

Detection of Cuts in Wireless Networks

Yogesh kushawaha
Assistant Professor
Information Technology
SRM University
NCR Campus, Modinagar

Vishakha Raje Singh, Anushree Gupta
B.Tech Student
Information Technology
SRM University
NCR Campus, Modinagar

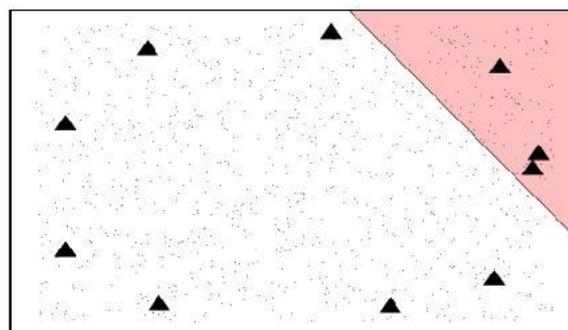
ABSTRACT:

A wireless sensor network can get separated into multiple connected components due to the failure of some of its nodes which are termed as “cut”. In this article we consider the problem of detecting cuts by the remaining nodes of a wireless sensor network. In this we propose an algorithm that allows every node to detect when the connectivity to a designated node has been lost and one or more nodes that are connected to the special node detect the occurrence of the cut. The algorithm is distributed and asynchronous in which every node needs to communicate with those nodes that are within the communication range. The algorithm is based on the iterative computation of the nodes. The convergence rate of the underlying iterative scheme is independent of the size and structure of the network.

Keywords: cut, nodes, distributed network, spatial and temporal resolution.

INTRODUCTION

Wireless sensor networks are a promising technology which is used monitoring large regions at high spatial and temporal resolution. It offers an excellent opportunity to monitor environment and have lots of interesting applications some of which are quite sensitive and require proof secured environment. In this paper we address threats and attacks in wireless sensor network. In wireless network a node may fail due to various factors such as tempering, mechanical or electrical failures, environmental degradation etc. Fail node is expected to be quite common due to typically limited energy budget of nodes in small battery. Failure of a node will reduce the numbers of multi hopes path of a network. This failure causes the subset path of a node that has not failed to become disconnected from rest of the nodes in the network resulting in the “CUT”. Two nodes are said to be connected if the path between these nodes are not lost and are said to be disconnected if there is no path between them to be connected in the network. We assume a designated node which we call as a source node. Source node may act as a base station which serves an interface between network and its user. Since a cut may or not separate a node from a source node we distinguish between two distinct outcomes of a node. To examine the benefits of a cut detection capability we have to imagine that sense which has to send the data to the nodes which are disconnected to the source node.



Node distribution in liner cut

When a node is disconnected in the network, we can say that the DOS(disconnected from source) event is occurred and when the node which are failed and are not separated from the network than we can say that the CCOS(connected but a cut occurred) event will occurred in the network. By the detection of a cut we can detect when DOS event will occur or when will CCOS event will occur in the network by the node close to the cut area and approximate location of particular cut. By examine the location of cut we can assume the active nodes lies on the boundary of the cut that are connected to the source. Without the knowledge of network disconnection state the nodes will simply forward the data to the next nodes which will result in the waste of precious energy of a nodes, the cut which is occurred will prevent the data to reach to its destination node. On the other hand if the node will able to detect the cut area, it will wait for the network to be repair and reconnected which saves onboard energy of multiple nodes and prolongs their lives. There is an ability of the source node to detect the occurrence and location of a cut will allow it to undertake network repair. Algorithms for detecting cuts are proposed here which can serve for detecting cuts and repairing them.

EXISTING SYSTEM

Wireless Multimedia Sensor Networks (WMSNs) has many challenges such as traditional mechanisms for network layers are no longer acceptable or applicable for these networks. Wireless sensor network can get separated into multiple connected components due to the failure of some of its nodes, which is called a “cut”. Existing cut detection system deployed only for wired networks. nature of wireless media and multimedia information transmission.

