ISSN : 2347 - 8446 (Online)
ISSN : 2347 - 9817 (Print)
Vol. 2 Issue Special 1 Jan-March 2014
International Journal of Advanced Research in Computer Science & Technology (IJARCST 2014)

Recovering of Node Failure in Wireless Sensor Networks

[I]R.Mohanapriya, [II]C.Jeyalakshmi
[I]PGStudent, Dept. of CSE, Sethu Institute of Technology, Kariapatti, India
[II]Assistant Professor, Dept. of CSE, Sethu Institute of Technology, Kariapatti, India

Abstract
Wireless sensor and actor networks refer to a group of sensor and actors linked by wireless medium to perform distributed sensing and actuation tasks. In such a network ,sensor gather information about the physical world, while actors take decision and then perform appropriate action upon the environment ,which allows remote,automated interaction with the environment. Actors usuallycoordinate their motion so that they sty reachable to each other.However,a failure of an actor may cause the network to partition into disjoint blocks and would thus violate such a connectivity requirement. In this project, we use a least distributive topology repair (LeDiR) algorithm.LeDiR isa localized and distributive algorithm that leverage exiting route discovery activities in the network and impose no additional pre-failure communication overhead.

Keywords
TopologyRepair,Least–Distributive topology repair algorithms(LeDiR),Autonomous reconfiguration system (ARS), Wireless link failure, WirelessSensor-ActorNetwork

I. Introdution

A WSAN consists of a set of miniauturized low -cost sensors that are spread in an area of interest to measure ambient condition in the vicinity. The sensor serve as wireless data acquisition devices for the more powerful actor nodes that process the sensor readings and put forward an appropriate response.

Robots and unmanned vehicles are example actors in practice.A strongly connected inter actor network topology would be required at all times. A failure of an actor may cause the network to partition into disjoint blocks and would thus violate such a connectivityrequirement. The remote setup in which WSANs often serve makes the deployment of additional resources to replace failed actors impractical and repositioning of nodes becomes the best recovery option. Basically, in some application, such as combat robotic networks and search and rescue operation, timelyco-ordination among the actors is required, and extending the shortest path between two actors as a side effect of the recovery process would not be acceptable.

Applicationof wireless sensor and actor networks may include team of mobile robots that perceive the environment from multiple disparate viewpoints based on the data gathered by a sensor networks,a smart parking system redirects drivers to available parking spots, or a distributed heating,ventilating,and air conditioning(HVAC) system based on wireless sensors.

A. Creative network topology

The physical layer is the first and lowest layering the seven –layer OSI model of computer network. The implementation of this layer is often termed PHY.The physical Layer consists of the basic hardware transmission technologies of a network. Due to the plethora of available hardware technologies with widely varying characteristics,this is perhaps the most complex layer in the OSI architecture. The physical layer defines the means of transmitting raw bits rather than logical data packets over a physical link connecting networking nodes. The bit stream may be grouped into code words or symbols and converted to a physical that is transmitted over hardware.

B. Application

Area monitoring is a common application of WSNs.In area monitoring; the WSN is deployed over a region where some phenomenon is to be monitored. A military example is the use of sensors to detect enemy intrusion's civilian example is the geo- fencing of gas or oil pipelines. The term environmental sensor Networks has evolved to cover many applications of WSNs to earth science research. Thisincludesensingvolcanoes,oceans ,glaciers,forests.Industrial monitoring includes machine health monitoring, water/wastewatermonitoringinindustries,agricultur eandstructural monitoring.

C. Features of wireless medium

The wireless medium is shared medium this means that unlike wire line systems, where there exist dedicated physical connections between users, every user can essentially receive an attenuated version what other users are transmitting. In such a system, the manner of the transmission is broadcast of the signal and there is interference in reception of a signal.

