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Multi-Failure Recovery System with the Help of Ex SensRob in WSAN

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Abstract: ***Wireless device and SensRob networks is a bunch of detectors and SensRob's joined by wireless medium to perform dispersed sensing and exploit works. In such a network, detectors gather information concerning the physical world, whereas SensRob's take choices and so perform acceptable actions upon the surroundings that permit outback, device-controlled interaction with the surroundings. SensRob's sometimes coordinate their motion in order that they keep the connectivity. Anyway, a failure of associate SensRob might cause the network to partition into disconnected blocks and would therefore violate such a characteristics demand. In this project, we tend to present a Least-Disruptive topology Repair algorithmic rule. The LeDiR is localized and distributed rule that leverages previous route discovery activities within the network and imposes no more pre-failure communication overload. Our main aim is to develop an economical theme for restoring network connectivity in divided Wireless Detector-SensRob Networks in multi node failure recovery by unused SensRob devices.***

Keywords: Kid's movement, Free SensRob, disconnected network group

1. Introduction

Recent years Wireless sensing element and SensRob Networks square measure gaining growing interest due to their suitableness for mission vital applications that need autonomous and intelligent interaction with the setting. Samples of these applications embody fire observance, disaster management, search and rescue, security police investigation, field intelligence operation, house exploration, coast and border protection, etc.

WSANs comprise varied miniaturized stationary detectors and fewer mobile actors. The detectors function wireless knowledge acquisition devices for the additional powerful SensRob nodes that method the sensing element readings and proposes associate applicable varied miniaturized stationary detectors and fewer mobile actors.

The detectors function wireless knowledge acquisition devices for the additional powerful SensRob nodes that method the sensing element readings associated proposes an applicable response.



Figure 1a: Example SensRob devices

For example, detectors could find a hearth associated trigger a response from associate SensRob that has an device. Robots and pilotless vehicles area unit example SensRob's in observe. SensRob's work autonomously and collaboratively to attain the appliance mission. Given the cooperative SensRob's operation, a powerfully connected inter-SensRob configuration would be needed in any respect times. Failure of 1 or multiple nodes could partition the inter-SensRob network into disjoint segments. Consequently, associate inter-SensRob interaction could stop and therefore the network becomes unable of delivering a timely reply to a significant event. Therefore, recovery from associate SensRob failure is of utmost importance.

The remote setup during which WSANs usually serve makes the readying of extra resources to switch failing SensRob's impractical, and emplacement of nodes becomes the simplest recovery possibility. Distributed recovery is going to be terribly difficult since nodes in separate partitions won't be ready to reach one another to coordinate the recovery method. Therefore, up to date schemes found within the literature re-quire each node to take care of partial data of the network state. To avoid the unnecessary state-update overhead and to further the property restoration method, previous work depends on maintaining one- or two-hop neighbor lists and predetermines some criteria for the node's involvement within the recovery.

In contrast to previous work, this paper considers the property restoration downside subject to path length constraints. In some applications, timely coordination among the SensRob's is needed, and lengthening the shortest path between 2 SensRob's as a aspect result of the recovery method wouldn't be acceptable. Most of the prevailing approaches within the literature are strictly reactive with the recovery method initiated once the failure of "F" is detected. the most plan is replace the unsuccessful node "F" with one in every of its neighbors or move those neighbors inward to autonomously mend cut topology within the neighborhood of F.

