Adaptive Load Balanced Approach for Multi-path Routing in VANETS

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ABSTRACT
The VANETs carry several security considerations. One in every of the popular and dangerous attacks is launched within the variety of Sybil, connectivity holes or cut-up attack, wherever associated in Nursing assaulter inserts a faux position inside within the cluster. The inserted faux node data is used by the hackers within the case of inconsiderate driver, traffic jams, selective collisions and different similar dangerous things. To avoid such things the VANETs should be protected against such attacks. During this paper, a completely unique answer has been projected to beat the Sybil and cut-up attacks on the VANETs. The game theoretic approach has been designed to calculate per user resource requirement and the total load of the cell in order to calculate the utility, which denotes the resource consumption on the WSN cluster or cell. In this research, the load measurement is the primary concern in order to perform the load balancing using the game theoretic approach. The proposed model has removed the attack by the means of load balancing mechanism based upon the pushback algorithm. The proposed model shows the improved results than the existing models for the VANET data propagation.

Keywords
VANET security, VANET secure mobility, connectivity hole avoidance, wormhole detection.

1. INTRODUCTION
In wireless communication and embedded micro-sensing technologies, advances encourage the use of sensor networks today in many environments to detect and monitor sensitive information[5,18]. These environments include border protection, disaster areas, areas related to health, and control of smart home and much more.[15,16] VANETs are there to detect and track tanks on a battlefield, personnel tracking in a building, measure the percentage of traffic on a route, monitor environmental pollutants, detect fire and rain.[11,12,23] Sensors contribute to the production of electricity, and also used in the collection of solar energy VANETs.[1,29,20,30]

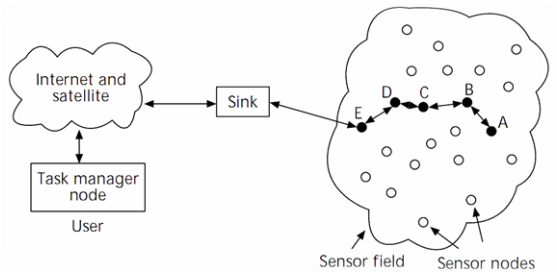

Figure 1.1: Vehicular network connectivity graphs

Now if sensor networks are becoming a reality in this world, but there are some limitations such as topology change randomly, restrictions in power, the limited computing resources such as energy, the environment errors , energy efficiency[2,3,4]. In the latest research on VANETs, the researchers are trying to find and overcome the drawbacks of wireless sensor networks such as limited energy resources, ranging energy consumption by location, the high cost of transmission, and limited processing capabilities [25,26,5,10] All these characteristics of vehicular networks are totally opposed to their cable counterparts network, which energy consumption is not an issue, the cost of transmission is relatively cheap, and network nodes have a lot of processing power. [6,8,10] Routing approaches that have worked so well for traditional networks over twenty years will not be enough for this new generation networks.[28,7]

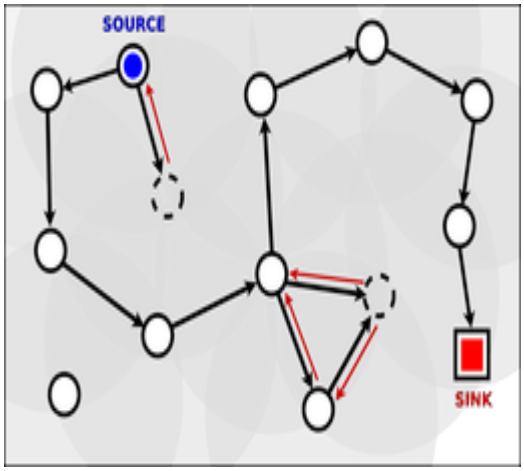

Figure 1.2: Representation of a network in which a node goes down due network outage and a different path is chosen with a Single-path algorithm

Besides maximizing the lifetime of sensor nodes[14,18,21], it is best to distribute the energy dissipated across the wireless sensor network to minimize maintenance and maximize overall system performance. [19,12,13] A communication protocol that involves synchronization between equal nodes sustain some overhead of setting up communication. VANET routing protocols or group to determine whether the benefits of more complex routing algorithms overshadow the additional control messages each node must communicate. [9,11, 17]

2. LITERATURE SURVEY
Hai-Yan Shi [23] Game theory (GT) is a mathematical method of describing the phenomenon of conflict and cooperation between intelligent rational decision makers. This article examines recent developments and the conclusions of the WG, its applications in sensor networks, and offers the community an overview of this dynamic area of research. The author begins with the typical GT formulation in the field of application of WSN. The roles of GT are described which

include routing protocol design, topology control, power control and energy saving, packet transmission, data collection, spectrum allocation, bandwidth allocation, service quality control, optimization of coverage, security of WSN, sensor and other management tasks. Then, three variants of game theory are discussed, namely, the cooperative, uncooperative, and repeated plans.