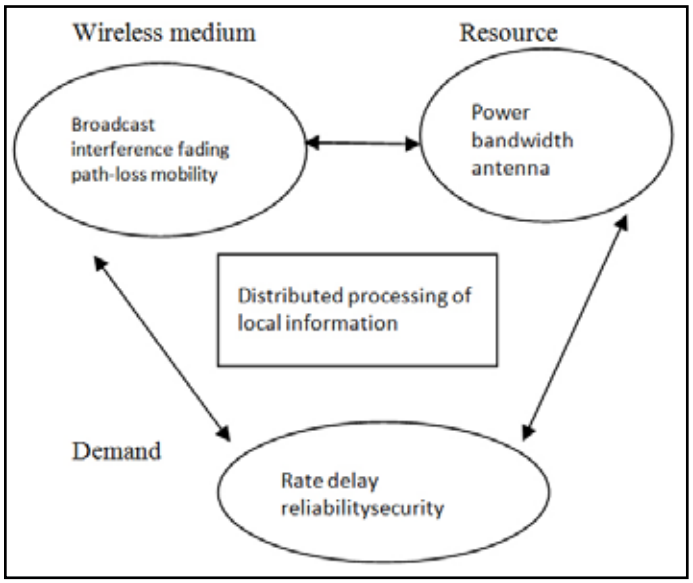


Fig. 1: Source of challenges in analysis and design of wireless network

II. Related work

Self –Deployment by Density Control in sensor Networks Ruay-Shinung Chang andShuo-Hung Wanget al [5]. In this paper authors using the concept of molecule spreading from physics, they present an efficient method for sensor deployment, assuming that global

ISSN : 2347 - 8446 (Online)
ISSN : 2347 - 9817 (Print)

information is not available. Our algorithm, self –Deployment by Density Control(SDDC),uses density control by each node to concurrently deploy sensor nodes. In this paper authors have proposed a deployment strategy such that the sensor nodes can deploy themselves like quickly spreading small molecules. The experiments clearly establish the usefulness of the SDDC algorithm but the weakness of this approach is perhaps that the sensor nodes will not select a narrow area to move if they have a better choice.

A coverage and Latency aware Actor Placement for Wireless Sensor and Actor Network Kemal Akkayaand Mohamed Younis et al.[6].In this paper, authors propose COLA,an actor placement mechanism that Consider both the delay requirements of data collection and the coverage. Results indicated that COLA achieved about 30% increase in coverage and up to 40% delay reduction in comparison to the random deployment.in addition, COLA improved the lifetime of the network by reducing the average energy per packet but they have to consider the issue of asset planning by determining the deal number of actors based on the network topology and application requirements.

Fig 1. shows that the channel to a given user might have poor condition at some times and favorable conditions at other times. This is called the fading behavior of the channel. In many situations, multiple copies of the transmitted signal may be received with different strength. This is referred to as "multipath fading" and can severely deteriorate the performance when the transmitted signals have shorter duration. Conventionally, the goal is to combat the, randomness introduced by the environment.However,in recent years,there has been another view and that is to exploit the inherent randomness in the environment to increase the performance.

For instance, the multi-user diversity gain in the downlink of cellular system is based on this idea,i.e.,in a system of many users with random quality of reception there exists one user with good quality of reception with very high probability.

D. Efficient Use of Resource

Wireless system are faced with an ever-growing demand for higher rates and quality of services.However,the available resources such as bandwidth,power,and number of antennas are limited. Therefore,efficient usage and allocation of these resources is more important than ever.In,many scenarios, from mobile users in cellular network have limited power supplies.

Scan-Based movement –Assisted Sensor Deployment Methods in Wireless SensorNetworksShuhui Yang, Minglu Li andJie Wu [9].In this paper authors present propose a Hungariyan-Algorithm-based optimal solution, Which is centralized. Then, a localized Scan-based Movement-Assisted sensor deployment method (SMART) and several variations of it that use scan and dimension exchange to achieve a balanced state are proposed. The results show that the proposed method can achieve an even deployment of sensor with modest costs but they have to perform an in-depth simulation on energy consumption of sensor deployment algorithms and design some intra cluster balancing algorithms to achieve high-resolution load balancing.

III. Existing System

The restoring network connectivity in partitioned WSANs A number of node failure in a topology. Some schemes recover the network by repositioning the exiting nodes so no of nodes disconnected in the topology and packets transmission is failure. No of node relocation overhead or extend some of the inter-actor data paths. And packets transmission time delay is very high.

