A safety in transport and to achieve traffic

A review on latest development on VANET Kamlesh GautamAbstractVehicular Ad-hoc NETwork (VANET) is used in many metropolitan and smart cities to perform inter-vehicular communication for stationary conveyance, moving conveyance, autonomously operated conveyance, dealing drones, phone and other ad-hoc networking systems of organizations. So, that we can achieve a lot of cognition, like as to reduce the Reaching Time (RT) of fire fighter troops, ambulance, drones and to reduce the number of accidents/disasters in cities. It plays a vital role in the efficient management of city traffic by preventing traffic jams and effective control of drones as well. VANETs are deployed in two dimensional as well as three dimensional networks in accordance to the applications to attain energy efficient routing and easy handoff.

The determination of appropriate topology and characteristics of VANET is of prime importance for densely deployed 2D/3D networks. VANET is compatible with 5G technologies and able to deliver high throughput suffering lower delay providing higher energy efficiency. The objective of this paper is to present a review on latest development on VANET to spread the awareness of this emerging field.

It is an attempt to review and present the work which has already been done by eminent researchers of this field. The aim is to motivate researchers to contribute in this field. KeywordVANET, VC, TWU, BTS, RSU1. IntroductionThe core consideration about VANET is to   wireless access between vehicles with roadside applications.

Nowadays it is used in many cities for VC (Vehicular Communication). The VC is a process of communication between vehicles. These vehicles are may be road side vehicles, unmanned aerial vehicles, under water vehicles and also on water vehicles.

The VC is applicable to improve the safety in transport and to achieve traffic efficiency. It is also applicable to convey information about stationary and moving conveyance, automatically operated conveyance, dealing through drones, phones and other ad-hoc network systems of edifices, watercrafts, aircrafts, etc. This technology is used in Japan, USA, and few European countries for army, navy, air force projects. It is also efficiently used in lot of industries of MEMS (micro electro mechanical system) of these countries to achieve economical and organizational goals as per requirements. It is also useful for the marketing application through drones.

In present competition timing the fast delivery is a crucial requirement of the market. So as to reduce the reaching time of drones the VC is very helpful. As per the data analysis of WHO the vehicular disaster are increasing continuously after 2000 in maximum nations, which should decrease 2. On the other hand according to current warfare environment of global nation's (e.

g. USA, China, South Korea, North Korea, Russia, UK, India, Pakistan, etc.) air weapon expansion is required. Hence, VC system is helpful to decrease and increase the vehicular disaster in all countries as per requirements.

This VC system is not possible without advance networking of VANET to unceasing security and rapid data swapping. Just from last two years the

research papers are increasing extensively on IEEE Xplore about the following things of VANET. These are: The Deployment of VC, Characterization of VC, Two dimensional and/or Three dimensional scenario of VC, Routing in VC, Energy consumption of VC, Hand-off in VC, Modulation scheme in VC, System operating margin in VC, Security in VC, Velocity Change in VC, Delay in VC, Throughput in VC, Clustering in VC, Packet delaying in VC, Congestion in VC. In these researches, to judge actual estimate of execution of the VC, we implement it on various network and marching simulators. Hence, the research and demand of vehicular communication system is increasing broadly. And the VC system will increase more broadly in overall world. Because the VC system is not established till now in lot of number of countries.

The principle purpose of this review paper is to provide help and motivation in the development of artificial intelligence in the field of vehicles. Hence, the focus of this review paper is centralized technically on the Deployment, Characterization of the VANET in 2D/3D with energy efficient routing and hand off. The arrangement of this review paper is produced as following: second segment present overview about the VANET, third segment present review about deployment in VC, fourth segment present review about characterization of VANET in VC, fifth segment present review about simulation tools, sixth segment present application of VC, seventh segment present review on feature research problems conclusion of overall review paper finally. 2. VANET2. 1 VANET Architecture: The architecture of VANET is established with only three thinks V, TWU, and SD 1.

These are V (Vehicles, e. g. car, drone, submarine, etc.), TWU (Transport Way Unit, e. g. roadside unit, airways unit, waterways unit), and SD (substructure domain). The VC in this architecture can be established using wireless standards like as IEEE 802.

11p. In this architecture, TWU works as the router. Which range (coverage) should be higher than vehicles range.

