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Enhance life Time of Mobile Ad-hoc Network using WiTriCity and Backpressure Technique

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ABSTRACT: **A mobile Ad-Hoc network is an infrastructure less temporary network without any centralized administration. In such network, all nodes are mobile and can be connected dynamically in an arbitrary manner. In mobile Ad-Hoc networks, limited power supply is a challenge. So this problem has two solutions either wirelessly charge the existing network or energy efficient mechanisms should be combined with existing routing protocols. This solution reduces node failure and improve the network lifetime. This paper presents the technique to wirelessly charge the existing network and Energy-Efficient Position Based Routing protocol (EEPBR) using Backpressure technique for Mobile Ad Hoc Networks. The protocol deals with four parameters as Residual Energy, Bandwidth, Load and Hop Count for route discovery. The problem of the link failure in the channel during the call in progress thus leads to the degradation of the QoS (Quality of Service). To deal this paper using a Witricity and Backpressure Technique. The simulation results show that the proposed algorithm is able to find a better solution, fast convergence speed and high reliability. Our proposed scheme is useful for minimizing the overheads, maintaining the route reliability and improving the link utilization.**

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Keywords: MANET, Bandwidth, Load and Residual Energy.

1. INTRODUCTION

Mobile ad hoc network is a collection of mobile devices which can communicate through wireless links. The task of routing protocol is to direct packets from source to destination. This is particularly hard in mobile ad hoc networks due to the mobility of the network elements and lack of central control. Source routing is a routing technique in which the sender of a packet determines the complete sequence of nodes through which it forwards the packet; the sender explicitly lists this route in the packet's header, identifying each forwarding "hop" by the address of the next node to which to transmit the packet on its way to the destination host. Source routing has been used in a number of contexts for routing in wired networks, using either statically defined / dynamically constructed source routes. The protocol presented here is explicitly designed for use in the wireless environment of an ad hoc network. When a host needs a route to another host, it dynamically determines one based on cached information and on the results of a route discovery protocol. Dynamic source routing protocol offers a number of potential advantages over conventional routing protocols such as distance vector in an ad hoc network.

Source routing is a technique in which the source node determines the entire sequence of nodes through which a packet has to pass. The source node puts the list of addresses of all nodes in the header of the packet, so that the packet is forwarded to the destination through those specified nodes. However source routing can be done statically or dynamically. Here it does dynamically. This is done using a procedure called route discovery. Whenever a node has packet to send to some other node, the first node initiates the route discovery. Each node maintains a cache called route cache to store the routes it has gathered to different destinations. To support efficient routing in energy constrained ad hoc networks, power-aware routing policies can be integrated and evaluated with existing features of routing protocol. Unlike conventional routing protocols, our protocol uses no periodic routing advertisement messages, thereby reducing network bandwidth. The proposed protocol enhances Dynamic Source Routing protocol with some Energy constraints to improve its performance [1]. As the residual energy of nodes in an ad hoc network goes below threshold, some of the existing links break and the routes in the route caches of the nodes must be

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modified and alternative route may be used. For the above problem we have two solutions. First the network has always sufficient amount of power with the help of WitriCity [2] and Energy-Efficient Position Based Routing protocol (EEPBR) using Backpressure technique for Mobile Ad Hoc Networks. The rest of the paper is organized as follows: we have given design space and related works in Section 2, Section 3 presents the Generation of Witricity Section 4 presents the proposed protocol, Section 5 discusses Simulation results and finally Conclusion and Future work is discussed in Section 6.

2. DESIGN SPACE AND RELATED WORK

The routing concept basically involves two activities first, determining optimal routing routes and secondly, transferring the information packets through network. There are various Energy-Efficient routing protocols which deal with the following constraints:

- Switching on/off radio transmitters to conserve energy [3][4],
- Power and topology control by adjusting the transmission range (power) of transmitters [5][6],
- Routings based on the energy efficient metrics [7].

The radio transmitters are turned off for an adaptively varying period to save power when there is no traffic. In order to adapt to operational environment, several algorithms are proposed, for examples, using application level information and node density [3], and routing fidelity and location information [4]. Topology control is another approach, in which the transmission power is adjusted to achieve energy efficiency. For instance, the transmission power is changed while maintaining a connected topology by observing local and global topology information [5]. The node battery life is extended by using the radio's minimum power level. A distributed power control scheme is proposed, in which power control level is established by exchanging control messages, according to the estimated minimum and maximum power level [6]. There will be frequent link ups and downs, causing more link errors. Retransmission due to link breakage will consume extra energy and network bandwidth. For Metric-based routing [7][8], different kinds of metrics are used to maximize the lifetime of networks by evenly distributing the energy consumption among all nodes. MBCR (Minimum Battery Cost) algorithm incorporates the battery capacity into the metric. In addition, the expected energy spent in reliably forwarding a packet over a specific link is considered in [9]. In order to maximize the network life time, the cost function defined in [10] takes into account energy expenditure for one packet transmission and available battery capacity. Furthermore in [11], the queue load condition and the estimated energy spent to transmit all packets in the queue are considered.

2.1 Dynamic Source Routing Protocol (DSR)

The Dynamic Source Routing (DSR) protocol is an on-demand routing protocol. Mobile nodes are required to maintain route caches that contain unexpired routes and are continually updated new routes are learned. The protocol consists of two major phases: **route discovery and route maintenance**.

Route Discovery is done by the source if it doesn't found any route for the destination in its route cache. It is done by broadcasting a RREQ packet to all the neighbors initiated by source then by every node that receives the RREQ packet, till the destination is found. When destination receives a RREQ packet, it replies source with a RREP packet along the reverse of the route recorded in RREQ. **Route maintenance:** Route maintenance is done by the use of route error packets and acknowledgments. RERR packet is send by a node to the source when the data link layer met a fatal transmission problem. When a RERR packet is received, the erroneous hop is removed from the node's route cache and all routes that contain that hop are truncated at that point.

3. GENERATION OF WITRICITY - *Phase 1*

Household devices produce relatively small magnetic fields. For this reason, chargers hold devices at the distance necessary to induce a current, which can only happen if the coils are close together. A larger, stronger field could induce current from farther away, but the process would be extremely inefficient. Since a magnetic field spreads in all directions, making a larger one would waste a lot of energy. An efficient way to transfer power between coils separated by a few meters is that we could extend the distance between the coils by adding resonance to the equation. A good way to understand resonance is to think of it in terms of sound. An object's physical structure -- like the size and shape of a trumpet -- determines the frequency at which it naturally vibrates. This is its resonant frequency [13]. It's easy to get objects to vibrate at their resonant frequency and difficult to get them to vibrate at other frequencies. This is why playing a trumpet can cause a nearby trumpet to begin to vibrate. Both trumpets have the same resonant frequency. Induction can take place a little differently if the electromagnetic fields around the coils resonate at the same frequency. The theory uses a curved coil of wire as an inductor. A capacitance plate, which can hold a charge, attaches to each end of the coil. As electricity travels through this coil, the coil begins to resonate. Its resonant frequency is a product of the inductance of the coil and the capacitance of the plates [14].