

Establishing Stable and Reliable Routes for Heterogeneous Multihop Wireless Sensor Networks

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ABSTRACT:-In multihop wireless networks, when a mobile node wants to communicate with a destination, it relies on the other nodes to forward the packets. This multihop packet transmission can extend the network coverage area using limited power and improve area distance efficiency. In the proposed multihop wireless network E-STAR integrates the payment and trust systems with the routing protocol with the goal of enhancing route reliability and stability. The payment system describes to charge the nodes that send packets and reward those forwarding packets. The trust system is important to evaluate the nodes' trustworthiness and reliability in forwarding packets in terms of multi-dimensional trust values and the trust values are calculated for each node and developed two routing protocol is used to send the packets through highly trusted nodes having sufficient energy to minimize the possibility of breaking the route. To strengthen the trust evaluation, recommendation from each node is included in trust calculation by TP (Trusted Party). This protocol is implemented over the MANET network and simulated using NS2. Performance evaluated from the parameters such as packet delivery ratio, call acceptance ratio and route lifetime.

Keywords: *Securing heterogeneous multihop wireless networks, packet dropping, trust systems, and secure routing protocols*

1. INTRODUCTION

The multihop wireless network implemented in many useful applications such as data sharing and multimedia data transmission. It can establish a network to communicate, distribute files, and share information. However, the assumption that the nodes are willing to spend their limited resources, such as battery energy and available network bandwidth. Drawbacks in the existing routing protocols such as DSR [6] assume that the network nodes are willing to relay other nodes' packets. This assumption is reasonable in disaster recovery because the nodes pursue a common goal and belong to one authority, but it may not hold for civilian applications where the nodes aim to maximize their benefits, since their cooperation consumes their valuable resources such as bandwidth, energy, and computing power without any benefits. In civilian applications, selfish nodes will not be voluntarily interested in cooperation without sufficient incentive, and make use of the cooperative nodes to relay their packets, which has negative effect on the network fairness and performance. Fairness issue arises when a selfish node takes advantage from the cooperative nodes without contributing to them, and the cooperative nodes are unfairly overloaded. The selfish behavior degrades the multi-hop communication. In addition, some nodes may break routes because they do not have sufficient energy to relay the source nodes' packets and keep

the routes connected. Because of this uncertainty in the nodes' behavior, randomly selecting the intermediate nodes will degrade the routes' stability. This proposed system overcomes these drawbacks by the following techniques, trust and payment system [3]. The payment system uses credits to charge the nodes that send packets and reward those relaying packets [7]. The trust system is essential to assess the nodes' trustworthiness and reliability in relaying packets. A node's trust value is defined as the degree of belief about the node's behavior. The trust values are calculated from the nodes' past behaviors and used to predict their future behavior.

2. LITERATURE SURVEY

1. Minimum-energy broadcast routing in static ad hoc wireless networks

Energy conservation is a critical issue in ad hoc wireless networks for node and network life, as the nodes are powered by batteries only. One major approach for energy conservation is to route a communication session along the routes which requires the lowest total energy consumption. This optimization problem is referred to as minimum-energy routing. While minimum-energy unicast routing can be solved in polynomial time by shortest-path algorithms, it remains open whether minimum-energy broadcast routing can be solved in polynomial time, despite the NP-hardness of its general graph version. Previously three greedy heuristics were proposed in Wieselthier et al. (2000): MST (minimum spanning tree), SPT (shortest-path tree), and BIP (broadcasting incremental power). They have been evaluated through simulations in Wieselthier et al., but little is known about their analytical performance. The main contribution of this paper is the quantitative characterization of their performances in terms of approximation ratios.

2. A flexible weighted clustering algorithm based on battery power for Mobile Ad hoc Networks

Mobile Ad hoc Networks (MANET) consist of a number of wireless hosts that communicate with

each other through multi-hop wireless links in the absence of fixed infrastructure. The previous research on mobile ad-hoc network suggested the use of clustering algorithm because clustering makes it possible to guarantee basic levels of system performance, such as throughput and delay, in the presence of both mobility and a large number of mobile terminals. In this paper, we propose that the Flexible Weighted Clustering Algorithm based on Battery Power (FWCABP), leads to a high degree of stability in the network, minimizing the number of clusters, and minimizing the overhead for the clustering formation and maintenance by keeping a node with weak battery power from being elected as a cluster-head. Simulation experiments are conducted to evaluate the performance of our algorithm in terms of the number of clusters formed, reassignment frequency, and number of cluster-head change.

