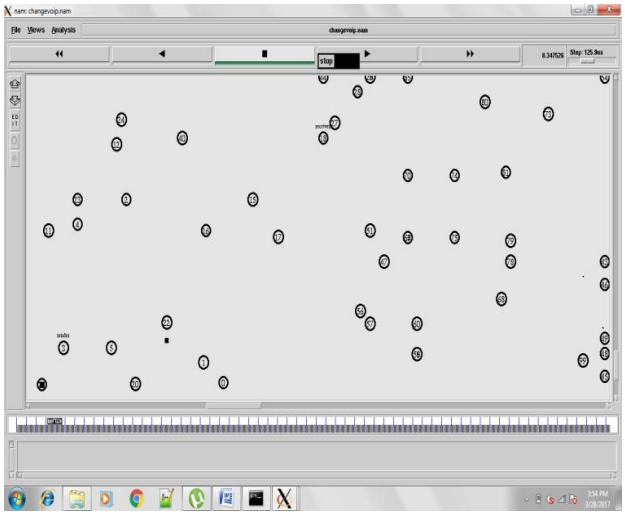

Fig.6 Packet Drop

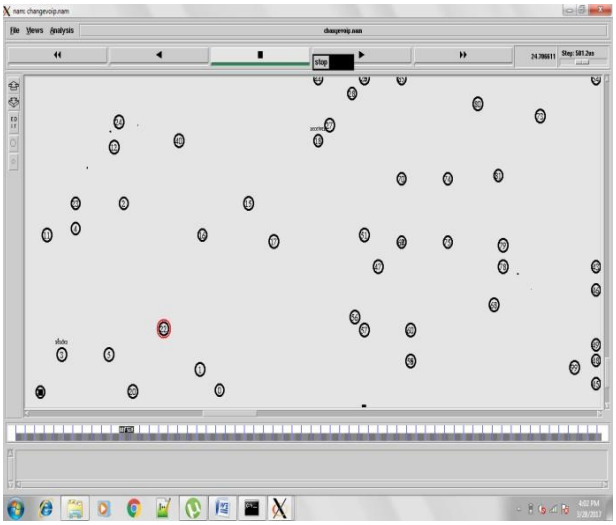

Fig.7 Node Failure

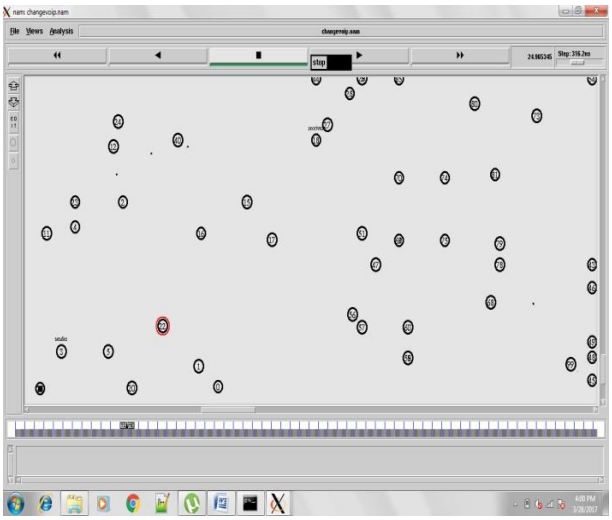

Fig.8 Cut Detection

Results

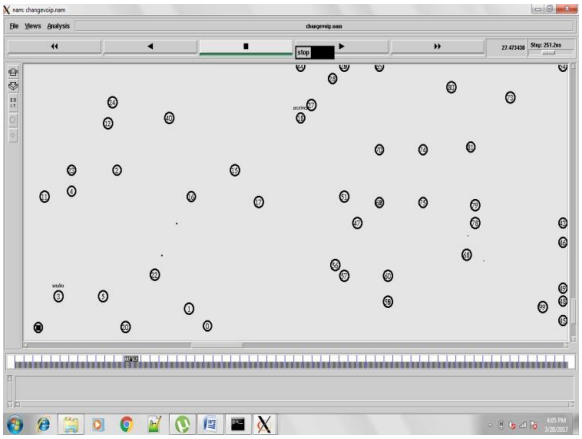

Fig.9 Path Reconstruction

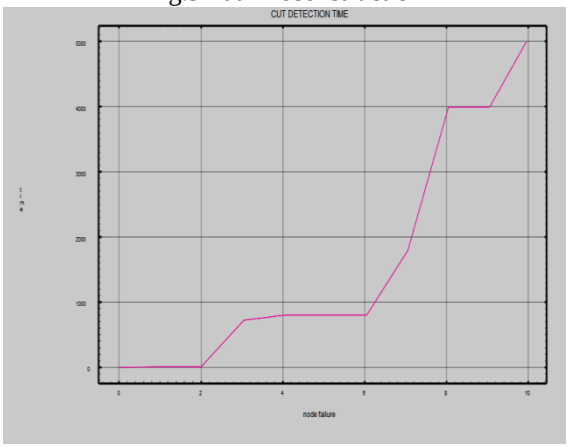

Fig.10 Existing Cut Detection Time

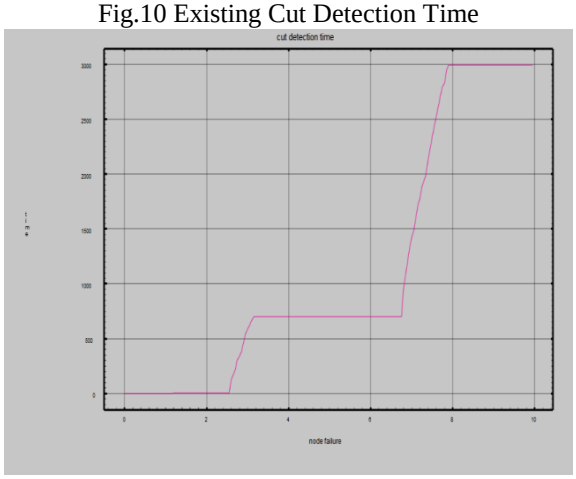

Fig.11 Proposed Cut Detection Time

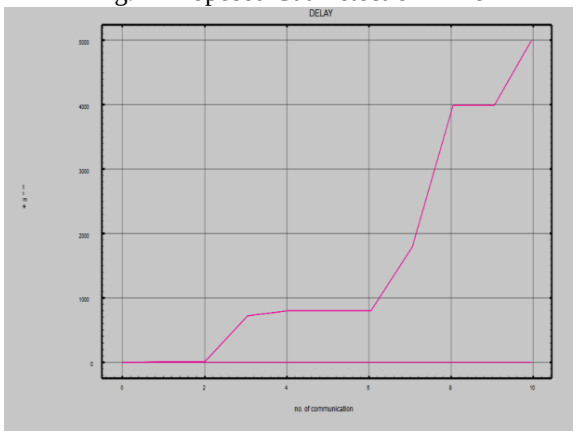

Fig.12 Existing Delay Graph

The above graph is plotted between node failure on X axis and Time on Y axis. The graph clearly shows the possibility of node failure and time in a frequent interval of time. Graph Shows the possibility of node failure explains about the power usage of a device as it is studied that a sensor device does not have the huge power. On comparing both existing and proposed graph we can state that our proposed algorithm node failure is detected efficiently than the existing method.

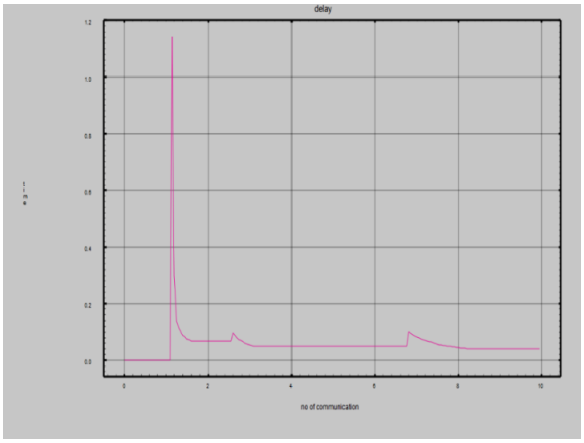

Fig.13 Proposed Delay

The above graph is plotted between no of communications on X axis and Time on Y axis. The graph clearly shows the possibility of delay with respect to time in a frequent interval. Graph Shows the possibility of node failure explains about the Delay between two operations, designed to make it safer or more efficient. On comparing both existing and proposed graph we can state that our proposed algorithm delay w.r.t time is detected efficiently than the existing method.