In this VANET architecture for VC the vehicles are established with OBU (On Board Unit). This OBU is consisted with a lot of technologies (e. g. Global Positioning System, Radio detection, Radar ranging, Laser technology, satellite communication, etc.) So that vehicles can track location and situation of each other including destination location. In these vehicles of VC an ELP (Electronic License Plate) is induced. In this architecture an AOC (Authority of Certification) is exist. So that, many facilities (e.

g. safety, TCP/IP) and applications can be provided. Fig. 1 shows VANET architecture with an example of vehicular communication (vehicle to vehicle communication) which is also indicating V2SD (vehicle to substructure domain) and SD2V (substructure domain to vehicle) linking. 2. 2 Brilliant Transportation System: Brilliant transportation system (BTS) is an example of artificial intelligence. In this, a vehicle itself is capable to transmit information, receive information and also works as a router for the broadcasting of information. This BTS is can be used in roadways traffic system, drones traffic system, etc.

The BTS provides two type of VC. First is V2V (Vehicle to Vehicle communication) and second is V2SD (Vehicle to Substructure Domain) or

substructure domain to vehicle (SD2V) communication. Fig. 1 shows this concept with help of roadways traffic system. For the transmission of information, V2V uses multi-hop communication and V2SD uses single hop communication. Here inter-vehicle communication is also classified into two categories.

First is naïve broadcasting and second is intelligent broadcasting. First one is applicable to produce beacons at regular intervals. But in this, the collisions of messages are occurring due to the large generation of messages. Whereas in the second method. The messages are generated only on demand. Hence, the collisions of messages are reduced in the second method.

The high bandwidth linking is provided between TWU and vehicles in this system. So that TWS can detect the speed of vehicles. If the speed of a vehicle is greater than the range of TWS, then TWS produce a visual alarm message for the vehicle. Fig.

1 VANET Architecture2. 3. VANET Standards: Product development is possible with help of VANET Standards. These are used to assist users for comparison and verification of products. As per requirement of used protocol these standards (e. g. DSRC, WAVE) are used. Dedicated short range communication (DSRC) standard is processed by USA but also using in Japan and Europe.

It is short to MRCS (medium range communication services). DSRC 11 is utilized for V2SD and V2V. It includes seven channels, where each channel has 100MHz band. In this standard data rate was not higher. But due to BTS

functionary high data rate is required. To overcome this problem a new standard is developed, that is Wireless access in vehicular environment (WAVE). 3.

Deployment in VCThe VC system is currently advancing their TWU deployment. The deployment in VC with minimum budget is a demanding research work. Velasco et al. 1 introduce a RSU (Road Side Unit) deployment of three merger techniques.

First is deploying RSUs on stable spot, second is deploying RSU on public mobile transportation, and last is deploying RSU on absolutely manageable vehicles. In which firstly, a map of city area into a grid graph is designed. Then, a new optimization problem is formulated and shows its NP-hardness. In 3, Zhang et al. study an on-road base station (SCS) is proposed, to utilize renewable energy harvesting, mm Wave backhaul, and data caching style to attain pliable, continual, and economical VC. With help of 5G technologies, SCSs can allow " drop-and-play" deployment, green operation, and low-latency data dispatch, paving the way to economical VC.

Zheng et al. 4 study provides a stochastic geometry scheme for a performance analysis and network layout. In which linking outage and confidential outage probabilities are examined for a typical statutory connection, and show that the linking outage probability is raised by enabling copious FD receivers but decreases the confidential outage probability. In 5, Cavanagh et al. study Ad hoc electrical networks are formed by connecting power sources and loads without planning the interconnection structure (topology) in advance. They are designed to be installed and

operated by individual communities-without central oversight-and as a result are well-suited to addressing the lack of electricity access in rural and developing areas. However, ad hoc networks are not widely used, and a major technical challenge impeding their development (and deployment) is the difficulty of certifying network stability without a priori knowledge of the topology.

We develop conditions on individual power sources and loads such that a micro-grid comprised of many units will be stable. We use Brayton-Moser potential theory to develop design constraints on individual micro-grid components that certify transient stability-guaranteeing that the system will return to a suitable equilibrium after load switching events. Our central result is that stability can be ensured by installing a parallel capacitor at each constant power load, and we derive an expression for the required capacitance. 4.