3. Implementing A New Algorithm For Analysis Of Protocol Efficiency Using Stability And Delay Tradeoff In Mane

Mobile Adhoc Network (MANET) routing protocols. Our simulations show that modified Power DSR (PDSR) routes are more stable than existing DSR routes, which are more stable than DSDV and AODV routes. This also results in an increased packet delivery ratio for PDSR in comparison to that of DSR and DSDV. On the other hand, based on the energy consumed per packet and the average energy used per node, DSR is better than DSDV, which is better than PDSR. At low network density and mobility, PDSR routes incur the lowest delay and as the network density and node mobility increases, DSR incurs lower delay. Thus, we see a stability-delay-energy consumption tradeoff among these three stability-oriented routing protocols. Regarding the fairness of node usage, we observe that routes get distributed more evenly with increase in the node mobility and network density. But, still there is an appreciable variation in the energy consumption per node as only the chain of nodes that form stable routes are exhausted to a greater extent. A routing protocol that

incurs fewer transitions will lose fewer data packets, create less routing overhead and also maintain in-order data delivery. At the same time, by staying with a long-lived route, the routing protocol may incur a longer end-to-end delay. We intend to explore this tradeoff between stability and delay and try to come with up a metric that would quantify the efficiency of a MANET routing protocol with respect to both stability and delay. On these lines, we introduce the idea of Stability-Delay Tradeoff (*SDT*) as a measure of the efficiency of a MANET routing protocols.

4. Routing Mechanisms For Mobile Ad Hoc Networks Based On The Energy Drain Rate

In this paper we propose A new metric, the drain rate ,to forecast the lifetime of nodes according To current traffic conditions. This metric Is combined with the value of The remaining battery capacity To determine which nodes can be part of an Active route. We describe new route selection mechanisms for MANET routing protocols, which we call the Mini um Drain Rate(MDR) and the Conditional Minimum Drain Rate(CMDR). MDR extends node al battery life and the Duration of paths, while CMDR also minimizes the Total transmission power Consumed per packet. Using the ns-2simulatoran the dynamic source routing(DSR)protocol, we compare MDR and CMDR Against prior proposals for power-aware routing

5. Performance analysis of random-based mobility models in MANET routing protocol

With current advances in technology, wireless networks are increasing in popularity. Wireless networks allow users the freedom to travel from one location to another without interruption of their computing services. Ad hoc networks is one of the subset of wireless network that dynamically forming a temporary network without using any existing network infrastructure or centralized administration. Therefore, it is required a good routing protocol in order to established the connection between the nodes

since the mobile node can change their topology frequently. In the routing protocol, the movement of the mobile node is one of the important characteristics because it can effects the performance of the ad hoc network protocol. In this research, we have studied the effect of the different mobile node movement pattern in random-based mobility model group (Random Waypoint Mobility Model, Random Walk Mobility Model and Random Direction Mobility Model) on the performance of Ad hoc On-demand Distance Vector (AODV). The performance analysis was conducted by using the discrete-event simulator, OMNeT++. The simulator was used to simulate the mobility environment and the Open System Interconnections (OSI) layers utilized in wireless simulation.

3.Existing system:

- MANET is group of mobile nodes that form a network independently of any centralized administration. Since those mobile devices are battery operated and extending the battery life time has become an important aim.
- Mobile nodes in MANETs are battery driven. Thus, they suffer from limited energy level problems. Also the nodes in the network are moving if a node moves out of the radio range of the other node, the link between them is broken
- In wireless ad-hoc networks deals with the problem of finding and maintaining correct routes to the destination during mobility and changing topology.
- Simple implementable algorithm which guarantees strong connectivity and assumes limited node range

PROPOSED SYSETM:

- ✓ We implement E-STAR (efficient power aware routing)to maximize the network lifetime
- ✓ Energy efficient routing protocols, for MANET try to reduce energy consumption by

means of an energy efficient routing metric, used in routing table computation instead of the minimum-hop metric.

- ✓ The data packet header in DSR consists of all the intermediate route address along with source and destination, thereby decreasing the throughput.
- ✓ This increases the available multiple paths for source but at the same time increases the routing packet load of the network.

Optimized Link State Routing (OLRS) is a topologybasedneighbor selection protocol, in which each node only maintains a subset of network topology information.

4.IMPLEMENTATION

Linear Network

The wireless network engages in a neighborhood discovery process. This gives each node's information about which nodes it can communicate directly. Next, the sensor network executes a routing protocol so that senders are able to send messages to their desired destination. Since nodes both send and receive messages, the protocol must provide nodes with routing information so that nodes can send messages specifically to other nodes.

