Analysis MAC Protocol for Wireless Powered Sensor Networks

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ABSTRACT

The DCF protocol design on the principle of MAC channel allocation and energy harvesting selection based on limited power threshold factor. The research gap between DCF and RF is sharing of information for the selection of tree node process. During the cluster node selection more power is consumed. Now reduction of this power effect used reference node selection mode for the selection of tree head and data transmission for the communicating node. The proposed method made in two factors one is measurement of power during formation of tree head and in second phase used the process of data for the reference node. The deployment model of sensor node is distributed in different section. The distribution of this sensor node in random fashion according to mobility model of senor network. The modified protocol simulated in MATLAB simulator. For the process of simulation used two different file one is guide and other function file is scripted in the form of sensor's direct implemented in the form of reference model. Our empirical evaluation of result shows that the modified protocol proposed is very efficient in compression of HEMAC. The process reduces the consumption of energy and route cost about 15%.

Keywords: WSN, MAC, RF-MAC, HE-MAC, MATLAB, DCF, RF.

INTRODUCTION

Wireless sensor networking is an emerging technology that has a wide range of potential applications including environment monitoring, smart spaces, medical systems and robotic exploration. Such a network normally consists of a large number of distributed nodes that organize themselves into a multi-hop wireless network. Each node has one or more sensors, embedded processors and low-power radios, and is normally battery operated. Typically, these nodes coordinate to perform a common task[2, 8]. Like in all shared-medium networks, medium access control (MAC) is an important technique that enables the successful operation of the network. One fundamental task of the MAC protocol is to avoid collisions so that two interfering nodes do not transmit at the same time. There are many MAC protocols that have been developed for wireless voice and data communication networks. Typical examples include the time division multiple access (TDMA), code division multiple access (CDMA), and contention-based protocols like IEEE 802.11 [1]. To design a good MAC protocol for the wireless sensor networks, we have considered the following attributes. The first is the energy efficiency. As stated above, sensor nodes are likely to be battery powered, and it is often very difficult to change or recharge batteries for these nodes. In fact, someday we expect some nodes to be cheap enough that they are discarded rather than recharged. Prolonging network lifetime for these nodes is a critical issue. Another important attribute is the scalability to the change in network size, node density and topology. Some nodes may die over time; some new nodes may join later; some nodes may move to different locations. The network topology changes over time as well due to many reasons. A good MAC protocol should easily accommodate such network changes. Other important attributes include fairness, latency, throughput and bandwidth utilization[3-7]. In the rest part of this paper described the efficient utilization of the spectrum in section II, modified protocol in section III, proposed methodology in section IV, result and performance analysis in section V. Finally discuss the conclusion of this paper in section VI.

II. EFFICIENT UTILIZATION OF THE SPECTRUM

The ISM bands are used by Enormous wireless communication technologies, including IEEE 802.11, IEEE 802.15.4 and Long-Term Evolution (LTE) in an Unlicensed network. This resulted for high spectrum occupancy. Moreover, wireless networks working in the same spectrum band may suffer from mutual interference, which might degrade the performance of all the networks. This is further exacerbated by the uncontrolled deployment of WLANS in the ISM band, which is very common in advanced environments. For example, let us imagine a complex with several apartments and a WLAN in each one[12]. There would easily allow many WLANs operate in overlapping medium and suffering mutual interference. To overcome this issue, it is expected that new APs will increasingly incorporate DCA (Dynamic Channel Allocation technique is to select and update their operating channel/Medium at run-time. An alternative Approach to increase the spectrum occupancy problem is to move to a different part of the spectrum, even if the new portion of the spectrum is occupied by communication systems operating under a license. In that case, Wireless networks will be the secondary users and must avoid causing interference to the primary users. In today's scenarios, the change from analog to digital TV broadcast transmission has resulted in a reorganization of the spectrum at UHF/VHF bands. This reorganization has shown that there are many empty TV channels, called TV white spaces, which can be used for data communication, especially in underdeveloped areas /rural areas [9-11]. Furthermore, WLANs operating in those TV white spaces may take the advantage of radio propagation properties in the UHF band to provide large coverage areas[14].