Sinha et al. [29] wireless sensor nodes can be deployed on a battlefield and organized in an ad-hoc network on a large scale. Traditional routing protocols do not take into account that a node contains only a limited amount of energy. Optimal routing attempts to maximize the period, during which the detection task can be performed, but require future knowledge. Since this is not realistic, the authors come from a practical guide based on the histogram of the energy and develop a range of new techniques to improve routing in sensor networks. Our first approach aggregates robust packet flow resulting from the energy by a factor of 2 to 3. Then reductions in this article the author argues that the more consistent use resource can be obtained by shaping of the traffic flow.

Sonam et.al [28] proposed an efficient routing protocol energy, which is hierarchical and based cluster. In this protocol, the base station selects cluster heads (CH). The selection procedure is carried out in two stages. In the first stage, all candidates to become nodes CH are listed on the basis of parameters such as the relative distance of the candidate node from the base station, remaining energy level, the likely number of neighboring sensor nodes candidate node can have, and the number of times the candidate node cluster has already become the leader. The cluster head generates two schedules for the cluster members know sleep and TDMA transmission function. The performance of the proposed protocol is compared with that of LEACH by simulation experiments. It is noted that the proposed protocol outperforms LEACH in all circumstances considered in the simulation.

Geon et.al [16] wireless sensor network consists of hundreds of thousands of sensor nodes collect various data, such as sound, temperature, location, etc. They have been applied in many fields such as health, the surveillance system, the military, and so on. It is mainly difficult to replace the sensor nodes that have limited battery capacity. Energy efficiency is a key challenge in maintaining the network. In this paper, the author proposes a method of selection of the head effectively clustered using K-means algorithm to optimize the energy efficiency of wireless sensor networks. It is depends on the concept of finding the cluster head reducing the sum of the Euclidean distances between the nodes of the head and member.

Stojmenovic et al. [24] proposed a metric aware of the costs for wireless networks based on the remaining battery power at nodes has been proposed for the shortest-cost routing algorithms, assuming constant transmission power. Power-current measurements, where the transmission power depends on the distance between the nodes and the shortest power corresponding algorithms have also been proposed. The author defines a cost metric of power based on the combination of the life of both the node and the power measurements as a function of distance.

3. EXPERIMENTAL DESIGN

In this paper data drop attack is removed by using game theory.The game theoretic approach has been designed to calculate per user resource requirement and the total load of the cell in order to calculate the utility, which denotes the resource consumption on the VANET cluster or cell. In this research, the load measurement is the primary concern in order to perform the load balancing using the game theoretic approach. In this model, every user u has different data rate requirement denoted by Du and the data rate per Physical Resource Block (PRB) given by $R(SINR_u)$ of the user u. We assume that every cell in the network has the same number of resource units that are available to be allocated. We denote the entire number of PRBs per frame for all cells by Ntot and define the traffic load of the user u as

$$\kappa u = \frac{Du}{R(SINR\ u)Ntot} \quad (1)$$

According to this definition, the load κu of the user u is interpreted as the percentage of occupied PRBs per frame needed to make him satisfied, i.e., meeting his data rate requirement. The load of the cell c is denoted by

$$\rho_c = \sum_{u|X(u)=c} K_u \geq c \quad (2)$$

The utility can be denoted as the following:

$$utility_i = \begin{cases} U_i + x_i & if\ 0 \leq \rho_i \leq 1 \\ \frac{U_i + x_i}{\rho_c + \sum_{j=1}^{x_i} k_j}, & otherwise \end{cases} \quad (3)$$

4. RESULT ANALYSIS

To evaluate the performance of network different parameters are used. These parameter graphs are shown along with their values in tables, which are as

4.1 Packet Delivery Ratio

Packet delivery ratio of network is evaluated after performing path formation and path forwarding. It is represented on Y-axis and number of packets is represented on Y-axis. For comparison, number of packets (no. of packets/1000) value is computed for 100, 500, 1000, 2000, 3000, 4000, 5000, 6000 packets to map the scale precision of existing scheme. Figure 4.1 shows that the proposed works performs well than the existing one. Its average Packet delivery ratio is almost 1 which shows transmission of almost all packets from source to destination.