SPOON groups

We propose a P2P content based file sharing system, namely SPOON, for disconnected MANETs. SPOON groups common-interest nodes that frequently meet with each other as communities. Present peer-to-peer (P2P) file distribution methods in mobile ad hoc networks (MANETs) can be divided into three categories: local broadcasting based advertisement (push) and discovery (pull)-based and contact-based. The first two techniques can simply be time consuming and low ability to accommodate when the demand grows higher. They are mainly developed for linked MANETs, in which end-to-end relativity among nodes is preserved. The contact-based methods adjust to the adaptable nature of

disconnected MANETs but fail to regard the social contents of portable nodes, which can be subjugated to advance the file searching effectiveness The system uses an interest extraction algorithm to derive a node's interests from its files for content-based file searching.

Node Role Assignment

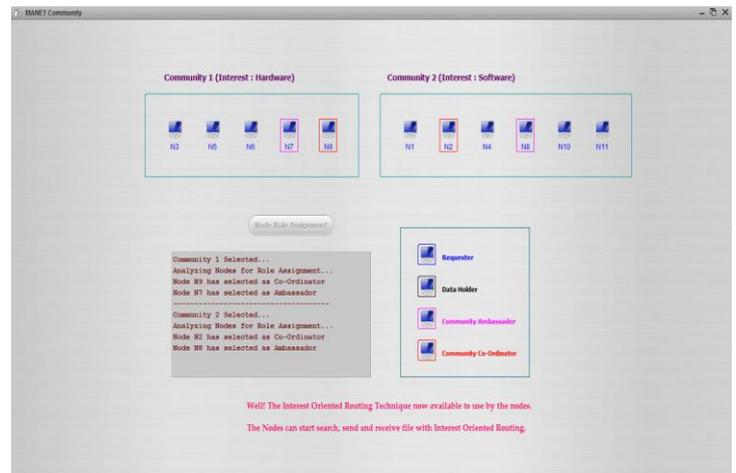
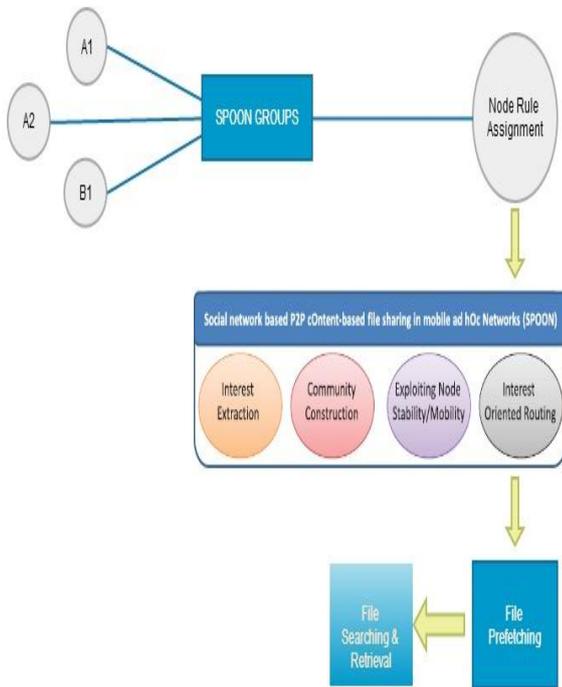
We propose a node role assignment algorithm that takes advantage of node mobility for efficient file searching. It exploits nodes with topology based on connection with protocol community for file searching and highly nodes that frequently for inter-community file. The interest-oriented file searching scheme selects forwarding nodes for queries based on enhance file searching efficiency.

Content-Based File Sharing

The Peer-Peer file sharing model makes large-scale networks in which nodes share files directly with each other without a centralized server. The Peer-Peer file sharing systems have successful paradigm for file sharing among millions of users. The deployment of Peer-Peer file sharing systems and the mentioned impediments to file sharing in MANETs make the P2P file sharing over MANETs a promising complement to current infrastructure model to realize pervasive file sharing for mobile users.

