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Efficient message forwarding in MANETs

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***Abstract*— The effective incentive scheme is proposed to stimulate the forwarding cooperation of nodes in VANETs. In a coalitional game model, every relevant node cooperates in forwarding messages as required by the routing protocol. This scheme is extended with constrained storage space. A lightweight approach is also proposed to stimulate the cooperation.**

***Index Terms*—VANETs, Routing Protocol, Lightweight approach**

I. Introduction

VANET is the technology, which is used to move cars as joint in network to make a transportable network. Participating cars become a wireless connection or router through vanet and it allow the cars almost to connect 100 to 300 meters to each other and in order to create a wide range network, other vehicles and cars are connected to each other so the mobile internet is made. It is supposed that the first networks that will incorporate this technology are fire and police mobiles to interact with one another for security reasons.

Vehicular ad hoc networks (VANETs) are a subgroup of mobile ad hoc networks (MANETs) with the distinguishing property that the nodes are vehicles like cars, trucks, buses and motorcycles. This implies that node movement is restricted by factors like road course, encompassing traffic and traffic regulations. Because of the restricted node movement it is a feasible assumption that the VANET will be supported by some fixed infrastructure that assists with some services and can provide access to stationary networks. The fixed infrastructure will be deployed at critical locations like slip roads, service stations, dangerous intersections or places well-known for hazardous weather conditions.

The three major classes of applications possible in VANET are safety oriented, convenience oriented and commercial oriented. Safety applications will monitor the surrounding road, approaching vehicles, surface of the road, road curves etc. They will exchange messages and co-operate to help other vehicles out under such scenario. Though reliability and latency would be of major concern, it may automate things like emergency braking to avoid potential accidents. Convenience application will be mainly of traffic management type. Their goal would be to enhance traffic efficiency by boosting the degree of convenience for drivers. Commercial applications will provide the driver with the entertainment and services as web access, streaming audio and video.

A routing protocol is a protocol that specifies how routers communicate with each other, disseminating information that enables them to select routes between any two nodes on a computer network, the choice of the route being done by routing algorithms. Each router has *a prior* knowledge only of networks attached to it directly. A routing protocol shares this information first among immediate neighbors, and then throughout the network.

Routing is the process of directing packets from a source node to a destination node on a different network. Getting packets to their next hop requires a router to perform two basic activities: path determination and packet switching.

Path Determination involves reviewing all paths to a destination network and choosing the optimal route. To determine the optimal route, information is put in a route table, which includes information such as destination network, the next hop, and an associated metric.

Packet Switching involves changing a packet's physical destination address to that of the next hop (the packet's logical destination and source addresses will stay the same).

The term routing protocol may refer specifically to one operating at layer three of the OSI model, which similarly disseminates topology information between routers. Although there are many types of routing protocols, three major classes are in widespread use on IP networks:

- Interior gateway routing via link-state routing protocols, such as OSPF and IS-IS
- Interior gateway routing via path vector or distance vector protocols, such as RIP, IGRP and EIGRP
- Exterior gateway routing . BGP v4 is the routing protocol used by the public Internet.

Many routing protocols are defined in documents called RFCs. The specific Characteristics of routing protocols include

- the manner in which they either prevent routing loops from forming or break them up if they do
- the manner in which they select preferred routes, using information about hop costs
- the time they take to converge
- how well they scale up
- Many other factors.

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Game theory is the branch of decision theory concerned with interdependent decisions. The problems of interest involve multiple participants, each of whom has individual objectives related to a common system or shared resources. Because game theory arose from the analysis of competitive scenarios, the problems are called *games* and the participants are called *players*. But these techniques apply to more than just sport, and are not even limited to competitive situations. In short, game theory deals with any problem in which each players strategy depends on what the other players do.

The goal of [1] is to stimulate the node cooperation of message forwarding in VANET. The coalitional game theory approach is proposed.In addition the lightweight approach also proposed for storage space in VANET. The coalitional game theory is used to solve the forwarding cooperation problem in VANETs. In particular, node is cooperative in forwarding in VANETs if it follows the routing protocol. In a coalitional game, there are a number of players. These players correspond to the nodes in a VANET. When the players in a subset decide to cooperate within the subset, the subset is called a coalition. In particular, the coalition of all players is called the grand coalition. Hence, whenever a message needs to be forwarded in a VANET, all involved nodes have incentives to form a grand coalition. In coalitional game theory, there is a strong solution concept, namely, core, which can provide such guarantees.

The goal of [2] is to stimulate the nodes' cooperation in multi-hop wireless networks and to reduce the number of submitted receipts and protect against collusion attacks. The payment model, practical incentive system model, Reactive receipt submission mechanisms are used to achieve this aim. A payment model that takes into account the features of cooperation stimulation, which can improve the practical implementation of micropayment in multi-hop wireless networks. A Practical Incentive System model is used to stimulate the nodes cooperation in multi-hop wireless network. A reactive receipt submission mechanism is used to reduce the number of submitted and processed receipts, and protect against collusion attacks.