IV. Proposed system

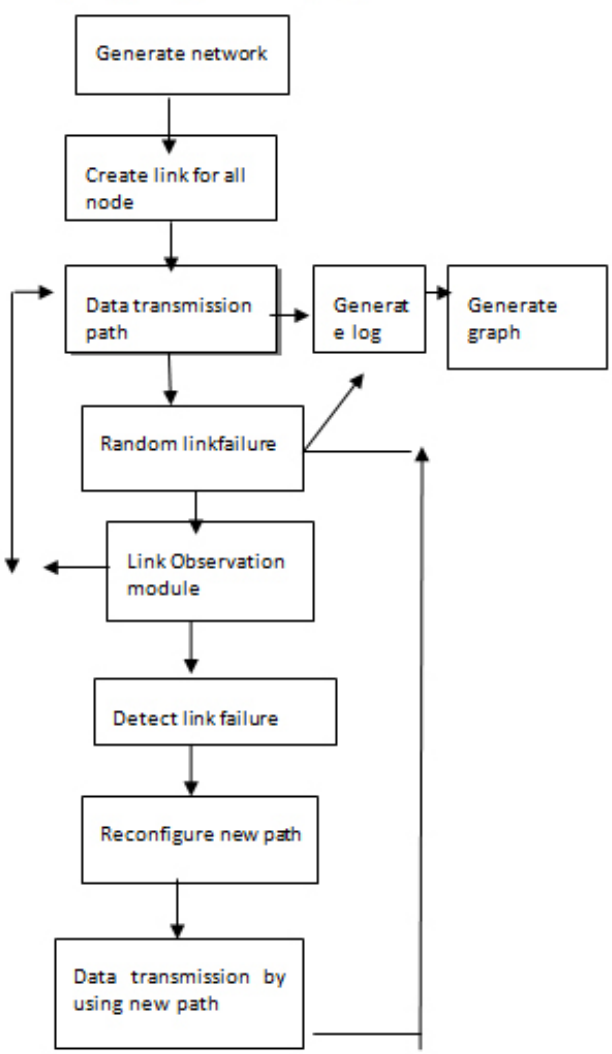
The focus of ARS is on considered a joint connectivity and coverage recovery metric in the future. In the future, we plan to investigate this issue. And more no of actor sensor network using in the topology .The performance of ARS is simulated using NS2 simulator. Reduce the no of packets transmission time delay and increasedthenoof sensor life time.

1) ARS monitor the quality of the outgoing wireless links at every time period tm and then sends then sends the result to the control gate way via management message.

2)Once a control gateway has deleted a failure,ARS that are allocated in the detector node activates the group formation among the local mesh routers that are using a faultychannel, after this a leader is elected among the group members by using bully algorithm for coordinating the reconfiguration.

3)Once the leader is elected it sends the planning request to the control gateway and the gateway synchronizes the planning requests and the gateway synchronizes the planning request to the control gateway and the gateway synchronizes the planning request to the control gateway synchronizes the planning requests and generates a reconfiguration plan for the request.

4) The reconfiguration plan is forwarded to the leader by the gateway and to the group members.



1. Topology formation:
This method is used for create topology format in Actor node.

2. Failure of actor:
Actors will periodically send heartbeat messages to their neighbor's. For that they are functional, and also report changes to the one-hop neighbor's. Missing heart beat messages can be used to detect the failure of actors. After that it's just check whether failed node is critical node or not.

3. Replacing faulty node:
A node is a child if it is two hops away from thefailednode"grand childifthreehopsAwarefromthe failed node in case more than one actor fits the characteristics of a BC(Best Candidate), the closest actor to the faulty node would be picked as a BC Any further ties will be resolved by selecting the actor with the least node degree. At last the node ID would be used to resolve the tie.

4. Children Movement:
When node J moves to replace the faulty node, possibly some of its children will lose direct links to it. When do not want this to happen since some data paths may be extended. This algorithm doesn't want to extend the link if a child receives a message that the parent P is moving child then notifies it's neighbor's (grandchildren of node P) travels directly toward the new location of P until it reconnects with its parent again.

V. Performance Analysis
The experiments are performed on a wirelesssensornetworks (WSN) simulator developed in visual C++.In the experiments,we have connected topology consisting of varying number of actors(20 to100) with fixed transmission range(r=100m).All nodes are assumed to transmit at the maximum power set for the individual experiment, and thus, the detection of failure of a node would justify the invocation of LeDiR.

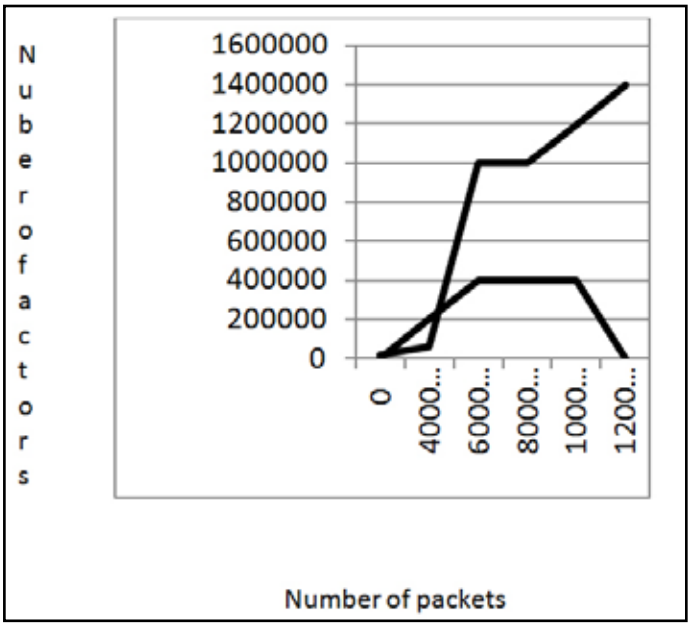


Fig. 2: Simulation Result

VI. Conclution and future Enhancement
In wireless sensor networks have s network s have started to receive growing attention due to their potential in many real life applications. This paper has tackled an important problem in mission critical, is re-establishing network connectivity after node failure without extending the length of the data paths. We proposed LeDiR algorithms that restore connectivity

