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A Framework for Location Estimation and Node Failures Detection in Mobile Wireless Networks

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Abstract— **Detecting node failures in mobile wireless networks is incredibly difficult as a results of the topology is extremely dynamic, the network may not be perpetually connected, and additionally the resources are restricted. Throughout this paper, we have a tendency to require a probabilistic approach and propose two node failure detection schemes that consistently combine localized observation, location estimation and node collaboration. Extensive simulation results in each connected and disconnected networks demonstrate that our schemes accomplish high failure detection rates close to a bound and low false positive rates, and incur low communication overhead. Compared to approaches that use centralized monitoring, our approach has up to eighty percent lower communication overhead, and solely slightly lower detection rates and slightly higher false positive rates. We tend to arrange to measure our schemes using real-world quality traces and in eventualities with irregular transmission ranges. Our approach depends on location estimation and also the usage of heartbeat messages for nodes to observe each other. Additionally, our approach has the advantage that it is applicable to each connected and disconnected networks whereas centralized monitoring is simply applicable to connected networks. evaluate to different methods that utilize localized monitoring, our approach has comparable failure detection rates, up to fifty seven percent lower communication overhead and much lower false positive rates.**

Index Terms -- **Mobile Wireless Networks, Node Failure, Node Failure Detection, Fault Management;**

I. INTRODUCTION

Mobile wireless networks have been used for several mission essential applications, as well as search and

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rescue, environment monitoring, disaster relief, and military operations. Such mobile networks are generally formed in an ad-hoc manner, with either persistent or intermittent network property. Nodes in such networks are prone to failures as a result of battery evacuation, hardware defects or harsh surroundings, Node failure detection in mobile wireless networks is extremely difficult as a result of the configuration may be extremely dynamic as a result of node movements. Therefore, techniques that are designed for static networks are not applicable. Secondly, the network might not perpetually be connected. Therefore, approaches that have confidence network connectivity have limited applicability. Thirdly, the restricted resources computation, communication and battery life demand that node failure detection should be performed during a resource preserving manner. Node failure detection in mobile wireless networks is incredibly difficult as a result of the configuration may be extremely dynamic as a result of node movements. Therefore, techniques that are designed for static networks are not applicable. Second, the network might not perpetually be connected. Therefore, approaches that believe network property have restricted applicability. Third, the restricted resources computation, communication and battery life demand that node failure detection should be performed during a resource preserving manner. During this paper, we tend to recommend a distinctive probabilistic approach that judiciously combines localized monitoring, location estimation and node collaboration to observe node failures in mobile wireless networks. Specifically, we tend to propose two schemes. within the initial scheme, once a node A cannot hear from a neighboring node B, it uses its own data regarding B and binary feedback from its neighbors to determine whether or not B has failing or not. Within the second theme, A gathers information from its neighbors, and uses the data collectively to make the decision. We have evaluated our schemes victimization intensive simulation in each connected and disconnected networks i.e., networks that lack contemporaneous end-to-end paths. Simulation results exhibit that every system achieve high failure detection rates, low false positive rates, and incur low communication overhead. Compared with approaches that use centralized monitoring, while our approach might have slightly lower detection rates and slightly higher false positive rates, it has considerably lower communication overhead. In addition, our approach has the advantage that it is applicable to each connected and disconnected networks. Compared to alternative approaches that use localized observation, our approach has similar failure detection rates, lower communication overhead and much lower false positive rate. [9] discussed about a method, This scheme investigates a traffic-light-based intelligent routing strategy for the satellite network, which can adjust the pre-calculated route according to the real-time congestion status of the satellite constellation. In a satellite, a traffic light is deployed at each direction to indicate the congestion situation, and is set to a relevant color, by considering both the queue occupancy rate at a direction and the total

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queue occupancy rate of the next hop. The existing scheme uses TLR based routing mechanism based on two concepts are DVTR Dynamic Virtual Topology Routing (DVTR) and Virtual Node (VN). In DVTR, the system period is divided into a series of time intervals. On-off operations of ISLs are supposed to be performed only at the beginning of each interval and the whole topology keeps unchanged during each interval. But it has delay due to waiting stage at buffer. So, this method introduces an effective multi-hop scheduling routing scheme that considers the mobility of nodes which are clustered in one group is confined within a specified area, and multiple groups move uniformly across the network.