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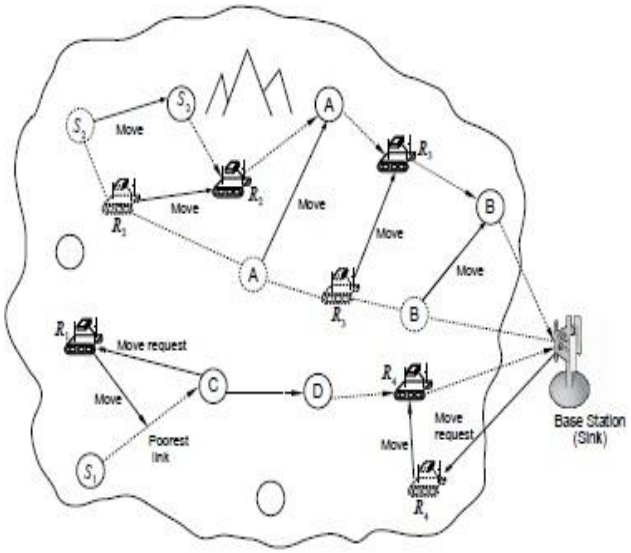


Figure 1b: An Example wireless detector and SensRob network setup

2. Related Work

A number of schemes have recently been planned for restoring network property in divided WSANs [2]. All of those schemes have centered on reestablishing cut off links while not considering the impact on the length of pre-failure information methods. Some schemes recover the network by placement the prevailing nodes, whereas others rigorously place extra relay nodes. Like our planned DCR algorithmic program, DARA [7] strives to revive property lost as a result of failure of cut-vertex. However, DARA needs additional network state in order to make sure convergence. Meanwhile, in PADRA [8], determine a connected dominating set (CDS) of the full network so as to discover cut-vertices. Although, they use a distributed algorithmic program, their resolution still needs 2-hop neighbor's data that will increase electronic communication overhead.

Another work planned in [9] conjointly uses 2-hop data to discover cut-vertices. The planned DCR algorithmic program depends solely on 1-hop data and reduces the communication overhead. Though RIM [10], C3R [11] and tape machine [12] use 1- hop neighbor data to revive property, they are strictly reactive and don't differentiate between crucial and non-critical nodes. Whereas, DCR could be a hybrid algorithmic program that proactively identifies crucial nodes and designates for them applicable backups. the prevailing work on synchronic node failure recovery planned in [8] could be a mutual exclusion mechanism known as [13] so as to handle multiple synchronic failures in a very localized manner. Our planned approach differs from MPADRA in multiple aspects. Whereas, our approach solely needs 1-hop data and every crucial node has just one backup to handle its failure.

2.1 System Model and Problem Statement

For restoring network property in partitioned off WSANs variety of schemes has recently been projected. All of those schemes have targeted on reestablishing cut links while not considering the impact on the length of pre-failure knowledge ways. Some schemes recover the network by positioning the prevailing nodes, whereas others fastidiously place further relay nodes. On the opposite hand, some work on device relocation focuses on metrics aside from property, e.g., coverage, network longevity, and quality safety, or to self-spread the nodes once non-uniform readying.

Existing recovery schemes either impose high node relocation overhead or extend a number of the inter-SensRob knowledge ways.

Existing recovery schemes are targeted on reestablishing cut links while not considering the impact on the length of pre-failure knowledge ways.

3. Proposed Technique

In this project, we have a tendency to gift a Least-Disruptive topology Repair rule. LeDiR depends on the native read of a node regarding the network to plan a recovery plan that relocates the smallest amount range of nodes and declares that no path between any try of nodes is extended. LeDiR could be a localized and distributed rule that focuses existing route discovery activities within the network and imposes no further pre-failure communication overhead. The performance of LeDiR is simulated victimization NS2 machine.It is nearly insensitive to the variation within the communication vary. LeDiR conjointly works all right in dense networks and yields near best performance even once nodes square measure part conscious of the configuration.

4. Implementation

4.1 Failure Detection

SensRob's can sporadically send heartbeat messages to their Neighbors to make sure that they're useful, and conjointly report changes to the one-hop neighbors. Missing heartbeat messages will be accustomed observe the failure of actors. After that it's simply check whether or not failing node is vital node or not. Critical node suggests that if that node failing it type disjoint block within the network.

