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RESEARCH ARTICLE OPEN ACCESS

Performance Enhancement of Resource Allocation in Mobile ADHOC Networks

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ABSTRACT:
A MANET is a type of ad hoc network that can change locations and configure itself on the fly. Because MANETS are mobile, they use wireless connections to connect to various network. An infrastructure- less, self-organizing network of mobile hosts connected with wireless communication channels. An attack is an information security threat that involves an attempt to obtain, alter, destroy, remove, implant or reveal information without authorized access or permission. The Adaptive Resource Allocation (ARA) Algorithm which can efficiently adapt to the varying network state and maximize the system Throughput, resource allocation to satisfy the Quality of service (QoS) request of each user.

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I. INTRODUCTION

A mobile ad-hoc network (MANET) is a set of mobile nodes which communicate over a wireless medium over single or multiple and do not need any infrastructure such as access points or base stations. Mobile ad-hoc network is a decentralized group of mobile nodes which exchange information temporarily by means of wireless transmission Therefore, mobile ad-hoc networks are suitable for temporary communication links. The unique characteristics of an Ad Hoc Network differentiate it from other classes of networks. MANET is a collection of mobile devices, which form a communication network with no pre-existing wiring or infrastructure. The devices used to form an Ad Hoc Network possess limited transmission range; therefore, the routes between a source and a destination are often multi hop.

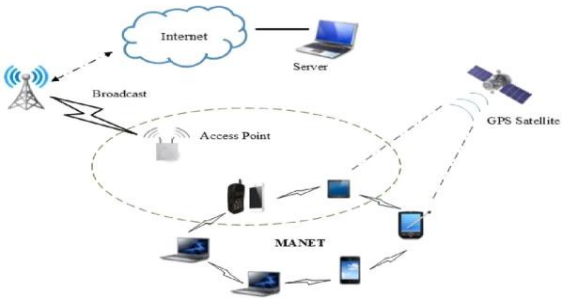
Achieve good network performance, a network Improve the Parameter metrics and Quality of service (Qos) performance based on analysis of both transmission resource and storage resource using the Adaptive Resource Allocation (ARA). The node needs to be selfless to allocate more storage resource and more transmission resource for storing and forwarding packets of other nodes.

The main issues of Ad Hoc Network are challenges in routing due to dynamic network topology and providing consistent quality of service in wireless nodes. Routing is a main issue for communication networks. The main problem solved by any routing protocol is to direct traffic from sources to destinations. The demand of quality of service (QOS) is increases day by day. The role of a QoS to compute paths which are suitable for different type of traffic generated when highly use network resources.

In DSR is a simple and efficient routing protocol designed specifically for use in multi-hop wireless ad hoc network of mobile nodes. DSR allows the network to be completely self-organizing and self-configuring, without the need for any existing network infrastructure or administration. There are two main mechanism in DSR, Route Discovery and Route Maintenance. Route Discovery determines the optimum path for a transmission between a given source and destination. Route Maintenance ensures that the transmission path remains optimum and loop-free as network conditions change, even if this requires changing the Route during a transmission

II. OVERVIEW

MANETs are networks with nodes that are mobile and can be connected dynamically and arbitrarily making the topology very flexible. The communicating devices are auto configurable and there is no need for extra infrastructure. Each of the network activities such as discovering the topology, sending messages or routing messages is performed by each node. Typical examples of these networks are research of rescue operations, military operations etc.



ADAPTIVE RESOURCE ALLOCATION ALGOITHM PROCESS

Adaptive Resource Allocation Algorithm which can efficiently adapt to the varying network state by building an optimal mathematical model and then changing the weighted value of the objective function. The Algorithm can adaptively allocate the resource to the users according to the varying user density which represent the network state. ARA is one of the most effective methods to improve the Throughput and Quality of Service.

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OBJECTIVE

Improve the Parameter metrics and Quality of service (Qos) performance based on analysis of both transmission resource and storage resource using the Adaptive Resource Allocation (ARA). Results for Maximizing the throughput and Quality of Service, reduce the Delay and packet loss. comparison with Optimal Resource Allocation (ORA) and Adaptive Resource Allocation (ARA).