Figure 1: Architecture of Mobile Wireless Networks

II. RELATED WORK

One approach adopted by several existing studies is predicated on centralized monitoring. It requires that every node send periodic "heartbeat" messages to a central monitor that uses the shortage of heartbeat messages from a node after a definite timeout as an indicator of node failure. This approach assumes that there continuously exists a path from a node to the central monitor, and therefore is only applicable to networks with persistent connectivity. Another approach relies on localized monitoring, wherever nodes broadcast heartbeat messages to their one-hop neighbors and nodes during a neighborhood monitor each other through heartbeat messages. Localize examination simply generates localized traffic and has been utilize successfully for node failure detection in static networks. In Existing system, they use only the binary scheme to observe the node failure, therefore we are able to observe only the ON or OFF state of the nodes, we tend to cannot realize whether the node is robust or weak. In Existing system, there is no way to discover the weak node and to search out the alternate node for the information transmission. Use only Binary scheme which provides Zero's or Ones, it will not show the weak or robust status of nodes, in this there is no way to realize alternative path for information transfer during a wireless network with multihop transmissions and interference-limited link rates. The problem arises when equalization power management within the physical layer and congestion management within the transport layer to enhance the general network performance whereas maintaining the discipline modularity between the layers. It will be solved by presenting a distributive power management algorithm that couples with existing TCP protocols to extend end-to-end throughput and energy efficiency of the network. Below the rigorous framework of nonlinearly unnatural utility maximization, the convergence of this coupled algorithm

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to the global optimum of joint power management and congestion management, for each synchronized and asynchronous implementations is established. The speed of convergence is geometric and a desirable modularity between the transport and physical layers is maintained.

III. FRAME WORK

In this paper, we tend to suggest a novel probabilistic approach that sensibly merges localized monitoring, node collaboration and location estimation to discover node failures in mobile wireless networks. Specifically, we tend to propose two schemes. within the initial scheme, once a node A cannot hear from a neighboring node B, it uses its own information concerning B and binary feedback from its neighbors to determine whether or not B has failed or not. Within the second scheme, A gathers information from its neighbors, and uses the data collectively to make the decision. We have evaluated our schemes using in depth simulation in each connected and disconnected networks i.e., networks that lack contemporaneous end-to-end ways. Simulation consequences express that each scheme makes it high failure detection rates, low false positive rates, and incur low communication overhead. Compared with approaches that use centralized observation, whereas our approach might have slightly lower detection rates and slightly higher false positive rates, it has significantly lower communication overhead up to eighty percent lower. In addition, our approach has the advantage that it is applicable to each connected and disconnected networks. Compared to alternative approaches that use localized observation, our approach has similar failure detection rates, lower communication overhead up to fifty seven percent lower and much lower false positive rate. We tend to design two schemes for detection node failures. The primary scheme uses binary feedback whereas the other uses non-binary feedback. Hence we tend to discuss with them as binary and non-binary feedback schemes, severally. We tend to next present these two schemes, so shortly compare their performance. We tend to measure the performance of our schemes through in depth simulations using a purpose-built machine. The simulator is constructed victimization Mat-lab. The most reason for using the purpose-built simulator instead of alternative simulators for instance ns3 is as a result of it provides much more flexibility in implementing the node failure detection algorithms that are projected within the paper. Implementing location estimation an important part of our algorithms presented in Section is particularly convenient in Mat-lab due to several readily obtainable mathematical libraries than that in alternative network simulators. Within the following, we tend to initial describe the simulation setting, and then describe the analysis results. The binary feedback scheme does not absolutely utilize the data from alternative nodes as a result of the responses from alternative nodes is binary (i.e., 0 or 1). The non-binary feedback scheme differs from the binary version in that a primary gathers non-binary data from its neighbors then calculates the chance that B has unsuccessful using all the data collectively.