. A node which has high processing power finishes its own work quickly and is estimated to have less or no load at all most of the time. So, in the presence of under-loaded nodes, the need for overloaded nodes is undesirable. Multi-path routing can balance the load better than the single path routing in ad hoc networks, where the first selective shortest paths are used for routing

5. SYSTEM MODEL



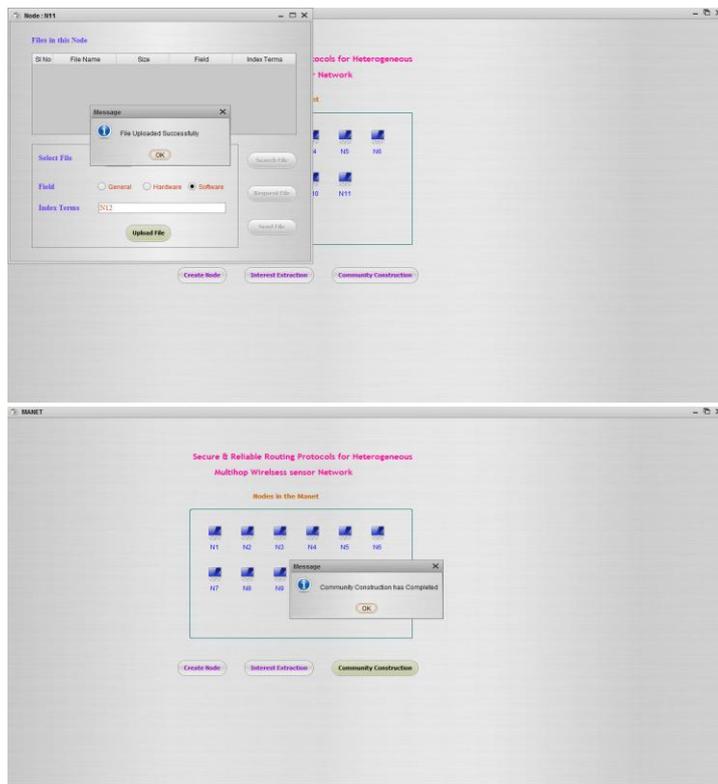
7. CONCLUSION AND FUTURE WORK

In this paper, we propose a social network-based P2P cOntent file sharing system in disconnected mOBile ad hoc Networks. SPOON considers both node interest and contact frequency for efficient file sharing. We introduce four main components of SPOON: Interest extraction identifies nodes' interests; Community construction builds common-interest nodes with frequent contacts into communities. The node role assignment component exploits nodes with tight connection with community members for intracommunity file searching and highly mobile nodes that visit external communities frequently for intercommunity file searching; The interest-oriented file searching scheme selects forwarding nodes for queries based on interest similarities. SPOON also incorporates additional strategies for file prefetching, querying-completion, and loop-prevention, and node churn consideration to further enhance file searching efficiency. The system deployment on the real-world GENI Orbit platform and the trace-driven experiments prove the efficiency of SPOON.

Future Work

In future, we will explore how to determine appropriate thresholds in SPOON, how they affect the file sharing efficiency, and how to adapt SPOON to larger and more disconnected networks.

6. Screenshots



8. REFERENCES:

- [1] S. Marti, T. Giuli, K. Lai, and M. Baker, "Mitigating routing misbehavior in mobile ad hoc networks", in Proc. IEEE/AC, pp. 255–265, August 6-11, 2000.
- [2] M. Mahmoud and X. Shen, "ESIP: Secure incentive protocol with limited use Of public-key cryptography for multi-hop wireless networks", IEEE Transactions On Mobile Computing, vol. 10, no. 7, pp. 997-1010, July 2011.
- [3] P. Velloso, R. Laufer, D. Cunha, O. Duarte, and G. Pujolle, "Trust management in mobile ad hoc networks using a scalable maturity-based model", IEEE Transactions on Network and Service Management, vol. 7, no. 3, pp.172–185, September 2010.
- [4] Shilpa S G , Mrs. N.R. Sunitha, B.B. Amberker, "A Trust Model for Secure and QoS Routing in MANET", International Journal of Innovative Technology & Creative Engineering (ISSN: 20458711), vol.1no.5 may 2011.
- [5] M. Mahmoud and X. Shen, "PIS: A practical incentive system for multi-hop wireless networks", IEEE Transactions on Vehicular Technology, vol. 59, no.8, pp. 4012-4025, 2010.
- [6] N. Bhalaji and A. Shanmugam, "Reliable routing against selective packet drop attack in DSR based MANET", Journal of Software, vol. 4, no. 6, pp. 536-543, August 2009.
- [7] J.Gunasekaran, M.Ezhilvendan, P.Vijayanand, S.Rajasekaran, S.Murugesan "Report Based Payment Scheme for Multihop Wireless Networks". ISSN: 2319 - 1163 vol. 2, Issue. 4, pp. 459 – 464, APR 2013.

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