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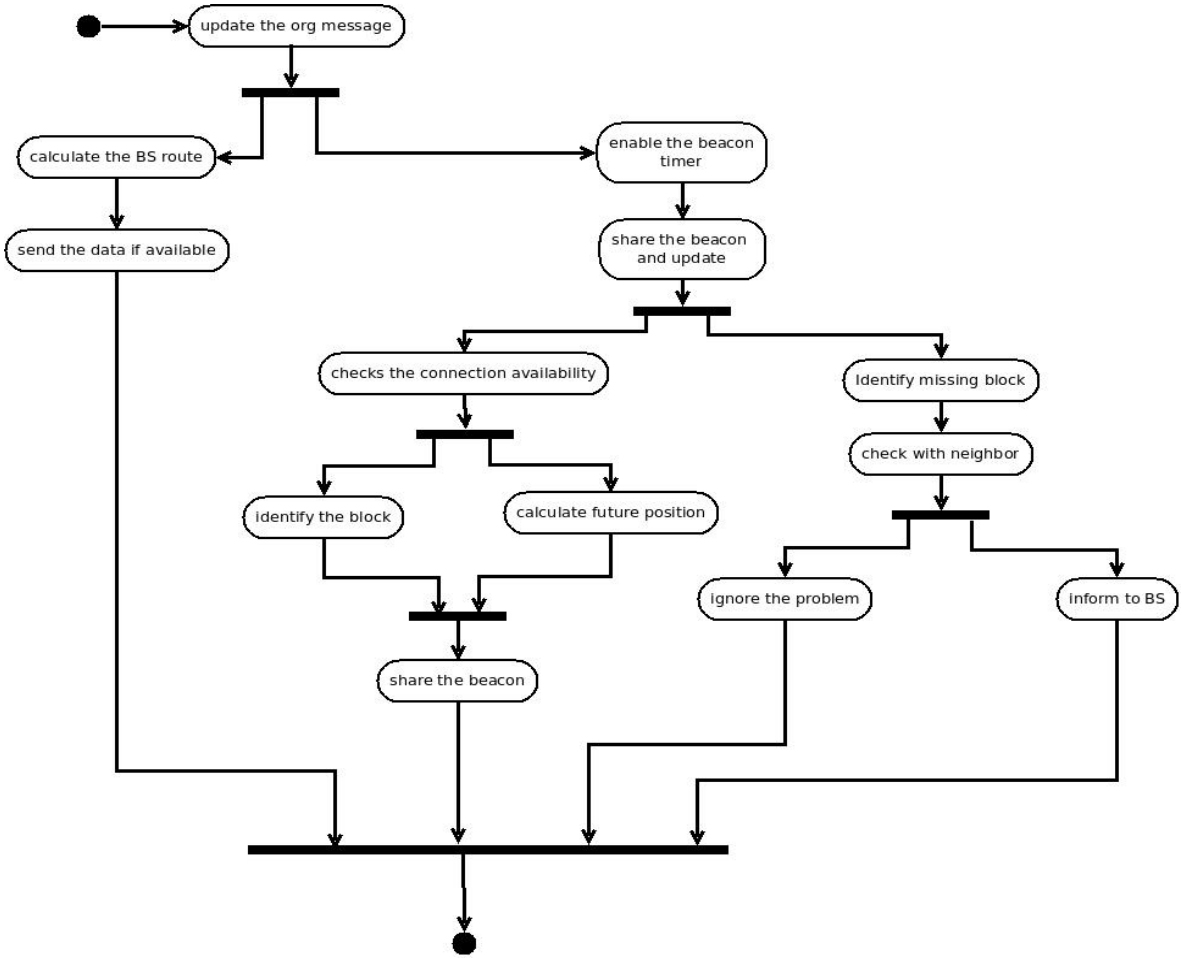


Figure 2: Activity flow of proposed work

4.2 Smallest Block Identification

In this step we've to seek out smallest disjoint block. If it's tiny then it'll scale back the recovery overhead within the network. The tiniest block is that the one with the smallest amount variety of nodes.