A mobile ad-hoc network consists of many sensor nodes which sense physical phenomena or collect data from an environment. Depending on a predefined application of a network, sensor nodes can be located in fixed places or distributed randomly over a large geographical area. Their communication with each other occurs wireless and they share a channel for signal transmission. Some parameters such as position, distance, and power consumption for each node and communication technology between sensor nodes have inevitable impact over the network's performance. In spite of a tremendous development, there are still limitations that MANETs.

FAIR ENERGY EFFICIENT RESOURCE ALLOCATION IN WIRELESS SENSOR NETWORKS VER FADING TDMA CHANNELS

The energy efficient resource allocation that minimizes a general cost function of average user powers for small or medium scale wireless sensor networks, here the simple time division multiple access (TDMA) is adopted as the multiple access scheme. A class of so-called fair cost function is derived to balance the tradeoff between efficiency and fairness in energy efficient designs**.** Based on such cost functional, optimal channel-adaptive resource allocation schemes are developed for both signal-hop and multi-hop TDMA sensor networks. Relaying on stochastic optimization tools, further develop stochastic resource allocation schemes which are capable of dynamically learning the intended wireless channel fading distribution function.

ON PERFORMANCE MODELING FOR MANET UNDER GENERAL LIMITED BUFFER CONSTRAINT

The real achievable performance of mobile ad hoc networks (MANET) under practical network constraint is of great importance for their applications in future highly heterogeneous wireless network environments. The performance modeling for MANET under a general limited source buffer of size B9 to store its locally generated packets and also a limited shared relay buffer of size B, to store relay packets for other nodes. Based on the Queuing Theory and birth-death chain theory, we first develop a general theoretical framework to fully depict the source /relay buffer occupancy process in such a MANET, which applies to any distributed MAC protocol and any mobility model that leads to the uniform distribution of nodes location in steady state. with the help of this framework, we then derive the exact expressions of several key network performance metrics,
Including achievable throughput, throughput capacity, and expected end-to-end delay. we further conduct case studies under two network scenarios and provide the corresponding theoretical/simulation results to demonstrate the application as well as the efficiency of our theoretical framework. Finally, we present extensive numerical results to illustrate the impacts of buffer constraint on the performance of a buffer limited MANET.

END-TO-END DELAY MODELLING IN BUFFER-LIMITED MANETs

focus on a class of important two-hop relay mobile ad hoc networks with limited-buffer constraint and any mobility model that leads to the

uniform distribution of the locations of nodes in steady state, and develops a general theoretical framework for the end-to-end delay modelling there. we first combine the theories of fixed-point, quasi-birth-and-death process, and embedded Markov chain to model the limited distribution of the occupancy states of a relay buffer, and then apply the absorbing Markov chain theory to characterize the packet delivery process, such that a complete theoretical framework is developed for the end-to-end delay analysis. with the help of this framework, we drive a general and exact expression for the end-to-end delay based on the modelling of both packet queuing delay and delivery delay. To demonstrate the application of our framework, case studies are further provided under two network scenarios with different MAC protocols to show how the E2E delay can be analytically determined for a given network scenario. Finally, we present the extensive simulation and numerical results to illustrate the efficiency of our delay analysis as well as the impacts of network parameters on delay performance.

ENERGY-EFFICIENT RESOURCE ALLOCATION FOR WIRELESS POWERED COMMUNICATIOBN NETWORKS

The Wireless Powered Communication Network (WPCN), where multiple users harvest energy from a dedicated power station and then communicate with an information receiving station. Our goal is to investigate the maximum achievable energy efficiency of the network via joint time allocation and power control while taking into account the initial battery energy of each user. We first stud the EE maximization problem in the WPCN without any system throughput requirement. The EE maximization problem for the WPCN can be cast into EE maximization problems for two networks via exploiting its special structure. For each problem, we derive the optimal solution and provide the corresponding physical interpretation, despite the nonconvexity of the problems. Subsequently, we study the EE maximization problem under a minimum system throughput constraint. Exploiting fractional programming theory, we transform the resulting nonconvex problem into a standard convex optimization problem. This allows us to characterize the optimal solution structure of joint time allocation and power control and to derive an efficient iterative algorithm for obtaining the optimal solution. Simulation results verify our theoretical findings and demonstrate the effectiveness of the proposed joint time and power optimization.

