ENERGY EFFICIENT ROUTING PROTOCOL FOR WIRELESS SENSOR AND ACTOR NETWORKS

Abstract

Wireless Sensor and Actor Networks (WSANs) are composed of heterogeneous nodes referred to as sensors and actors. Sensors are low-cost, low-power, multifunctional devices that communicate untethered in short distances. Actors collect and process sensor data and perform appropriate actions on the environment. Hence, actors are resource-rich devices equipped with higher processing and transmission capabilities, and longer battery life. In WSANs, the collaborative operation of the sensors enables the distributed sensing of a physical phenomenon. After sensors detect an event in the deployment field, the event data is distributively processed and transmitted to the actors, which gather, process, and eventually reconstruct the event data. WSANs can be considered a distributed control system designed to react to sensor information with an effective and timely action. For this reason, in WSANs it is important to provide real-time coordination and communication to guarantee timely execution of the right actions and energy efficiency of the networking protocols is also a major concern, since sensors are resource-constrained devices. We propose an energy efficient routing protocol for wireless sensor and actor networks to cope with these challenges keeping in mind the resource constraints of the network and the early response by the actor nodes for delay sensitive applications with number of transmissions as less as possible. Our protocol is based on clustering (virtual grid) and Voronoi region concept. Simulation results demonstrate that, the proposed protocol outperforms in terms of delay, energy, throughput and packet delivery ratio.
SURVEY ON TIME SYNCHRONIZATION IN WIRELESS SENSOR NETWORKS

Abstract
Time Synchronization is important issue in multi hop sensor networks. Many applications need local clocks of sensor nodes to be synchronized, requiring various degrees of precision.

In this survey we have discussed some of the time synchronization techniques specifying its advantages and disadvantages.
Abstract
Limited Energy, Computational and Communication resources makes difficult for protocol designer and prevents a number of applications to be performed on Wireless Sensor Networks. The MAC protocols differ from the typical WLAN access protocols for reduction in energy consumption to maximize the network lifetime. Medium access control protocols provide the greatest influence over communication mechanism and provide influence on Energy. Section I gives the features of sensor networks including reasons of energy wastage. Section II proposes the review of different TDMA based MAC protocols listing their merits and Demerits.
Appendix - 4


A CLUSTER BASED APPROACH FOR WIRELESS SENSOR NETWORKS TO ACHIEVE SCALABILITY

Abstract
Recent advancement in wireless communication has enabled the design and development of wireless sensor networks with low cost, low energy consumption and high utilization. Scalability is one of the important characteristics for design of routing protocol in WSNs. As a result of the large number of nodes present in the network, the protocol must be truly scalable i.e. the operations of the protocol do not suffer any degradation as the number of nodes in the network is increased. Clustering provides an effective method to achieve scalability in a wireless sensor network where clusters are required to obey certain constraints that are useful for scalability of the hierarchy. In this paper, we have concentrated on scalability and proposed algorithms for cluster formation, cluster head selection and a method for nodes that join the network after cluster head selection process. The performance of the algorithm will remain the same though there is an increase of nodes in the network.
CLUSTER HEAD SELECTION FOR WIRELESS SENSOR NETWORKS – A SURVEY

Abstract

Wireless Sensor Networks (WSN) have become one of the most interesting networking technologies since it can be deployed without the need of a Communication Infrastructure. Several applications such as wild life sensing, surveillance, monitoring are developed using the strengths of WSN. The main concern of this technology is to increase network lifetime. One of the key factors to achieve the extended network lifetime is selection of cluster-head. In this paper, we first outline clustering and then we describe several cluster head selection methods proposed for WSN, emphasizing their strengths and weaknesses.
FAULT TOLERANT AODV ROUTING PROTOCOL IN WIRELESS MESH NETWORKS

Abstract

Wireless Mesh Networks are believed to be a highly promising technology and will play an increasingly important role in future generation wireless mobile networks. In any network finding the destination node is the fundamental task. This can be achieved by various routing protocols. AODV is one of the widely used routing protocol that is currently undergoing extensive research and development.

AODV routing protocol is efficient in establishing the path to the destination node. But when a link in the path crashes or breaks this protocol utilizes more time for finding another efficient path to destination.

We extend the AODV to resolve the above problem by making use of sequence numbers and hop counts, which results in increasing the efficiency of protocol. This paper also explains how the use of sequence numbers will have additional advantages in finding the shortest path to destination.
Appendix – 7
Paper published in International Journal of Computer Science and Network Security, 

RLL-MAC: RELIABLE AND LOW LATENCY MAC FOR EVENT CRITICAL 
APPLICATIONS IN WIRELESS SENSOR NETWORKS.