4.3 Substitution Faulty Node

If node J is that the neighbors of the failing node that belongs to the tiniest block J is taken into account the B.C. to interchange the faulty node Since node J is taken into account the entree node of the block to the failing vital node (and the remainder of the network) We talk over with it as "parent." A node could be a "Kid" if it's 2 hops Away from the failing node, "grand Kid" if 3 hops Away from the failing node In case over one SensRob fits the characteristics of a B.C. (Best Candidate), the highest SensRob to the faulty node would be picked as a B.C.. Any further ties are resolved by choosing the SensRob with the smallest amount node degree. At last the node ID would be accustomed resolve the tie

4.4 Kids Movement Guidance

In our base model, the researchers have considered the single node failure with the Kid node movement. Indeed our base model working perfectly and recovering the node failure and extend the communication throughout the network level. But the problem is while multimode failure the node movement is getting collapse. So to avoid this problem, we proposed the technique with extra actor system. As per our base model, each actor node will scan the environment by sharing the periodic beacon information. While sharing the beacon message each actor node can know the neighbor actor availability and position of each actor node. And each actor node will store the neighbor actor availability with limited expire time for neighbor availability and route availability.

In periodic interval the neighbor actor list will be deleted based on the expired time of the actor beacon information. Each time of data transmission the actor will check the neighbor actor availability in the list of neighbor actor list. In case, the deleted actor information is necessary to route the data then that actor information will be checked with the available neighbor actor's list. This information will be monitored by the base station in periodic manner by sharing the originating massage. While the monitoring time, if base station detected multimode failure then base station will gather the information of extra actor availability. The base station will calculate the position information of multi node failure. Based on the group of node failure information and available actor position, base station will calculate the group connectivity and distance b/w each member of group node with respect to available actors. Form this calculation the base station will sort-out available extra actors with respect to failure group. The extra actor sorting is done by the base station in two modes; one is based on the less distance and based on route connectivity. In case, there is no issue in the

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route connectivity of disconnected group then the extra actor will be moved towards nearest position which actor failed. In case, there is a problem in route of disconnected group the extra actor will be moved to the place which will be effective to connect the disconnected group and connected group.

5. Results

We have used the popular simulator such aw NS2 to simulate our proposed technique. We have tested our network with various number of SensRob's. here we have shown the simplified output model for ease of explanation.