The slow adaptive modulation (SAM) technique [3] is used that adapts the constellation size to the slow variation of the channel due to shadowing. The proposed SAM technique is more practical than conventional fast adaptive modulation (FAM) techniques that require adaptation to fast fading variations. The SAM technique is used to obtain the capacity of adaptive transmission schemes with diversity reception in composite Rayleigh fading and shadowing channels. The SAM technique can provide a substantial increase in throughput with respect to fixed schemes while maintaining an acceptable low bit error outage. The SAM is a less complex and requires lower feedback.

The non-cooperative networks [4] consists of selfish entities. These selfish entities will follow the protocols out of their own interests. The Fair payment sharing scheme is describes how to share the payments fairly among the receivers and how to share multicast cost among the receivers. The payment sharing scheme is used to stimulate the co-operation in non-cooperative networks. several non-VCG truthful payment schemes were used for multicast trees. The truthful multicast is designed based on Shared-Based Tree. Multicast routing protocols (such as MOSPF, DVMRP and PIM-DM) using a source-based tree are suitable for LAN networks while multicast routing protocols (such as PIM-SM and CBT) using a shared-based tree are more suitable for networks composed of different ASs; Every entity has a fixed cost for a specific multicast. Then it transforms an existing multicast protocol to a truthful multicast protocol. However that have not been touched, how to prevent collusion among agents.

Diversity techniques [5] play a key role in modern wireless systems. A simple class of bounds, whose parameters are optimized, on the symbol error probability (SEP) for detection of arbitrary two-dimensional signaling constellations with diversity in the presence of non-ideal channel estimation. Unlike known bounds, the optimized simple bounds are tight for all signals-to- noise ratios (SNRs) of interest. To apply the optimized simple bounds, to the evaluation of the SEP, the SEO, and the SNR penalty. For such systems, that the SEP as a function of the SNR, Γ, averaged over the constellation points and the small-scale fading is given by

$$P_e(\Gamma) = \sum_{i=1}^{M} p_i \sum_{j \in \beta i} I_N \left(C^{(i,j)}, \varnothing_{i,j}, \varphi_{i,j} \right) \quad (1)$$

Where, p_i is the transmission probability for constellation point βi is the set consisting of the indices for the constellation points that share a decision boundary with $\varnothing_{i,j}$ and $\varphi_{i,j}$ are angles describing the decision region of the constellation point.

II. PROPOSED SYSTEM

In this paper, Coalitional Game Theory approach is proposed to overcome the limitations of an existing systems. The coalitional game theory approach is used to solve the forwarding cooperation problem in VANETs. In particular, we say that a node is cooperative in forwarding in VANETs if it follows the routing protocol.

In coalitional game theory, there is a strong solution concept, namely, core, which can provide such guarantees. An incentive scheme for VANETs is proposed. Additionally, in this paper extend our scheme to take the limited storage space of each node into consideration. When a node does not have sufficient space for storage, it has to discard some of the messages. To decide which messages to discard, many routing protocols require some auxiliary information to be transmitted in control messages, such as the probabilities of meeting the destinations.

To make our scheme more efficient, a lightweight approach is proposed that makes full use of the selfishness of the autonomous nodes, giving them the freedom to choose which messages to discard.

In a coalitional game, there are a number of players. These players correspond to the nodes in a VANET. When

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the players in a subset decide to cooperate within the subset, the subset is called a coalition. In particular, the coalition of all players is called the grand coalition. Hence, whenever a message needs to be forwarded in a VANET, all involved nodes have incentives to form a grand coalition.

In coalitional game theory, the central concept is the formation of coalitions. Each coalition is a subset of game players who cooperatively join forces. Each selfish player always tries to join the coalition that can maximize its own payoff share. All players join the grand coalition so that any two players cooperate with each other. Since each player has the freedom to choose the coalition to join based on its own interests, it may ensure that joining the grand coalition is in the best interest of every player.

III. RESULTS AND DISCUSSION

To achieve the grand coalition, the core in the game and payoff allocation to each player in the coalition that satisfies the core requirement.

For each intermediate node, its share of payoff should reflect its contribution in the game. Hence, the payoff-allocation function for intermediate nodes is designed as based on two types of behaviors in the coalition, i.e., receiving and forwarding.

$$x_i = \alpha . m_r(i) + \beta . m_f(i) + u . n_{rec}(i) \quad \forall i \neq src$$

where, $m_r(i)$ is the number of times that the intermediate node I receives one copy of the message from some other node. $m_f(i)$ is the number of times that i successfully forwards one copy of the message to another node following the routing protocol . α and β are the rewards for the receiving and forwarding behaviors, respectively. $u . n_{rec}(i)$ is the amount of reward to node i for reporting the meeting records. Note that dest. Can be viewed as an intermediate node, which only receives copies without further forwarding.