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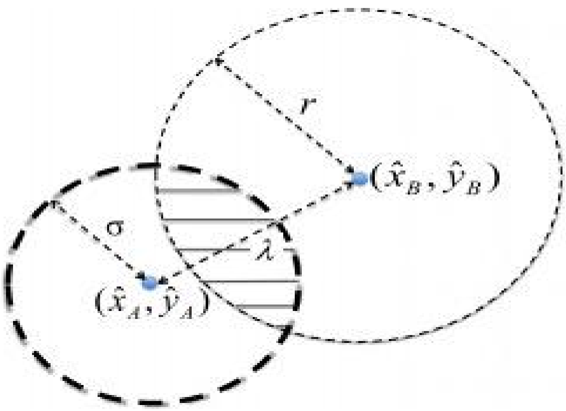

Figure 2: Proposed System Architecture

Specifically, once a suspects B has failed, a broadcasts to its neighbors an inquiry regarding B. Again, to avoid multiple nodes broadcast inquiry messages regarding B, we tend to assume a waits for a random amount of time, and only broadcasts a query message regarding B when it has not detected the other query about B. every neighbor that hears A's query responds to A its data on B. we tend to compare our scheme to two schemes, referred to as centralized and localized schemes, actuated by the schemes in and therefore the scheme in, severally. Within the centralized scheme, every node sends periodic heartbeat messages to the manager node that decides that a node has failed once not hearing from the node. The localized theme differs from our scheme only in that it does not calculate the probability of node failure. Specifically, once node a now not hears from node B, rather than scheming the probability that B has unsuccessful, A simply suspects that B has unsuccessful and sends an inquiry to its neighbors. If none of A's neighbors reply that B is alive, and then A sends a message to the manager node that B has unsuccessful. Extensive simulation results demonstrate that our schemes accomplish high failure detection rates, low false positive rates, and low communication overhead. We tend to any demonstrated the tradeoffs of the binary and non-binary feedback schemes. As future work, we tend to arrange to measure our schemes mistreatment real-world quality traces and in situations with irregular transmission ranges. Our approach depends on location estimation and therefore the usage of heartbeat messages for nodes to watch one another. Therefore, it does not work once location data is not obtainable or there are communication blackouts as an example because of weather conditions.

IV. EXPERIMENTAL RESULTS

In our experiments, any number of users can create the network to create the network first we need to enter the network size means how many sensor nodes we want for example 20 we are initialize the network size after entering the network size network simulation screen will be displayed after we need to select the source and destination nodes and then perform the binary and non binary feedback schemes to detect the node failures. In binary feedback scheme, the receiver nodes will send binary (0 and 1) values if its 0 then the node is alive and if it is 1 then the node is dead. In non binary feedback scheme, the probability values will be calculated then send and acknowledgement will be there also we can move nodes after to click on node failure then non binary feedback scheme. In the below chart we can observe that difference between the length of both binary and non binary feedback schemes.

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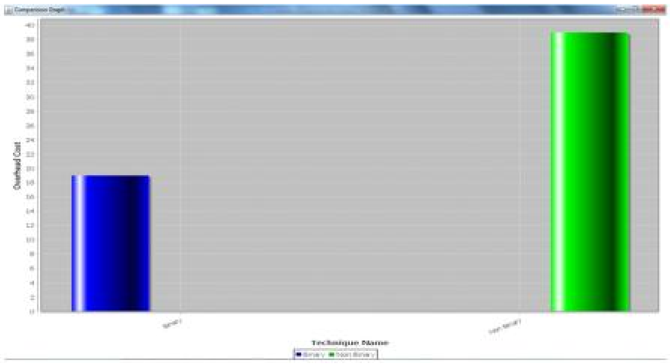

We can observe that non binary feedback scheme length is higher than binary feedback scheme length. The difference will be shown in the sense of overhead cost. Through our implementation user can create the network after the select source and destination and then perform binary and non binary feedback schemes based on to detect node failures in effective manner with low cost when compare to current techniques.

V.CONCLUSION

In this paper, we tend to propose a probabilistic method and designed two node failure detection schemes that mix localized monitoring, location estimation and node collaboration for mobile wireless networks. Extensive simulation results demonstrate that our schemes accomplish high failure detection rates, low false positive rates, and low communication overhead. We tend to additional demonstrated the trade offs of the binary and non-binary feedback schemes. As future work, we tend to arrange to measure our schemes using real-world quality traces and in scenarios with irregular transmission ranges. Our approach depends on location estimation and also the usage of heartbeat messages for nodes to observe each other. Therefore, it does not work when location data is not obtainable or there are communication blackouts for instance as a result of weather conditions developing effective approaches for those situations is not here as future-work.

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