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Energy Enhancement in IEEE 802.11 using Hybrid MAC Algorithm

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ABSTRACT

The optimized time division multiple access (TDMA) schedules that can achieve high power efficiency, zero conflict, and reduced end-to-end delay[1]. Based on the network-wide flow distribution calculated. The optimization model and transmission power on every link, then propose an algorithm for deriving the TDMA schedules. Utilizing the slot reuse concept to achieve (LiqiShi, *et al.*, 2010) minimum TDMA frame length. To implement the reuse of slot reuse with non-negligible interference and fixed frame length.

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INTRODUCTION

Wireless sensor network (WSN) is an application driven design determined by the requirements of network behavior.

Wireless sensor networks have been proposed for emergency applications. Example- Building Fire Monitoring & Response.

The network must be traffic and topology adaptive for this type of application. The algorithm – should be delay tolerant and energy efficient. The applications like real-time streaming (Priya, B. and S. Solai Manohar) for voice and video require comparatively high bandwidth utilization, throughput, and bounded end-to-end delay (Priya, B. and S. Solai Manohar) of few milliseconds. Thus, the design of effectual WSN medium access control (MAC) protocols has become a more challenging task and results in a very different design trade-off than other wireless networks.

II. *Relative Work:*

A. Low power TDMA in large wireless sensor networks:

TDMA scheme for a large population of sensors interconnected by a wireless multihop network. Key characteristics of this system are the large number of sensor nodes and the need to rely on battery operation for a long interval of time. Since communication is a major consumer of energy, low power communication protocols play a (Fredrik berggren) critical role in wireless sensor networks and have significant impact on the overall energy dissipation of these networked systems

B. Cross-Layer Design for Lifetime Maximization in Interference-Limited Wireless Sensor Networks:

The Optimization problem is convex and can be solved efficiently and exactly using interior point methods. Non-orthogonal link arrange Iterative algorithm that alternates between adaptive link scheduling and computation of optimal link rates Transmission powers for a fixed link schedule control (Fredrik berggren) the link schedules to the class of interference-free time division multiple access (TDMA) schedules.

C. Node clustering in wireless sensor networks: recent developments and deployment challenges:

The large-scale establishment of wireless sensor networks (WSNs) and the need for data aggregation necessitate efficient organization of the network topology for the purpose of balancing the load and prolonging the network lifetime.

Clustering has proven to be an effective approach for organizing the network into a connected hierarchy. the design rationale of the different clustering approaches The execution of a clustering algorithm can be carried out at a centralized authority (e.g., a base station) or in a distributed way at local nodes.

I. Exsiting System:

- The Existing System does not dealing about the reuse of slot with non-negligible interference
- Current work does not enforce a limit on the frame length.
- Low power TDMA in large wireless sensor networks (Pei, G. and C. Chien, 2001).

III. *Proposed system:*

- The propose system is going to produce efficient slot reuse.

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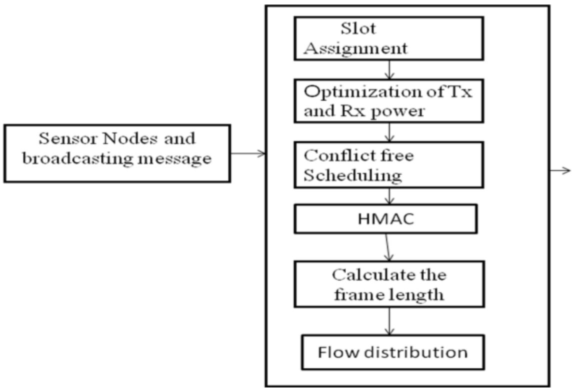
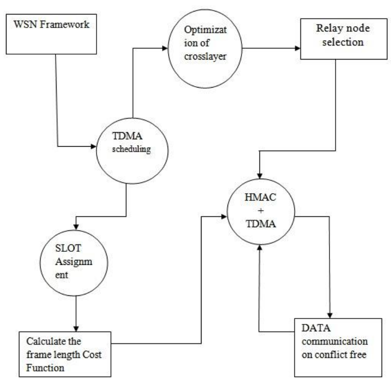
- Non-negligible intercession with Fixed frame length.
- Energy consumption
- Minimize the Conflict free and End-to-End Delay.



Transmission control protocol.