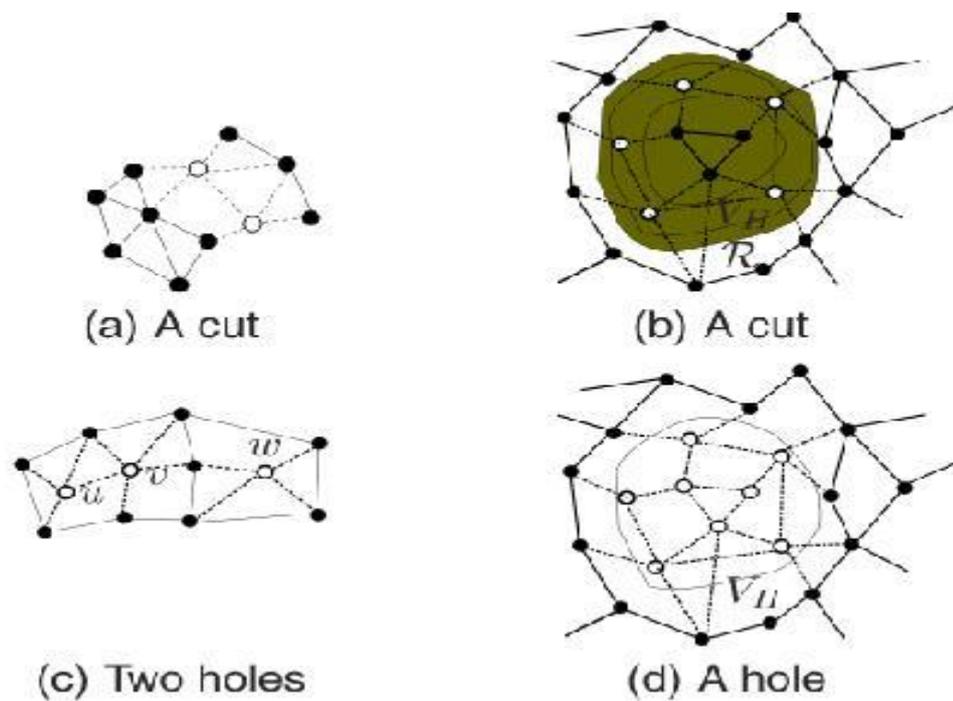
PROPOSED SYSTEM

Wireless sensor networks (WSNs) are a promising technology for monitoring large regions at high spatial and temporal resolution .Failure of a set of nodes will reduce the number of multi-hop paths in the network. Such failures can cause a subset of nodes – that have not failed – to become disconnected from the rest, resulting in a “cut”. We consider the problem of detecting cuts by the nodes of a wireless network. We assume that there is a specially designated node in the network, which we call the source node. Since a cut may or may not separate a node from the source node, we distinguish between two distinct outcomes of a cut for a particular node. When a node u is disconnected from the source, we say that a DOS (Disconnected from Source) event has occurred . When a cut occurs in the network that does not separate a node u from the source node, we say that CCOS (Connected, but a Cut Occurred Somewhere) event has occurred.

DESCRIPTION OF ALGORITHM

In this module, algorithm is used as follows:

1. Collect the destination of nodes from the database which have the status of ‘0’ and store it into array-1.
2. Allow Repeat Removal function on array-1.
3. Now,
 - i) Collect the destination of nodes from database which have the status of ‘1’ and nodes equals to the array-1 nodes and stored it in array-2.
 - ii) Reject that destination of nodes from database which have the status of ‘0’ and nodes equals to the array-1 nodes.
4. Allow the Repeat Removal function on array-2.
5. Last, collect the nodes of array-2 after applying the Repeat Removal function and stored it in the final array-3.