The payoff allocation to the source node contains two parts: the gains by successfully delivering message copies to dest. subtracted by rewards used to pay the intermediate nodes. The payoff allocation function for src. is defined as

$$x_{src} = \delta . d(N) - (\alpha \sum_{i \in N-\{src\}} m_r(i) + \beta \sum_{i \in N-\{src\}} m_f(i))$$

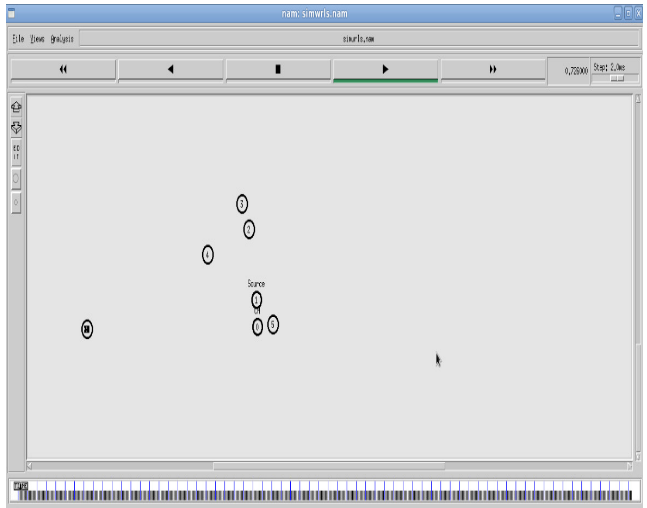

Fig.1. Creation Of Nodes

Fig.1. shows the deployment of nodes from the coalition formed.

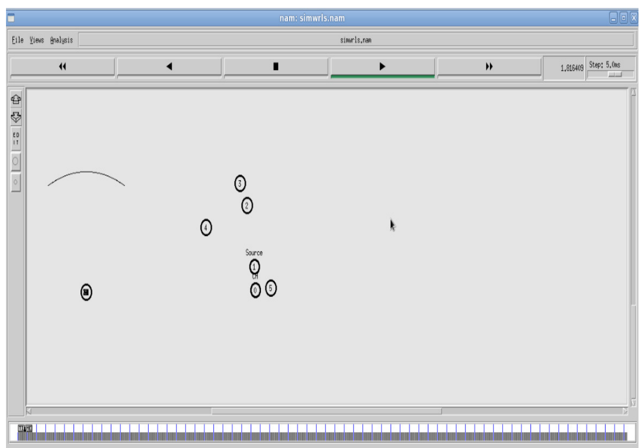

Fig.2. Range Detection of Nodes

In Fig.2. After the deployment of nodes from the coalition formed, range detectionis done by the nodes to know about the neighbouring node details.

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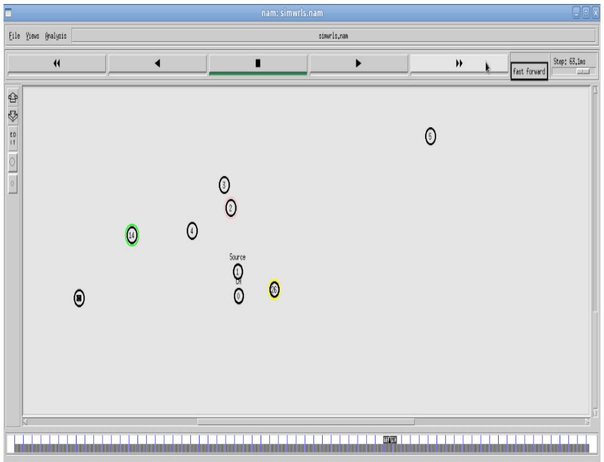

Fig.3. Nodes ready to transfer the message

When the nodes want to transfer the messages to the neighbouring node they communicate with each other. Fig 5.4 shows that the node 14 and node 26 are ready to transfer the messages to the destination.

IV. CONCLUSION

The effective incentive scheme is proposed to stimulate the forwarding cooperation of nodes in VANETs. In a coalitional game model, every relevant node cooperates in forwarding messages as required by the routing protocol. This scheme is extended with constrained storage space. A lightweight approach is also proposed to stimulate the cooperation.

REFERENCES

[1]D. Reichardt, M. Miglietta, L. Moretti, P. Morsink, and W. Schulz, "CarTALK 2000—Safe and comfortable driving based upon intervehicle- communication," in Proc. IEEE Intell. Veh. Symp., 2002, pp. 545–550.

[2] X. Yang, J. Liu, F. Zhao, and N. Vaidya, "A vehicle-to-vehicle communication protocol for cooperative collision warning," in Proc. MobiQuitous, 2004, pp. 14–123.

[3]Q. Xu, T. Mark, J. Ko, and R. Sengupta, "Vehicle-to-vehicle safety messaging in DSRC," in Proc. ACM Workshop VANET, 2004, pp. 19–28.

[4] J. Luo and J.-P. Hubaux, A Survey of Research in Inter-Vehicle Communications. Securing Current and Future Automotive IT Applications. New York: Springer-Verlag, 2005, pp. 111–122.

[5] J. Ott and D. Kutscher, "A disconnection-tolerant transport for drive-thru Internet environments," in Proc. INFOCOM, Mar. 2005, pp. 1849–1862.