

Delay Optimization in VANET Using Ant Colony Optimization and Wimax

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Abstract: VANETS is the most popular network which is called Vehicular Ad Hoc Network. The researchers make a lot of work in this network. From the Literature review, VANETS works on the basis of real time system where the vehicles are moving nodes and travel with a very high speed on the roads in the urban areas. There are many security issues like authentication, tunnel attacks, intelligent system approach, collision detection, congestion avoidance, communication system approach etc. In this present work we are presenting an intelligent route identification approach in case of accident occurrence for V2V communication. The intelligent vehicles are been defined respective to distance, direction and speed analysis. If some accident over the network, the neighbor node information flow will be performed to perform the route analysis. In this work a bio inspired V2V communication approach is been suggested to identify the safe path over the network.

Keywords: WIMAX, Ant Colony, VANET, MANET, REPLICATION

I. INTRODUCTION

Vehicular ad-hoc network are wireless networks where all the vehicles from the nodes of the network. It is for the driver comfort and road safety, the inter-vehicle communication provide them. Vehicular ad-hoc network is subclass of mobile ad hoc networks which provides a distinguished approach for intelligent transport system. It is very necessary for all the vehicles. Vehicular ad hoc network is special form of MANET which is vehicle to vehicle roadside wireless communication network. It is autonomous and self-organizing wireless communication network, where all the nodes in VANET involve themselves as servers or client for exchanging and sharing information. In today era used Wi-Fi IEEE 802.11 based technology it is very commonly used for deploying VANETS. All the vehicles connected with the wireless network interface it can be use either 802.11b or 802.11g are the two standards for access media. These standards are general purpose standards and they do not fit properly the requirements of high dynamic network such as VANETS. In this scenario currently describe the DSRC (Dedicated short-range communication) has been proposed as the

communication standard for VANET it is used in those platform where short medium range communication service that offered at very low latency and high data rate. IEEE 802.11 standard implies that vehicles communicate with in limited range while moving. These kinds of networks are very optimal configurations protocols in order to increase the effective data packet exchange, and reduce the transmission time and network usage [8].

The Literature Review is written in section 1. ANT COLONY optimization and WIMAX is discussed in section 2. In Section 3 New proposed technique is discussed in section 4. In the last section 5 conclusion and future work is illustrated.

II. LITRATURE REVIEW

M.S.Kakkasageri represent a paper on mobile ad-hoc network define the several challenges due to inherent characteristics of the network for example node mobility, reliability and their scarce resources etc. In this paper define the agent based multicast routing scheme in the (MANETS). It can use the static and mobile agents. Different scheme operates in different sequences like indentifies the reliable nodes and made connection between the reliable nodes. Construct a backbone for multicasting using the reliable nodes and intermediate nodes. There are so many cluster members that join to the backbone network. Five types of agents are used in the scheme route manger agent, network initiation agent, network management agent, multicast initiation agent and multicast management agent [1].Rakesh Kumar and Mayank Dav (2012) represent a paper based on the VANET vehicular ad-hoc networks are upcoming wireless network environment for intelligent transportation system. In the VANET applications build upon the data push communication model where information is disseminated to set of vehicles. There are so many types of VANET applications and their communication protocol needs a systematic literature survey. In this paper mainly define the VANET applications based on the various broadcasting data dissemination protocols are surveyed separately and

their fundamental characteristics are revealed. At the end of this paper comparison of all the protocols [2]. Amiour med tahar, Bilami azeddine represent a paper on VANET vehicular ad-hoc network where vehicles like car, bus, truck can assume as nodes of the network. Recently for driver comfort and road safety, the inter-vehicle communication became increasing a subject of much scientific research. On VANETs routing protocol have a great consequence where AODV is one of the most popular routing protocol dedicated to ad-hoc network it can use the flooding techniques for locating the destinations and possibly cause an overhead in the network. To overcome this problem used the multi point relay algorithm in the AODV protocol in order to reduce the number of messages broadcasted during the flooding techniques [3]. **Rakesh Kumar, Mayank Dave** represents a paper in (2011) on vehicular ad-hoc network is subclass of mobile ad-hoc network which provide a distinguished for intelligent transport system (ITS). According to the survey it is very necessary to use the ITS with the help of VANET routing protocol. In paper also discuss the advantage and disadvantages, applications of different routing protocols for vehicular ad-hoc networks. This paper also explores the motivation behind the designed and traces the evolution of this routing protocol. At last this paper also show the tabular comparison with various routing protocols for VANET [4]. Jason J. Haas and Yih-Chun Hu represents a paper based on the performance measurements obtained from simulations of the (VANETs) vehicular ad-hoc networks. These simulations use as input traces of vehicle movements that have been generated by traffic simulators which is based on the traffic model theory. In this paper mainly work based on the actual large scale recordings of vehicle movements. To our knowledge, no one has published any work on actual large scale recording of vehicle movements. In order to enable analysis on this scale, we have developed anew VANET simulator which handle more vehicle than ns2 [5]. Cristina Rico Garcia, Andreas Lehner represents a paper on efficient design and reliable broadcast MAC layers for wireless mobile ad-hoc networks (MANET) especially high user speeds are allowed is a current challenge. Despite the absence of infrastructure would permit channel allocation, awareness techniques allow a certain channel assignment. In this paper design the MAC layer protocol designed for broadcast MANETs called COMB cell based orientation-aware MANET Broadcast. In the technique of COMB allow the realization of collision free transmission, high speed is supported and no handshake is required. COMB is based on the localization aware cross layer dimensioned CDMA cell and it use the SOTDMA protocol as intra cell scheme [6].