Methodology:
Unicast data exchange between nodes can be performed (Tie Luo, et al.,) as follows:
1) Each node turns on its radio during its own wakeup slot and sleeps during all the other wakeup slots.
2) Each sender randomly picks up a data slot and announces the data slot number along with the receiver's node identifier via a "WAKEUP" message in the receiver's wakeup slot.
3) Upon reception of a "WAKEUP" message, a node checks the embedded node identifier in the "WAKEUP" message. If it is the intended receiver, then the node turns on its radio for the incoming data packet in the specified data slot; otherwise, it just sleeps. If a broadcast address is included in the "WAKEUP" message, then all nodes receiving this message should wake up in the specified data slot simultaneously.
4) If any collision occurs in a node's wakeup slot, then the node turns on its radio for a duration long enough to receive an RTS packet at the beginning of each data slot for a possible incoming data packet. If the node learns that it is the intended receiver from the received RTS message, then it keeps the radio on to receive the data packet; otherwise, it returns to sleep in the remaining period of the data slot. This way, a node can reduce the extra energy cost under such a situation.
5) In each data slot, unicast data transmission must follow the well-known RTS/CTS/DATA/ACK scheme in IEEE802.11 to avoid the "hidden terminal problem," since two senders may choose the same data slot to send data to their receivers at the same time, and the transmissions happen to be in a common interference range.
1. HMAC also provides support for one-hop broadcast operation. When a node has data to broadcast, it sends (Frans Kaashoek Andrew, M.,) out a "WAKEUP" message containing a broadcast address and a data slot in each wakeup slot.
2. After receiving such "WAKEUP" messages, all neighbors will wake up in the same data slot to receive the broadcast message.

Data flow diagram:

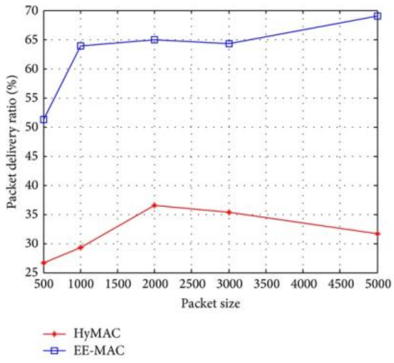


V. ***Conclusion And Future Enhancement:***
- EE-HMAC allows all nodes to access the media in an efficient and quick manner. This is achieved through an adaptive prioritization mechanism.
- EE-HMAC adapts itself, improves the delay performance, packet delivery ratio, and lower energy consumption.
- Present a new MAC protocol, which is referred to as hybrid MAC (HMAC).

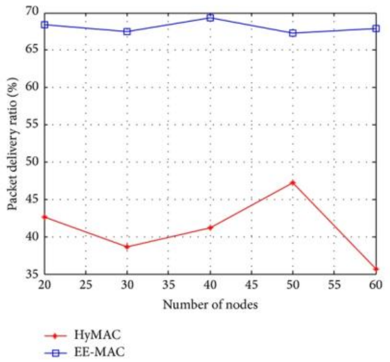
- which is suitable for WSNs in terms of energy efficiency, latency, and design complexity.
- HMAC combines channel-allocation schemes from existing contention-based and time-division multiple-access (TDMA)- based MAC protocols to allow the realization of tradeoffs between different performance metrics.
- It uses a short slotted frame structure and a novel wakeup scheme to achieve high-energy performance, low delivery latency, and improved channel utilization
- HMAC provides routing layer coarse-grained quality-of-service (QoS) support at the MAC layer.
- The MAC protocols presented in reduce the end-to-end delivery latency while increasing control overhead without considering different performance demands between flows

Experimental Results:

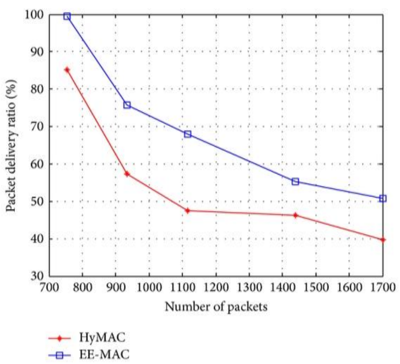
Packet delivery ratio for different packet sizes.



Packet delivery ratio with varying numbers of nodes.



Comparison of packet delivery ratio for different numbers of packets transmitted.



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