Characterization of VANET in VC 5. Simulation tools Algorithm Simulator Channel Model Comparison Based Upon DMAC N/S N/S N/S LID/HD GDMAC ns-2 Static RTx DMAC DMAC MDMAC JiST/SWANS++ Log-Normal DMAC DMAC DBC JiST/SWANS++ Log-Normal HD MDMAC CCA Unspecified Unspecified MDMAC MDMAC CBLR OPNET Unspecified None Original CBMAC Custom Custom None CBLR RMAC ns-2 Static RTX DMAC Original HCA VEINS Static RTX k-ConID Original C-DRIVE NCTUns Static RTX None Original K-hope ns-2 Two-Ray None MOBIC ALM SIDE/SMURPH FSPL GDMAC MOBIC C-RACCA ns-2 Two-Ray None Original CMGM ns-2 Two-Ray None C-RACCA MI-VANET ns-2 Static RTX None Original Sp-Cl Unspecified Unspecified LID Original E-Sp-Cl Custom FSPL+Shadowing Sp-Cl Sp-Cl PPC ns-2 Static RTX LID, HD

Original AMACAD Custom Static RTX LID, MOBILE, DGMA, MobHid Original UF Traffic Simulation 3. 0 Unspecified LID, HD LID/HD CSBP JiST/SWANS++ Unspecified None UF TC-MAC ns-3 Static RTX LID, HD, UF UF APROVE ns-2 Static RTX MOBIC, ALM, PPC Original CCP Unspecified Unspecified None Original SBCA ns-2 Static RTX CCP CCP TBC Custom Unspecified CBMAC, PPC Original PC GloMoSim Static RTX LID Original VPC ns-2 Static RTX PC PC CF-IVC N/S N/S N/S PC FBLA ns-2 Nakagami APROVE, CCP Original UOFC ns-2 Unspecified LID, UF UF VWCA MATLAB Static RTX LID, HD, WCA WCA TACR Unspecified Unspecified None Original DBA-MAC ns-2 Static RTX None Original CPTD ns-2 Static RTX None Original MCC-MAC MATLAB Unspecified None Original MCTC MATLAB Unspecified HD Original CBPKI VEINS Static RTX None Original CAC Unspecified Unspecified None Original ALCA VANET MobiSim Static RTX None Original MCA-VANET ns-3 FSPL+Fading MOBIC Original NMCS N/S N/S N/S Original FQGWS MATLAB Static RTX CMGM, C-DRIVE Original DMCNF ns-2 Unspecified K-Hop Original VMaSC ns-3 Static RTX K-Hop, MDMAC Original Table 1: The required algorithms with their validation methodologies. n/s stands for n to simulated1) Mainstream Models: Out of all surveyed papers mostly used simulator is ns-2 12. It regards a packet as having been successfully received if the received power exceeds a particular threshold while supposing a constant distortion floor, depended on the selected channel cam. 2) Custom Channel Models: In 12 paper a custom simulator described. It is dependent on a static transmission spectrum cam with consideration of the impact of reflection and diffraction near edifices. 3) Unspecified Channel Model Citations: In our literature review, we observe that no more particular data is available on the preference of channel cam.

Actually, the second-most usual " channel model" is unspecified. So, it is crucial to find out the generality of the simulation outcomes obtained in these literatures. However, of the reviewed papers lacking data on channel cam configuration, then specify the simulation framework in utilization, which produces intuition into which cam which may have been utilize.

6. Application of VCNow a days VC provides applications for e-Safety, security, emergency, establishes strong relations of producer with consumer, traffic management, stationary conveyance, moving conveyance, automatically operated conveyance, driver comfort support, enhanced maintenance, dealing through drones, maintenance, media services, marketing through drones, fast delivery through drones, gaming, micro electro mechanical system, e-shopping, crime investigation, defense, and so on. VC produces applications for vehicle manufacturers and consumers to avail superior facilities and services.

7. Future research scopes and ConclusionAs we all know vehicles are increasing in road ways, aerial ways and under water ways. The VC is getting its momentum day by day.

The deployment, characterization of VANET with energy efficient routing is necessary for the safe and cooperative transportation. Hence, the future work can be recommended in VC system for the expansion of Vehicular cloud, Fault Tolerance, Mobility model, and MAC layer protocol. Several previous literatures and taxonomies of deployment, characterization of VANET with energy efficient routing in VC system, such as 12 and 2, have

recognized the demand to utilize more of the unique facets of the VC. This literature review includes wider application of VC.

While these opportunities are significant, meaningful progress in advancing the state of the art in VC is hampered by a number of significant and fundamental shortcomings in the existing literature, which are summarized below, and which need to be adequately addressed if robust and reliable VC are to move beyond simulations and into large scale practical deployment. 8. Reference1   C.

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