Abstract
Wireless Sensor Networks are appealing to researchers due to their wide range of 
applications like target detection and tracking, surveillance and localization. Energy 
management is a critical issue to prolong the network lifetime in sensor networks. 
Clustering is an effective technique to improve energy efficiency and network lifetime. In addition to energy efficiency, Latency and reliability are prime concerns in sensor networks. We propose a new protocol, RLL-MAC (Reliable and Low Latency Medium Access Control) for event critical applications that provides a reliability approach in election of cluster head and a dynamic wake up scheme to reduce the latency.
Appendix - 8

DELAY ADJUST MAC PROTOCOL FOR ENERGY EFFICIENCY IN WIRELESS SENSOR NETWORKS

Abstract
Medium Access Control (MAC) Protocols are designed to improve energy efficiency in order to prolong lifetime of node in Wireless Sensor Networks, where they exploit listen/sleep cycles to conserve energy. These cycles of nodes influence the network performances such as energy efficiency, packet latency and throughput in these networks. The issue of performance enhancement of wireless networks in terms of overhead messages per node and energy consumption is an important challenge. In this paper we present different MAC protocols and propose a new Delay Adjust MAC protocol for Wireless Sensor Networks and summarize how this protocol provide energy-efficiency and throughput, over well known MAC protocols.
Appendix -9


RELIABILITY BASED CLUSTER HEAD ELECTION SCHEME FOR WIRELESS SENSOR NETWORKS

Abstract
Recently wireless sensor networks have become one of the most interesting networking technologies since it can be deployed without the need of a communication infrastructure. Several applications such as wild life sensing, surveillance, monitoring are developed using the strengths of wireless sensor networks. The main concern of this technology is to increase the network lifetime. One of the key factors to achieve the extended network lifetime is the selection of cluster- head. In our paper we are proposing a cluster head election scheme by considering the Parameters, which include available residual energy resources, Hop Count and the neighbor's vote of the node based upon the reliability.
ALGORITHMS FOR DYNAMIC NODE EVENTS AND FAULT TOLERANCE IN WIRELESS SENSOR NETWORKS

Abstract

Wireless Sensor Networks are new type of emerging networks with bunch of applications in all fields due to their low cost and low power scheme. As these networks follow open wireless communication, they under go dynamic node problems and fault node detection due to malicious node activities. In this paper, these problems overcame with the help of algorithms that will provide uninterrupted communication and also save nodes energy and time.
ALGORITHM FOR DYNAMIC NODE EVENTS IN WIRELESS SENSOR NETWORKS.

Abstract

Wireless Sensor Networks are emerging networks with bunch of applications in all fields due to their low cost and low power consumption. As these networks allow open wireless communication, they undergo routing level attacks where an adversary masquerades as a legitimate node to convince neighboring nodes that it is on a better path for forwarding packets, and drops the packets forwarded by neighboring nodes, also the communication link between network nodes is broken due to such malicious activities. These networks also face open problems like dynamic node events such as addition of new node and node deaths. During the initialization step though communication channel is free from malicious activities but during messaging these dynamic node events will cause communication link failures leading to wastage of power and inefficient communication link failure. In this paper, in order to overcome all the above problems, we have designed specialized algorithms for SUMP (Secure Unicast Messaging Protocol) through which node death and communication link breakage are identified and remedies are provided for uninterrupted communication. In addition to that merkel hash trees can implement security issues of nodes by grouping nodes into levels based on hop count. The main advantage of SUMP is that it doesn't require storage of parent node information like other protocols. We are designing our algorithm based on some environmental assumptions and by adding some extra field during initialization and path established steps where the response time and threshold limit of particular nodes are recorded as the base station. During messaging of nodes this response time will be considered basing on which node failures are determined with reference to threshold value death of node is decided and basing on node location communication paths are established.
DETECTING AND PREVENTING ACCIDENTS ON NATIONAL HIGHWAYS

Abstract

Wireless sensor Networks can enable the reliable information gathering and transmission for a variety of applications that range from environment protection and civil structure monitoring to battlefield surveillance.

In India, maximum number of accidents on national highways occurs due to drunken driving. This paper proposes the use of wireless sensor networks augmented with embedded processing, communication and sensing capabilities to monitor vehicle behavior on roads mainly considering drivers conditions. The primary goal of the system is to provide warning to drivers about their driving conditions which may help to reduce accidents.