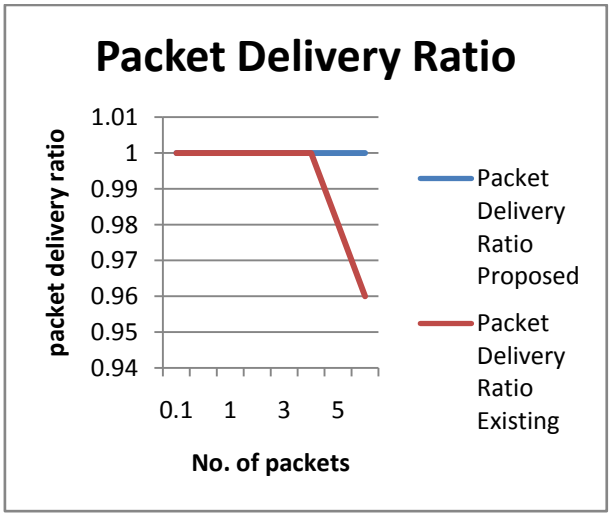

Figure 4.1: Comparison of Packet delivery ratio

The figure 4.1 shows the values of Packet delivery ratio parameter of the existing models and the proposed model. And, it shows that PDR of proposed model is better than the

existing models. The PDR of proposed is continuously decreasing from 1 to 0.96 in the given simulation.

4.2 Energy Consumption

It is calculated by subtracting the present energy of a path from the Initial energy of path. When data is sent from node 1 to node 26, energy consumed by whole path is computed. Energy consumption is taken as Y-axis and packets as X-axis.

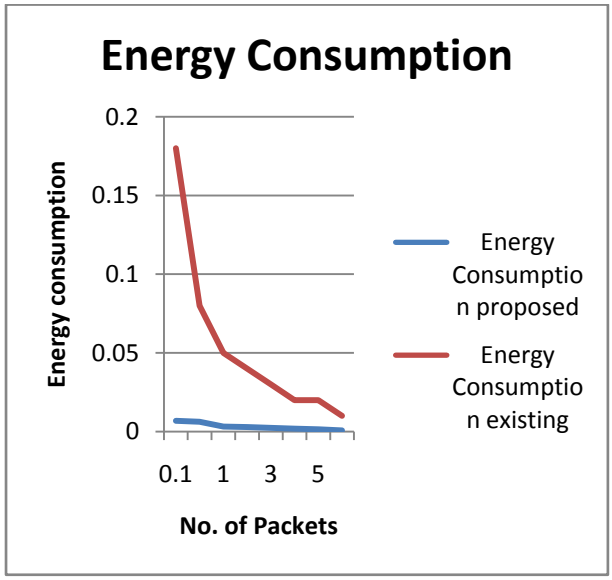

Figure 4.2: Comparison of energy consumption

The figure 4.2 shows the values of Energy consumption of network by the existing models and proposed models. These values show that the minimum energy consumed by nodes is 0.000755935 and maximum is 0.006800361which are good according to the network performance. Existing model consumes more energy than proposed model while routing. Its maximum consumption has been recorded nearly at 0.18.

5. CONCLUSION

The blackhole, sinkhole and connectivity hole attacks in VANET are known to significantly degrade the overall network performance and produces the greater threats to the VANET security. PDR of proposed model is better than the existing models. The PDR of proposed is continuously decreasing from 1 to 0.96 in the given simulation. Existing model consumes more energy than proposed model while routing. Its maximum consumption has been recorded nearly at 0.18. In this paper load balancing algorithm has been used to remove the attack. The results have clearly signified the better performance of the proposed model than the existing models.

6. FUTURE SCOPE

Multilink utilize for the evaluation of health of path using the data aware machanism. Also the data heristic traffic analyze algorithm can be incorporate to evaluate the traffic flow being arrived from the varient source.

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