We plan to consider a joint connectivity and coverage recovery metrics in future. Our future enhancement also includes factoring in coverage and on-going application tasks in the recovery process and developing a tested for evaluating the various failure recovery schemes.

Reference
[1] *A.P.Subramanian,H.GuPta,S.R.Das,andj.Cao "Minimumint erfacechannelassignmentinmultiradiowirelessmeshnetwork s",IEEETrans,MobileComput..,vol..7,no,12,pp.14591473,d ec.,2008.*

[2] *K.H.KimandK..G.shine,"Onaccurateandasymmetryaware measurementoflinkqualityinwirelessmeshnetworks",IEEE/ ACMTrans.Netw.,vol.17,no,pp,11721185,aug.2009.*

[3] *P.KyasanurandN.vaidya,"Capacityofmultichannelwirelessn etwork:Impactofnumberofchannelsandinterface",inproc.AC MMobileCom,Cologne,Germany,Aug.2006,pp.43-57.*

[4] *K.Akkaya,F.Senel,A.ThimmapuramandS. Uludag,"Distributed Recovery from network partitioning in movablesensor/actornetworksviacontrolledmobility,"IE EETrans,comput,vol.59,no.2,pp.258-271,Feb.2010.*

[5] *S.Vemulapalli and K.Akkaya, "mobility-based self –route recovery from multiple node failure in mobile sensornetworks," inproc.10thIEEEInt.WorkshopWLN,Denver,CO,Oct.2010.*

[6] *Z.Shen,Y.Chang,H.jiang,Y.Wang,andZ.Yan,"Agenericfram eworkforoptimalmobilesensorredeployment,"IEEETrans,V eh.Technol.,1.59,no.8,pp.4043-4057,Oct.2010.*

[7] *W.Youssef,M.Younis,andK.Akkaya,"an intelligent safety-aw aregatewayrelocationschemeforwirelesssensornetworks"in proc.ICC,Istanbul,Turkey Jun.2006,*

[8] *M.Imaran,M.Younis,A.M.said, Hasbullah,"localized motion based connectivity restoration algorithms for wireless sensor act or networks", J.New tComput. Vol. 35, no. 2. pp. 844-856, Mar. 2012.*

[9] *A.Fadhly,U.Baroudi,andM.Younis,"Optimal node repositioning for tolerating node failure in Wireless sensor actor networks, "in Proc.25th IEEE QBSC, Kingston, ON, Canada, Jun.2010, pp. 67-71.*

[10] *M.Sir,I.SENturk,E.SIsikoglu,and K.Akkaya,"An optimization based approach for connecting partitioned mobile sensor/ actuator networks, "in Proc.3rd Int.Workshop WiSARN, Shanghai, China, Apr. 2011, pp. 525-530.*

[11] *K.Akkaya,F.Senel,A.Thimmapuram, and S.Uludag, "Distributed Recovery from network partitioning in movable sensor/actor network kvia controlled mobility, IEEE Trans. Comput., vol. 59,no. 2,pp. 258-271, Feb, 2010.*

[12] *S.Vemulapalli and K.Akkaya,"Mobility-based self-route recovery from Multiple node failure in mobile sensor networks, "inproc10th IEEEInt.Workshop WLN, Denver, CO, Oct. 2010.*

[13] *Z.Shen, Y.Chang,H.Jiang,WangandZ.Yan,"A generic framework for optimal mobile sensor deployment, "IEEE Trans.Veh. Technol.1. 59, no.8, pp. 4043-4057, oct.2010.*

[14] *W.Youssef, M.younis, K.Akkaya,"Anintelligent safety-aware gateway relocation scheme for wireless sensor networks, " in Proc .ICC, Istanbul, Turkey Jun.2006.*

ISSN : 2347 - 8446 (Online)
ISSN : 2347 - 9817 (Print)

Mohanapriya.R received her B.Tech degree in Information Technology from Mohamed Sathak Engineering College, Annauniversity Chennai. india, in 2006. Currently pursing M.E in Computer Science Engineering from sethu Institute of Technology. Anna University Chennai India. Her research interest includes wireless ad-hoc network.