ADAPTIVE REROUTING TO AVOID LOCAL CONGESTION IN MANETS

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ABSTRACT

MANET (Mobile Ad-hoc NETworks) is useful in many practical scenarios since it provides multi-hop communication without wired infrastructure. However, there is a problem that the communication performance of a flow may be easily degraded by even a single local congestion on the whole path. A solution for the problem is to use a detour path that avoids the local congestion. However, to this end, the detour paths should not use the nodes in the congested area, which is in fact relatively large due to the nature of radio waves. In the current state of the art, we do not have such alternative-path computation algorithms. In this paper, we propose an algorithm and a routing scheme to compute and utilize detour paths adaptively according to the network traffic conditions. Through evaluation, we show that the proposed scheme improve the communication performance by using the detour paths in practical network scenarios.

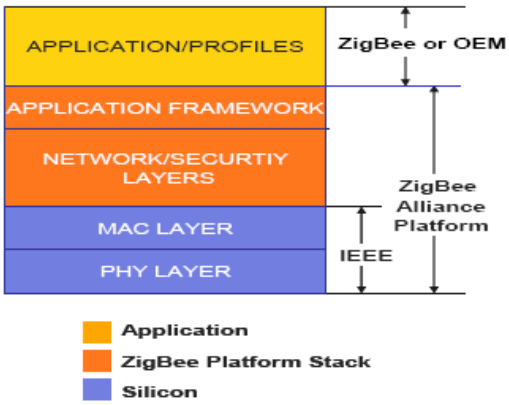
INTRODUCTION

Wireless Sensor Network

Wireless sensor network (WSN) becomes an important topic for researchers in recent year. IEEE 802.15.4 is the standard for WPAN which provided physical (PHY) and medium access control (MAC) layers . This standard support a low cost, low power and low data rate which is well-suited for WSN. IEEE 802.15.4 networks support star, mesh, and cluster-tree network. This network consist of two types of devices; Full Function Device (FFD) (2) Reduce Function Device (RFD). FFD can play a role of a router which can connect to other FFD and RFD devices. On the other hand RFD can only connect to FFD devices.

Zigbee Network

Zigbee is an emerging worldwide standard for wireless personal area network. Under the main goal to provide low-power, cost-effective, flexible, reliable, and scalable wireless products, ZigBee Alliance has been developing and standardizing the ZigBee network. On December 2004, they released the ZigBee Specification version 1.0 [1] to the public. Based on IEEE 802.15.4, ZigBee Specification defines a network layer, application framework as well as security services. Since ZigBee devices are designed for low cost and low data rates, it is expected their use in home and building automation with significantly small costs. Moreover, ZigBee networks support star and mesh topology, self-forming and self-healing as well as more than 65000 address spaces; thus, network can be easily extended in terms of size and coverage area.



ZigBee protocol stack

RELATED WORK

Several link quality-based routing metrics have been proposed over the past decade both for single-channel and multi-channel networks. All these metrics have been designed assuming a legacy 802.11a/b/g ,underlying MA C layer and have only been evaluated over 802.11a/b/g WMNs. The only metric that takes into account

some of the new characteristics introduced by the 802.11n standard (MAC/PHY overhead, FA) is the ECO T metric which is calculated as the expected time occupancy during which a data frame or a group of data frames is transmitted over the expected number of successfully transmitted data frames at a unit transmission attempt. However, ECO T was only evaluated in ns2 over an 802.11g PH Y layer. Some works have also compared the performance of different routing metrics in 802.11a/b/g WMNs. The only work that evaluated H C and ET X over a MIM O network is . The main finding is that the gain of MIM O over SIS O is 20% lower with ET X than with HC . The evaluation was done in simulations and only focused on the diversity provided by STBC. Our result in Figure 3 is qualitatively similar; 802.11n offers large throughput improvements over 802.11g with HC , small to mediocre improvements with ETX, and minimal or negative improvements with ETT. Several researchers have experimentally studied the performance of the various features of 802.11n over the past few years . All these studies focused on single-hop WLANs. A few recent works examined multihop performance in 802.11n WMNs, studying the impact of the 802.11n features on UD P throughput and video streaming. A single chain with nodes close to each other was used for all the experiments. To our best knowledge, no work has investigated routing protocol performance in an 802.11n network.

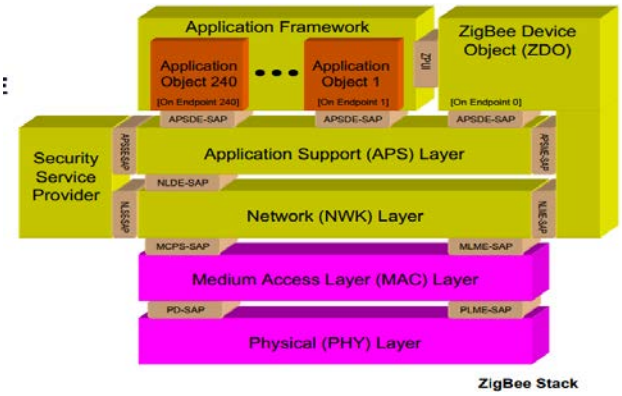
PROPOSED SYSTEM:

In this paper, we propose a novel probabilistic approach that judiciously combines localized monitoring, location estimation and node collaboration to detect node failures in mobile wire-less networks. Specifically, we propose two schemes. In the first scheme, when a node A cannot hear from a neighboring node B, it uses its own information about B and binary feedback from its neighbors to decide whether B has failed or not. In the second scheme, A gathers information from its neighbors, and uses the information jointly to make the decision (see Section V for details). The first scheme incurs lower communication overhead than the second scheme. On the other hand, the second scheme fully utilizes information from the neighbors and can achieve better performance in failure detection and false positive rates.

ADVANTAGES:

- In addition, since a node can be multiple hops away from the central monitor.
- This approach can lead to a large amount of network-wide traffic.
- In conflict with the constrained resources in mobile wireless networks.
- Another approach is based on localized monitoring.
- Localized monitoring only generates localized traffic and has been used successfully for node failure detection in static networks.

SYSTEM MODEL:



CONCLUSION

In this paper, we presented a probabilistic approach and designed two node failure detection schemes that combine localized monitoring, location estimation and node collaboration for mobile wireless networks. Extensive simulation results demonstrate that our schemes achieve high failure detection rates, low false positive rates, and low communication overhead. We further demonstrated the tradeoffs of the binary and non-binary feedback schemes.

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