III. ANT COLONY OPTIMIZATION AND WIMAX

Ant communication is accomplished primarily through chemical called pheromones. Ants communicate to one another by laying down pheromones along with their tail. Other ants receive the presence of pheromone and tend to follow path where the pheromones concentration is higher. Pheromone trail starts to evaporate, then reducing its attractive strength. The more time the pheromones have to evaporate. Ant follows that path which are shorter and the pheromone density remain high as it lay on the path as fast as it can evaporate [3].

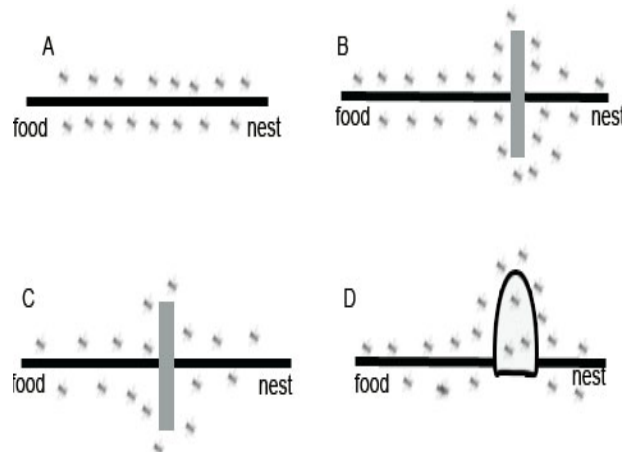


Fig1: Ant Behavior

In the figure A ants in the pheromone trail between nest and food; on other side in figure B an obstacle interrupts the trail; as it is same side C ants finds two paths to go around the obstacle; as compared to other sides in D figure new pheromone trail is formed along the shorter path. Pheromone evaporation has also advantage of avoiding the convergence to locally optimal solution. If there was no evaporation at all, the path chosen by the first ants would tend to be excessively attractive to the following ones. Ant find a good path from food to destination and other ant follow that path and positive feedback eventually leaves all the ants followings a single path. ACO is basically the optimization approach that is speed up the algorithmic process. In the wireless network the ACO is basically used to optimize the communication process. This approach is used in the nodes to find the optimize path over the network. Ant places the pheromones on the located path so all other nodes can follow these pheromones to communicate on this optimized path.

Wi-Max is a wireless system that is designed for metropolitan area. Therefore, in the wi-max support non-LOS channel, pedestrian mobility and high data rate. The core technique of wi-max is based on the IEEE802.16 family standard. Wi-max combined with wi-fi technique, which is most popular local area wireless scheme. Wi-max offered a metropolitan wide coverage. With the help of local hotspot receives the Wi-max signal convert into the

Wi-Fi protocol because it is compatible with most the existing wireless devices. Wi-max interoperability for microwave access is currently one of the hottest technologies in wireless. The institute of electrical and electronics which sets networking standards such as Ethernet 802.3 and wi-fi 802.11 has published standards. WiMAX is based on RF technology called orthogonal frequency division multiplexing which is very effective means of transferring data when carries of width of 5MHz or greater can be used. Below 5MHz carrier width, current CDMA based 3G systems are compatible to OFDM in terms of performance. WiMax is standard-based wireless technology that provides high throughput broadband connection over long distance, hotspots and high speed connectivity for business customers [7].

IV. NEW PROPOSED TECHNIQUE

In this proposed work we have defined the network with a new intelligent algorithm to perform the vehicle to vehicle communication. Each vehicle can pass the information to other regarding the path, speed etc. This information also includes the accident status also. In this proposed work, as a vehicle get some collisions it will inform to the follower vehicles about its status so that they can perform the decision regarding the route change at earlier stage. Each vehicle can pass the information to other regarding the path, speed etc. This information also includes the accident status also. In this proposed work, as a vehicle get some collisions it will inform to the follower vehicles about its status so that they can perform the decision regarding the route change at earlier stage. The intelligent bio inspired algorithm is suggested in this work to identify the new route. The simulation of the proposed technique is done in NS2. The delay is reduced in the new technique as compared to the previous technique. In figure 2, comparison delay graph is shown between the new and previous technique. The green line shows the delay in previous technique and red line technique shows the delay in new technique.