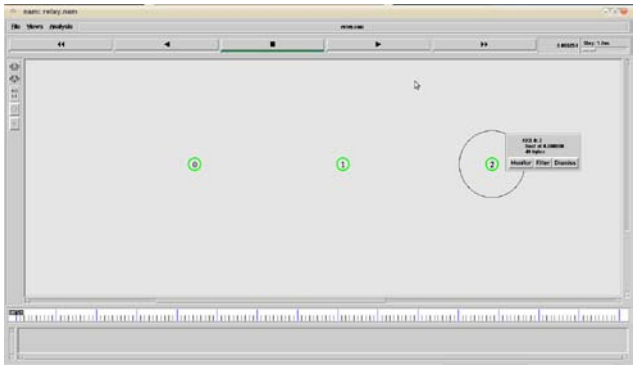


Figure 3: Network initialization

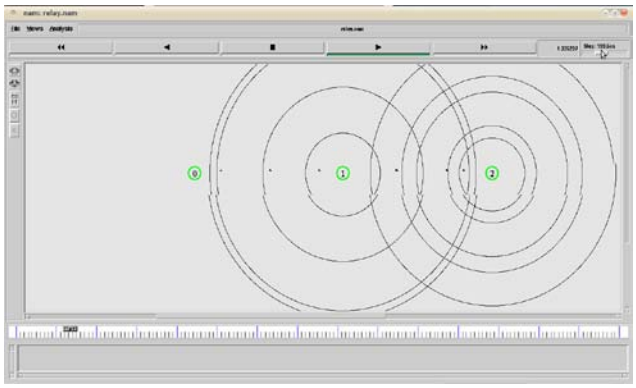


Figure 4: beacon sharing and data sharing

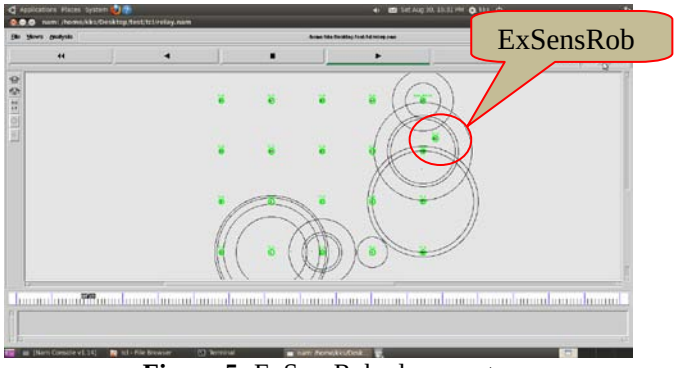


Figure 5: ExSensRob placement

In our result pictures we clearly shown the information such as heartbeat beacon sharing and failure detection and SensRob mobement (fig.3, 4, 5, 6)

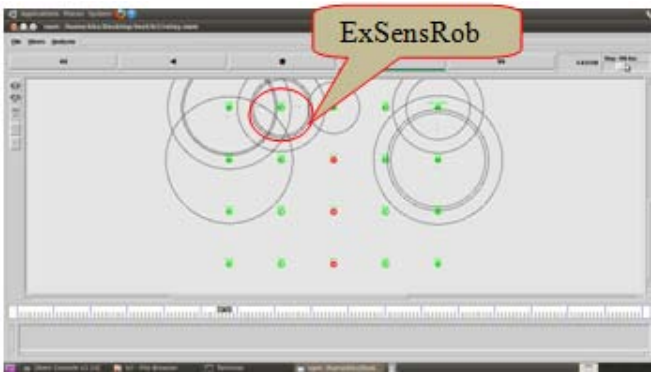


Figure 6: recovering the failure with ExSensRob



Figure 7: Packet delivery for enhanced method

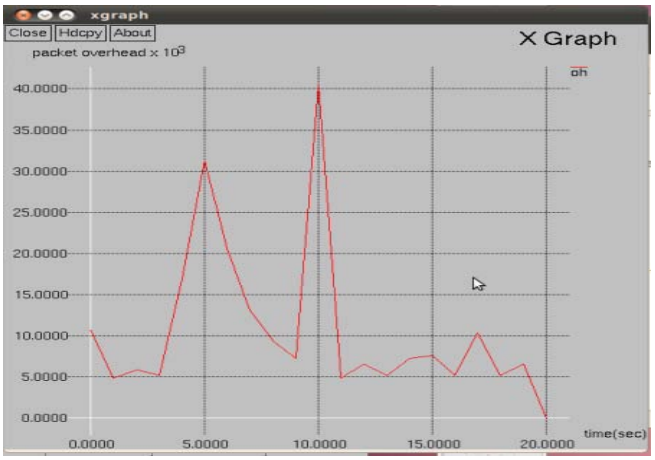


Figure 8: Overhead for enhanced method

6. Conclusion

Recent years Wireless sensing element and SensRob Networks square measure gaining growing interest due to their suitableness for mission vital applications that need autonomous and intelligent interaction with the setting. In this paper we have tested our proposed algorithm with multi node failure recovery system, by the use of free SensRob movements to recover SensRob failure. The algorithm which we have proposed provides the efficient results. In future we will study the details of sensor node coverage hole and hole healing methods.

