Mitigating Channel Allocation Problem using Dynamic Channel Assignment for Wireless Sensor Networks

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Abstract - Wireless sensor networks are becoming increasingly common, and balancing of load should also be taken care. This in turn increase the energy consumption cost , delay in the network Coordinated channel access protocols have been shown to be well suited for highly loaded wireless sensor network under uniform load distributions. Since there is lack of on-demand dynamic channel allocation in coordinated channel access protocol, there is problem in case of non uniform load distributions. The proposed system presents a lightweight dynamic channel allocation mechanism and load balancing strategies that are applicable to wireless sensor network. The protocols utilize a new mechanism to improve performance in terms of throughput, energy consumption and inter-packet delay variation. Through simulations both dynamic channel allocation and load balancing improve the bandwidth efficiency of the network.

I. INTRODUCTION

A Wireless sensor network are spatially distributed autonomous sensors to monitor physical or environmental conditions such as temperature, pressure, sound etc. and to cooperatively pass their data through the network to a main location. The more modern networks are bidirectional, also enabling control of sensor activity. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industry and consumer applications such as industrial process monitoring and control, machine health monitoring and so on.

II. LITERATURE SURVEY:

MH-TRACE: Multi hop time reservation using adaptive control for energy efficiency

The multihop time reservation using adaptive control for energy efficiency is proposed. This protocol combines fully distributed and fully centralized networks advantages for real time packets broadcasting. A novel clustering algorithm is introduced that dynamically organizes the network into two-hop clusters. Time is organized into cyclic superframes to support reservation based periodic channel access for real time traffic. Energy dissipation is avoided through the use of information summarization packets sent prior to the data transmissions by the use of source nodes.

III. Capacity analysis of multihop wireless sensor networks using multiple transmission channels:

A case study using ieee 802.15.4 based networks

A challenge is designing a multihop wireless network. This is because of high bit error rates. Protocols based on spatial reuse of frequency are introduced to improve the capacity. This is useful in wireless environment. The gap between reality and simulation based on initial test bed experiments. A generic channel allocation scheme based on k-distance coloring problem is presented.

On distributed dynamic channel allocation in mobile cellular networks

A problem in mobile cellular network is Distributed dynamic channel allocation. It is not exactly a mutual exclusion problem, but it has its flavor. A general algorithm is developed such that mutual exclusion for a single resource is guaranteed. The algorithm for addressing these issues further is applied and extended. Based on the results, a distributed channel allocation scheme is proposed.

IV. EXISTING SYSTEM:

In general, MAC protocols for wireless networks can be classified as coordinated and uncoordinated MAC protocols based on the collaboration level. In uncoordinated protocols such as IEEE 802.11, nodes contend with each other to share the common channel. For low network loads, these protocols are bandwidth efficient due to the lack of overhead. A coordinated channel access protocol is suited only for loaded wireless sensor networks under uniform load distributions. It is not suited for non- uniform.

For low network loads, these protocols are bandwidth efficient due to lack of overhead. However as the network increases, their bandwidth efficiency decreases. Due to idle listening, these protocols are in general not energy efficient. Coordinated channel access protocol adapt only in static environment.

In this paper lightweight dynamic channel allocation mechanism and a cooperative load balancing strategy that are applicable to wireless sensor network to address this problem. The protocols utilize these mechanisms to improve performance in terms of throughput, energy consumption and inter- packet delay variation (IPDV), bandwidth efficiency [10] in wireless sensor network. It is crucial for the Medium access control of a wireless sensor network not only adapt to the dynamic environment but also to efficiently manage bandwidth utilization. MAC protocol design is the maximization of spatial reuse and providing support for non-uniform load distributions.

V. PROPOSED WORK:

Similar to cellular systems, coordinated wireless sensor networks MAC protocols need specialized spatial reuse and channel borrowing mechanisms that address the unique characteristics of wireless sensor networks in order to provide as high bandwidth efficiency as their uncoordinated counterparts. Due to node mobility and the dynamic nature of the sources in a wireless sensor networks, the network load is often not uniformly distributed. In these paper two algorithms has been proposed to cope with the non- uniform load distributions in wireless sensor networks a light weight distributed dynamic channel allocation algorithm based on spectrum sensing, and a cooperative load balancing algorithm in which nodes select their channel access providers based on the availability of the resources.

The contributions of this paper are:

1. To propose a light weight dynamic channel allocation scheme for cluster-based mobile ad hoc networks
2. To propose a cooperative load balancing algorithm
3. To incorporate these two algorithms into our earlier TRACE framework leading to DCA framework leading to DCA-TRACE and CMH-TRACE.
4. To combine both algorithms to provide support for non- uniform load distributions and propose CDCA-TRACE.

To provide dynamic channel allocation and cooperative load balancing we use the MH-TRACE(Multi-Hop Time Reservation Using Adaptive Control for Energy Efficiency) protocol. MH-TRACE protocol contains four types of slots CA-slots, contention slots, IS slots, data slots. Each slot can be used to identify the channel efficiency, energy level. Why we need dynamic channel allocation means, the channel controller continuously monitor the power level in all available channels in network and assess the availability of the channels by comparing the measured power level. If it is below then, it will access the other channel in the network.

We create Nodes and channel Election process of cluster head, in which channel having high capacity it elected as a cluster head. Using beacon packets we can identify the channel coordinator, after the time expire if you cannot get bacon packet then cluster head automatically created. To allocate a channel depends on power level. Channel reuse is based on channel capacity cluster head maintain stack depends on size. Data can be split in to packet and then send data to destination nodes.

VI. CONCLUSION

The Effects of upper layer such as the routing layer have not investigated and instead focus on the MAC layer capability and local broadcasting service. Packet routing has a significant impact on the load distribution. Local link layer broadcasting service is directly used by some routing algorithms such as network flooding. Moreover, it can be used alongside with network coding and simultaneous transmission techniques for cooperative diversity.

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