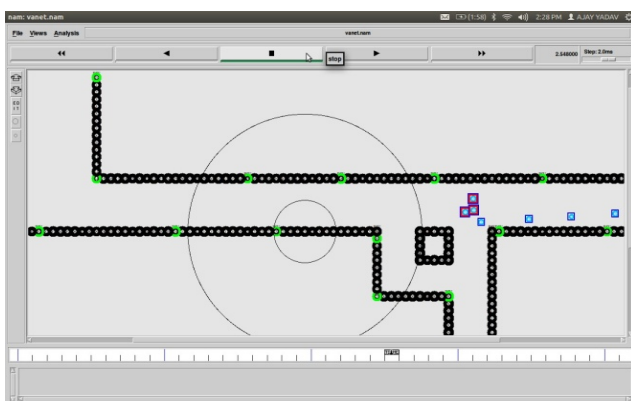


Fig 2: VANET simulation

Case 2: To decrease the delay between the vehicles use the case. In this case again define the road along will the RSU (road side unit).

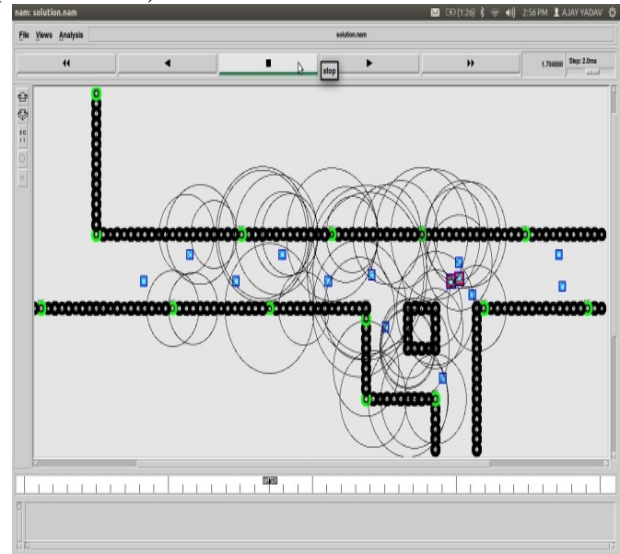


Fig 3: VANET simulation

Whole traffic passes on the road without any jamming in the network.

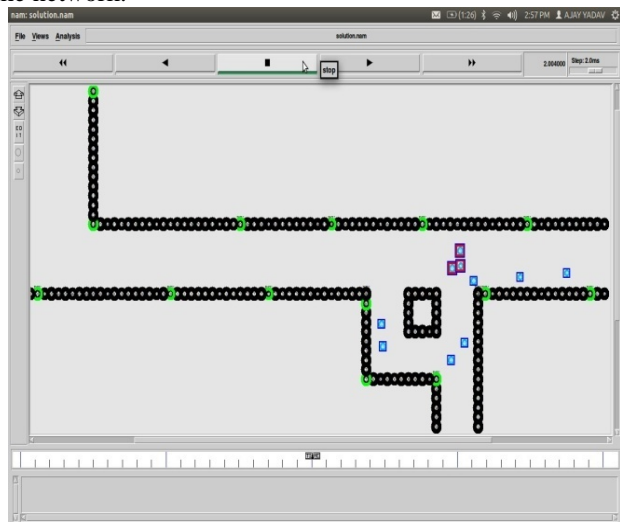


Fig 4: VANET simulation

Whole traffic reaches to destination stage.

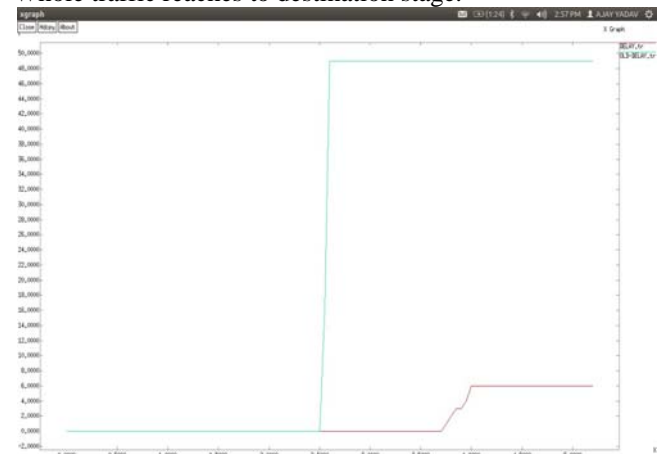


Fig 5: The delay comparison graph

V. CONCLUSION

In this paper we conclude that the ant colony optimization is efficient approach for VANET. The accident information should be flooded in the city roads as soon as possible .The accident information is exchanged between the road side sensors using WIMAX .The simulation results shows that proposed technique is more efficient than the previous techniques.

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