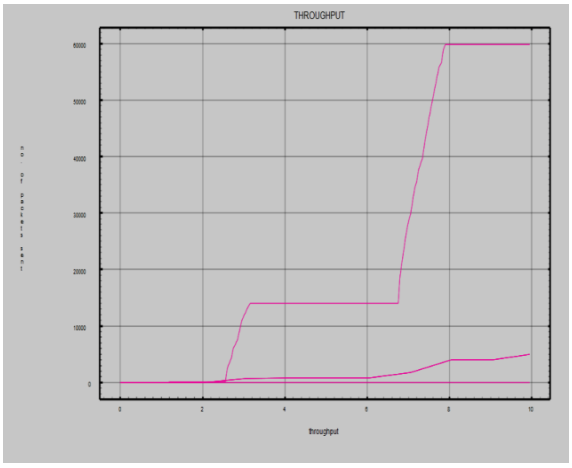

Fig.14 Existing Throughput

The above graph is plotted between no of communications on X axis and no of packets on Y axis. The graph clearly shows the possibility of throughput with respect to the packets and communication in a frequent interval of time. Graph Shows the possibility of throughput failure explains about between two operations, designed to make it safer or more efficient. On comparing both existing and proposed graph we can state that our proposed algorithm throughput w.r.t no of packets and communications is detected efficiently than the existing method.

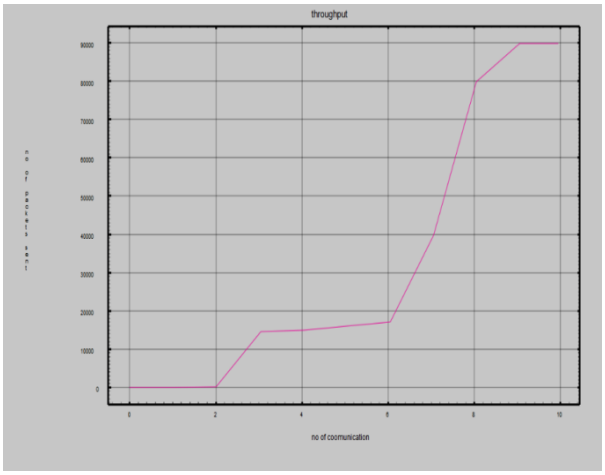

Fig.15 Proposed Throughput

VII. CONCLUSION

Here we have proposed a new algorithm called cut detection algorithm which will help us to identify the failure nodes that is been caused in WBAN. As we are eliminating the failure nodes it's very easy for the communication to continue its process without interruption. This will lead to a good efficiency and throughput which will help the WBAN communication to carry out with new alternative path.

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