III. MODIFIED PROTOCOL

In this method, master send by the node is called reference node. And those nodes accept the join query from reference node, generate token with the help of request node.

S. No.	Token	Clock	Neighbours
1	T1	3.4	1m
2	T2	4.5	2m
3	T3	3.5	1m
4	T4	7.9	3m

Offset value

Table 1: Token Generation.

1. The receivers will compare their clocks to one another to calculate their relative phase offsets. The timing is based on when the node receives the reference beacon.
2. The timing packet will be broadcasted to the receivers. The receivers will record when the packet was received according to their local clocks. Then, the receivers will exchange their timing information and be able to calculate the offset.
3. If the measured time interval is within the range of offset value, the next hop node is considered as a legitimate node. In case the time interval exceeds the value of the offset value, the next hop node is set aside as malicious.
4. Each token has offset value, clock and neighbours.

IV. PROPOSED METHODOLOGY

```
Void outgoing packet (Input: e)
{
R= (source IP, destination IP)
if e is a request/reply packet then
   for (i=0; i<k; i++ ) do
    j= Quee_i (e)
    Increment_j ++
   end for
end if
Void Incoming_Packet (Input: e) {
if e request/reply packet then
  R= (destination IP, source IP)
   for (i=0; i<k; i++) do
   j= Quee_i (e)
    if increment =0 then
    Suspicious Alarm (SA) is reported
    end if
 end for
end if
   for (i=0; i<k; i++ ) do
    j= Quee_i (P)
    Increment --
   end for
end if
Return
}
```

PROPOSED MODEL

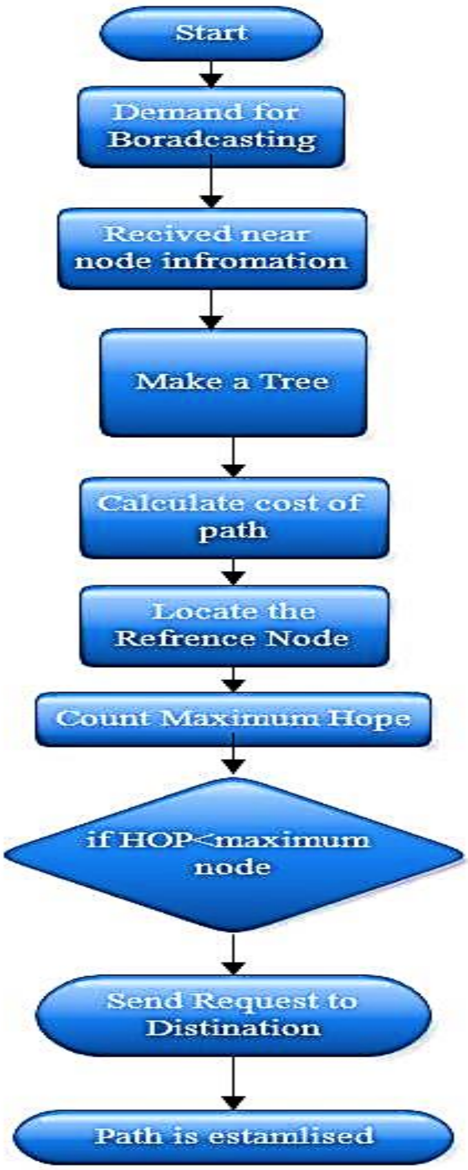

Figure 1: Show the improved proposed model of STR protocol.

V. RESULT AND PERFORMANCE ANALYSIS

	PDR	Routing-Overhead	Energy	Hop-count
RFMAC	0.0030	100	0.5612	12
HEMAC	0.1030	80	0.4924	7
Proposed	0.2030	70	0.4922	3

Table 2: given table show that the PDR, Routing-Overhead, Energy, Hop-count parameters numeric results when we give input of number of nodes is 3, number of child is 8, depth of network is 4 using RFMAC, HEMAC and PROPOSED techniques.