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References

[1] F. Akyildiz and I. H. Kasimoglu, "Wireless detector and SensRob networks: Research challenges," Ad Hoc Netw. J., vol.2, no. 4, pp. 351–367, Oct. 2004.
[2] M. Younis and K. Akkaya, "Strategies and techniques for node placement in wireless detector networks: A survey," J.Ad Hoc Netw., vol. 6, no. 4, pp. 621–655, Jun. 2008.
[3] A. Abbasi, M. Younis, and K. Akkaya, "Movement-assisted connectivity restoration in wireless detector and SensRob networks," IEEE Trans. Parallel Distrib. Syst., vol. 20, no. 9, pp. 1366–1379, Sep. 2009.
[4] M. Younis, S. Lee, S. Gupta, and K. Fisher, "A localized self-healing al-gorithm for networks of moveable detector nodes," in Proc. IEEE GLOBE-COM, New Orleans, LA, Nov. 2008, pp. 1–5.
[5] K. Akkaya, F. Senel, A. Thimmapuram, and S. Uludag, "Distributed recovery from network partitioning in movable detector/SensRob networks via controlled mobility," IEEE Trans. Comput., vol. 59, no. 2, pp. 258–271, Feb. 2010.
[6] K. Akkaya and M. Younis, "COLA: A coverage and latency aware SensRob placement for wireless detector and SensRob networks," in Proc. IEEE VTC, Montreal, QC, Canada, Sep. 2006, pp. 1–5.
[7] Abbasi, AA, Akkaya, K, Younis, M. A distributed connectivity restoration algorithm in wireless detector and SensRob networks. In: Proceedings of the 32nd IEEE conference on local computer networks (LCN 2007), Dublin, Ireland; October 2007.
[8] Akkaya, K, Thimmapuram, A, Senel, F, Uludag, S. Distributed recovery of SensRob failures in wireless detector and SensRob networks. In Proceedings of the IEEE wireless communications and networking conference (WCNC 2008), Las Vegas, NV; March 2008.
[9] Azadeh, Z. A hybrid approach to SensRob _SensRob connectivity restoration in wireless detector and SensRob networks. In: Proceedings of the 8th IEEE international conference on networks (ICN 2009), Cancun, Mexico; March 2009.
[10] Younis M, Lee S, Abbasi AA. A localized algorithm for restoring inter-node connectivity in networks of moveable detectors. IEEE Transactions on Compu-ters 2010;99(12).
[11] Tamboli, N and Younis, M. Coverage-aware connectivity restoration in mobile detector networks. In: Proceedings of the IEEE international conference on communications (ICC 2009), Dresden, Germany; June 2009.
[12] Imran, M, Younis, M, Said, AM, Hasbullah, H. Volunteer- instigated connectivity restoration algorithm for wireless detector and SensRob networks. In: Proceedings of the IEEE International Conference on Wireless Communications, Networking and Information Security (WCNIS 2010), Beijing, China; June 2010.
[13] Akkaya K, Senel F, Thimmapuram A, Uludag S. Distributed recovery from network partitioning in movable detector/SensRob networks via controlled mobility. IEEE Transactions on Computers 2010;59(2):258–71.
[14] MilenkoJorgic´, IS, Hauspie, Michael,¨ Simplot-ryl, David. Localized algorithms for detection of critical nodes and links for connectivity in ad hoc networks. In: Proceedings of the 3rd annual IFIP mediterranean ad hoc networking workshop, Med-Hoc-Net, Bodrum, Turkey; June 2004.
[15] Li, N Xu S, Stojmenovic, Ivan. Mesh-based detector relocation for coverage main-tenance in mobile detector networks. In: Proceedings of the 4th international conference on ubiquitous intelligence and computing (UIC 2007), Hong Kong, China; July 2007.
[16] Ameer A. Abbasi, Mohamed F. Younis, Senior Member, IEEE, and Uthman A. Baroudi,"Recovering From a Node Failure in Wireless Detector-SensRob Networks With Minimal Topology Changes". IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, VOL. 62, NO. 1, JANUARY 2013,256-271
[17] Muhammad Imran a,n, Mohamed Younis b, Abas Md Said c, Halabi Hasbullah c , "Localized motion-based connectivity restoration algorithms for wireless detector and SensRob networks", Journal of Network and Computer Applications 35 (2012) 844–856

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