Examples of cuts and holes

DESIGN ARCHITECTURE

Login Module

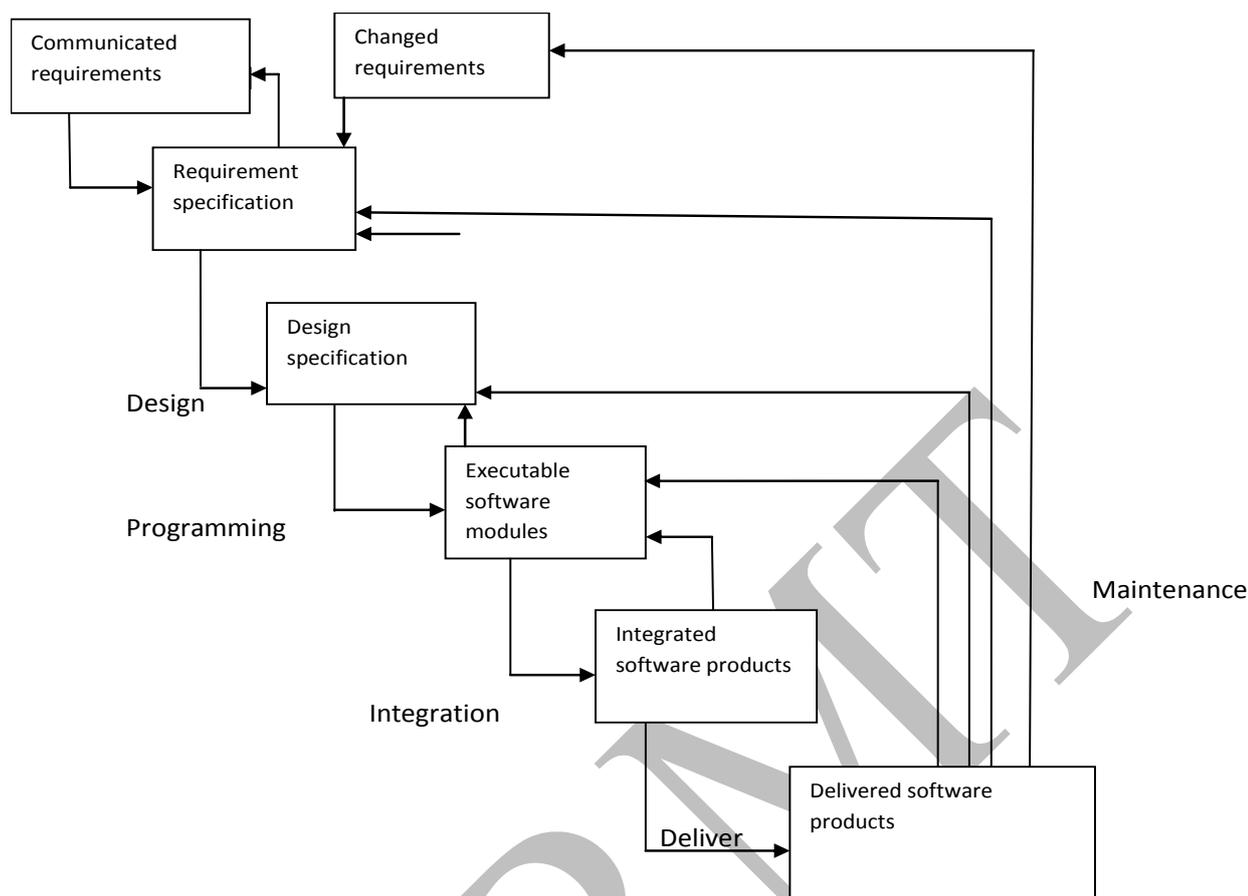
In this module, users can enter their username and password to access the cut detection project.

Registration Module

In this module, users can registered themselves to use the cut detection wireless sensor network Project by entering username, password, address, email id, mobile number.

Detection of Failure Nodes

In this module, failure nodes are detected. Nodes which have the status of '0' is called failure nodes or disconnected nodes or non-working nodes and nodes which have the status of '1' known as active nodes or working nodes or connected nodes.



CONCLUSION

In this paper we will discuss about cut occurrence in the network. Cut detection in wireless sensor network will be examined by the algorithm which was proposed to detect the failure of the nodes in different network. Wireless sensor network is used to forward the data to the network from source node to destination node through the network. If the data is forwarded to the network and there will be no detection of failure node and cut occurrence in the network then there will be waste of energy of nodes available in the network. In this we have to overcome the waste of energy of nodes and prevent the failure of nodes during the transmission of data to the source node to the destination nodes in the network. Failure of a node will reduce the numbers of multi hops path of a network. This failure causes the subset path of a node that has not failed to become disconnected from rest of the nodes in the network resulting in the "CUT". The algorithm is based on the iterative computation of the nodes. The convergence rate of the underlying iterative scheme is independent of the size and structure of the network.. Algorithms for detecting cuts are proposed here which can serve for detecting cuts and repairing them.

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