RESOURCE ALLOCATION IN WIRELESS POWERED SENSOR NETWORKS WITH CIRCUIT ENERGY CONSUMPTION CONSTRAINTS

The Wireless power transfer is able to provide sustainable and relatively stable energy supply for battery -powered wireless sensor networks. This paper investigates how to optimally design a wireless powered sensor network with minimal power requirements . To this end, we formulate an optimization problem to minimize the total energy consumption two remote radio units (RRU) by jointly optimizing energy beamforming and time assignment, where the circuit energy consumption including basic circuit and information processing energy consumption at sensors is taken into account in order to achieve a more practical and general system design. To solve this non-convex optimization problem, an efficient solution method is presented on the basis of variable substitutions and semidefinite relaxation technique . we analyze the optimality of our proposed solution method. When the number of sensors is not more than four, the rank-one constraint is always guaranteed. When it is larger than four, we show that with our proposed solution method via simulations, an approximate global optimal result can be achieved. Simulation results also show that by jointly optimizing the energy beamforming and time assignment, the system required power can be greatly reduced ,while the energy beamforming has greater effect than time assignment on the proposed system. The total energy consumption at the RRU almost linearly increases with the increment of transmission rate requirement. Besides, the total energy consumption at two RRU caused by different numbers of enjoyers and collaborators .

MOBILITY INCREASES THE CAPACITY OF AD HOC NETWORK WIRELESS NETWORKS

The capacity of ad hoc wireless networks is constrained by the mutual interference of concurrent transmissions between nodes. We study a model of an ad hoc network where n nodes communicate in random source –destination pairs .these nodes are assumed to be mobile .we examine the per-session throughput for applications with loose delay constraints, such that the topology changes over the time-scale of the packet delivery. Under this assumption, the per-user throughput can increase dramatically when the nodes are mobile rather than fixed. This improvement can be achieved by exploiting node mobility as a type of multiuser diversity.

DELAY AND CAPACITY TRADE-OFF IN MOBILE AD HOC NETWORKS: A GLOBAL PERSPECTIVE

Since the original work of Grossglauser and Tse, which showed that mobility can increase the capacity of an ad hoc network, there has been a lot of interest in characterizing the delay-capacity relationship in ad hoc networks. Various mobility models have been studied in the literature, and the delay-capacity relationships under those models have been characterized. The results indicate that there are trade –offs between the delay and capacity and that the nature of these trade-offs is strongly influenced by the choice of the mobility model. Some questions that arise are: (1) How representative are these mobility models studied in the literature? (2) Can the delay-capacity relationship be significantly different under some other" reasonable" mobility model? (3) What sort of delay-capacity trade-off are we likely to see in a real-world scenario? In this paper, we take first step toward answering some of these questions. In particular, analyze, among others, the mobility models studied in recent related works, under a unified framework. We relate the nature of delay-capacity trade-off to the nature of node motion, thereby providing a better understanding of the delay-capacity relationship in ad hoc networks in comparison to earlier works.

PRACTICAL PERFORMANCE OF MANETs UNDER LIMITED- BUFFER AND PACKET LIFETIME

While scaling law results on the performance of mobile ad hoc networks (MANETs) have been extensively reported in literature, the exact performance of such networks, particularly their real achievable performance under practical network constraints, is still largely unexplored. As one step toward practical performance study for MANETs, this paper considers a MANET with constraints on both buffer size and packet lifetime and explores the impacts of such constraints on network performance. Analysis on the exact throughput capacity of the network is first provided to reveal its maximum possible and input rate –independent throughput performance. With the help of the embedded Markov chain theory, a complete theoretical framework is then developed, which enables the achievable and input rate-dependent throughput and packet loss ratio to be derived in closed form under any exogenous rate. Based on the M/G/1/K queuing theory, the packet end-to-end delay under any exogenous rate is further studied to give a relatively whole picture on how buffer size and packet lifetime impact the network throughput, packet loss ratio, and packet delay.

OPTIMAL MULTICAST CAPACITY AND DELAY TRADE-OFF IN MANETs: A GLOBAL PERSPECTIVE

this paper, give a global perspective of multicast capacity and delay analysis in mobile ad-hoc networks (MANETs). Specifically, we consider two node mobility models:(1) two-dimensional i.i.d. mobility,(2)one dimensional i.i.d. mobility. Two mobility time scales are included in this paper:(i)fast mobility where node mobility is at the same time-scales as data transmissions;(ii)slow mobility where node is assumed to occur at much slower time-scale than data transmissions. Given a delay constraint D, we first

characterize the optimal multicast capacity for each of the four mobility models, and then we develop a scheme that can achieve a capacity-delay tradeoff close to a logarithmic factor. Our study can be further extended to two-dimensional/one-dimensional hybrid random walk fast/slow mobility models and heterogeneous networks.

