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CLUSTER-BASED VANET-ORIENTED EVOLVING GRAPH (CVOEG) MODEL USING GREEDY DETECTION (FLGR)

Mr. Dhamodharan S[1]

[1]*Assistant Professor, Department of ECE, SSM Institute of Engineering and Technology, Dindigul, Tamilnadu-624002*

Dharani S[2], Deepika R[2], Abinaya D[2]

[2]*Department of ECE, SSM Institute of Engineering and Technology, Dindigul, Tamilnadu-624002*

Abstract - *Vehicular Ad hoc Networks (VANETs), main objective is to provide road safety and enhance the driving conditions, are exposed to several kinds of attacks such as Denial of Service (DoS) attacks which affect the availability of the underlying services for legitimate users. In vehicular ad hoc networks (VANETs), communication links break more frequently due to the high-speed vehicles. We focus especially on the greedy behavior which has been extensively addressed in the literature for Wireless LAN (WLAN) and for Mobile Ad hoc Networks (MANETs). However, this attack has been much less studied in the context of VANETs. This is mainly because the detection of a greedy behavior is much more difficult for high mobility networks such as VANETs. In this paper, we propose a new detection approach called GDVAN (Greedy Detection for VANETs) for greedy behavior attacks in VANETs. The process to conduct the proposed method mainly consists of two phases, which are namely the suspicion phase and the decision phase. The suspicion phase is based on the linear regression mathematical concept while decision phase is based on a fuzzy logic decision scheme. The proposed algorithm not only detects the existence of a greedy behavior but also establishes a list of the potentially compromised nodes using three newly defined metrics. Moreover, the practical effectiveness and efficiency of the proposed approach are corroborated through simulations and experiments. Our simulation result shows that the proposed scheme significantly outperforms the existing scheme in terms of throughput, delay, energy consumption, cost.*

Key Words: VANET, Greedy detection, linear regression, fuzzy logic.

1. INTRODUCTION

VANET is an application of mobile ad hoc network. More precisely a VANET is self-organised network that can be formed by connecting vehicle aiming to improve driving safety and traffic management with internet access by drivers and programmers. Two types of communication are provided in the VANET.

First a pure wireless ad hoc network where vehicle to vehicle without any support of infrastructure. Second is communication between the road side units (RSU), a fixed infrastructure, and vehicle. Each node in VANET is equipped with two types of unit i.e. On Board Unit and Application Unit (AU). OBU has the communicational capability whereas AU executes the program making OBU's communicational capabilities. An RSU can be attached to the infrastructure network which is connected to the Interne. Figure 1 describes C2C-CC architecture of VANET.

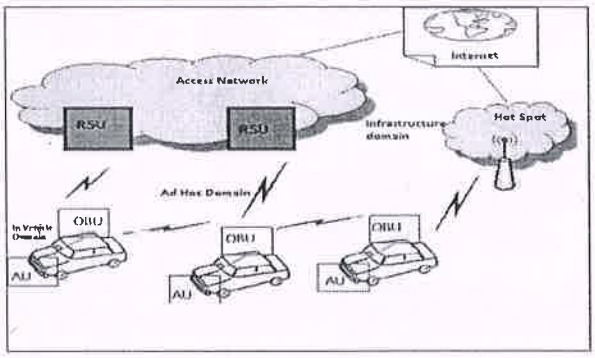

Figure 1. C2C-CC reference architecture

To establish a VANET, IEEE has defined the standard 802.11p or 802.16 (WiMax). A Dedicated Short Range Communication (DSRC) is proposed which is operating on 5.9GHz band and uses 802.11 access methods. It is standardized as 802.11p which provides short range communication with low latency. USA has allocated 75MHz of spectrum in the 5.9GHz band for DSRC to be used by Intelligent Transportation Systems (ITS). Also, Europe has allocated 30 MHz of spectrum in the 5.9GHz band for ITS. In vehicular ad hoc networks (VANETs), communication links break more frequently due to the high-speed vehicles. In this paper, a novel cluster-based VANET oriented evolving graph (CVoEG) model is proposed by extending the existing VoEG model to improve the reliability of vehicular communications[1]. The optimal parameter setting of the optimized link state routing (OLSR), which is a well-known mobile ad hoc network routing protocol, by defining an optimization problem[2].

Some protocols are being developed by the other groups also. NOW (Network on Wheels), which is associated with Car-2-Car Consortium, has developed some protocols. Ford and General Motors have also created a Crash Avoidance Metric Partnership (CAMP) in order to improve the VANET services.