	PDR	Routing-Overhead	Energy	Hop-count
RFMAC	0.0478	30	0.8241	18
HEMAC	0.0414	20	0.7992	8
Proposed	0.0512	10	0.7990	3

Table 3: given table show that the PDR, Routing-Overhead, Energy, Hop-count parameters numeric results when we give input of number of nodes is 5, number of child is 12, depth of network is 6 using RFMAC, HEMAC and PROPOSED techniques.

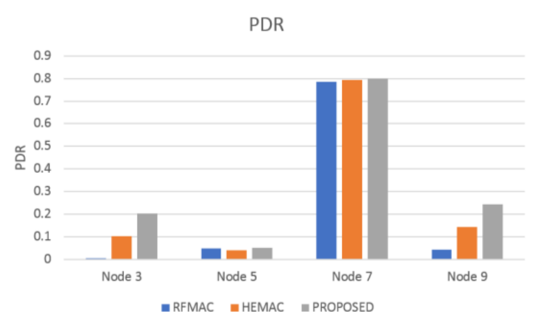

Figure 2: the comparative performance of PDR using RFMAC, HEMAC and proposed techniques.

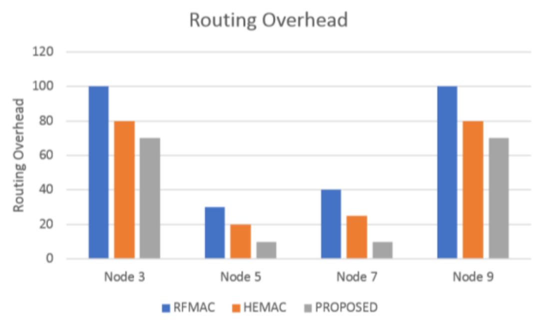

Figure 3: the comparative performance of PDR using RFMAC, HEMAC and proposed techniques.

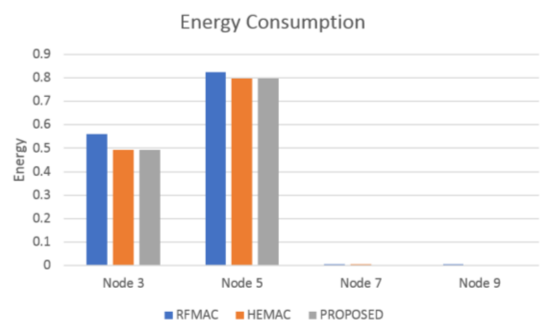

Figure 4: the comparative performance of PDR using RFMAC, HEMAC and proposed techniques.

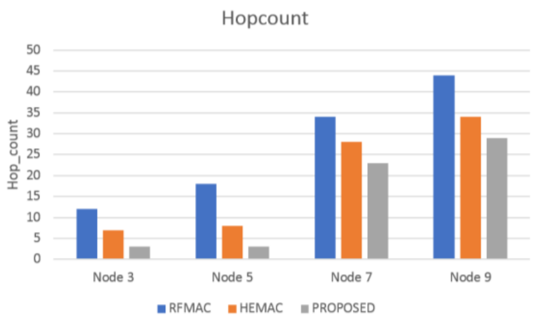

Figure 5: the comparative performance of PDR using RFMAC, HEMAC and proposed techniques.

CONCLUSIONS

The Proposed is a hybrid model of very famous reference node model and DCF protocol for energy saving and minimum route cost for communication in wireless sensor network. Basically, proposed work as a route filter, because in modern trend traffic apply by the flooding a power that power is consumed by sensor node. The proposed model PROPOSED estimate communication power loss rate of vehicle ad-hoc network with data powers, form Experimental results we can conclude: Power loss rate of WSNs is affected by a number of factors, such as flooding of control message protocol.

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