DEALY AND CAPACITY TRADE-OFF ANALYSIS FOR MOTION-CAST

we define multicast for an ad-hoc network through node's mobility as multicast as Motion Cast and study the delay and capacity tradeoffs for it. Assuming nodes move according to an independently and identically distributed(i.i.d.) pattern and each desire to send packets to k distinctive destinations, we compare the delay and capacity in two transmission protocols. one uses 2-hop relay algorithm without redundancy; the other adopts the scheme of redundant packets transmission to improve delay while at the expense of the capacity. In addition, we obtain the maximum capacity and minimum delay under certain constraints. We find that the per-node delay and capacity for the 2-hop algorithm without redundancy are (1/k) and (n log k) respectively; for the 2-hop algorithm with redundancy, they are (1/k(n log k)) and ((n log k)),respectively. The capacity of the 2-hop relay algorithm without redundancy is better than multicast capacity of static networks developed by Li[IEEE/ACM Trans. Netw.,vol.17,no.3,pp.950-961, Jun.2009]as long as k is strictly less than n in order sense, while when k=(n), mobility does not increase capacity anymore. The ratio between delay and capacity satisfies delay/rate>=O (nk log k) for these two protocols, which are both smaller than that of directly extending the fundamental tradeoff for unicast established by Neely and Modiano[IEEE Trans. Inf. Theory,vol.51,no.6,pp.1917-1937,Jun.2005] to multicast, i.e., delay/rate>=(nk).More importantly ,we have proved that the fundamental delay-capacity tradeoff ratio for multicast is

delay/rate>=O(n log k), which would guide us to design better routing schemes for multicast.

EXISTING SYSTEM

- In the Existing Work improve the parameter metrics performance based on the analysis of both

1. Transmission resource
2. Storage resource

- of a network node and use a two- tuple depict a optimal resource allocation configuration.

After number of transmissions, a route may loss its link quality.

Disadvantages:

- After the number of transmissions, a route may loss its link quality.
- Data is to be loss from source to destination. The attacker may be access the data.
- Network performance not improved.

PROPOSED SYSTEM

We propose an Adaptive Resource Allocation (ARA) Algorithm to improve the network performance. The algorithm can adaptively allocate there source to the users. By applying this algorithm between source and destination, attackers or selfish nodes were removed from the network. An attack is an information security threat that involves an attempt to obtain, alter, destroy, remove, implant or reveal information without authorized access or permission.

Advantages

- Improved data quality compared to existing.
- Improve the Link Quality, Throughput and reduce the Delay.
- Good network performance as compared to Existing work.

ADAPTIVE RESOURCE ALLOCATION ALORITHM

adaptive resource allocation algorithm which can efficiently adapt to the varying network state by building an optimal mathematical model and then changing the weighted value of the objective function. In this Algorithm to improve the Throughput, Quality of service and reduce the Delay, Packet loss.

COMPARRISON BETWEEN ORA AND ARA GRAPH DESIGN BASED RESULT

The range based localization approaches use the distance information. These limitations lead to the development of localization algorithms, where certain. From the WSN graph determined, is it possible to localize the network. Hence an anchor-free localization technique is designed in this work.

III. CONCLUSION

The Resource Allocation for performance enhancement of MANETs was investigated in this paper. For a general resource allocation configuration, we first established an efficient analytical framework for modelling the network dynamical behaviors and deriving the exact expressions of Throughput, End-to-End Delay and Quality of Service. With the help of performance evaluation results, we further efficient algorithm to determine the Adaptive Resource Allocation Algorithm. In order to achieve good network performance, a network node selfless to allocate more storage resource and more transmission resource for storing and forwarding the packets of other nodes. By applying this algorithm between source and destination, attackers or selfish nodes were removed from the network. The algorithm is efficient for end to end delay and packets delivery ratio. Future work will be to extend the system with the mobility module and we would like to increase the number of implemented routing protocols.

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