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A Survey UAV-Assisted VANET Routing Protocol

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ABSTRACT

The vehicle ad hoc network (VANET) has a substantial impact on improving road safety in traffic management systems, on-board infotainment activities and intelligent transport systems. Roadblocks, excessive movement, and occasional topological changes often interfere with the communication links for navigating the van. With the help of 3D mobility, the Unmanned Aerial Vehicle (UAV) can greatly enhance the VANET rerouting experience and improve visual and optimal connectivity and differential mechanisms. Effective promotion. As a result, different routing protocols for different purposes have been stated for drone assisted VANET. So far, there have been several tests for VANET based on different routing protocols. However, for the authors, no discovery has yet been made specifically regarding the root protocols of drone-assisted valves. This survey document provides a detailed overview of the advanced root protocol for UAV-assisted vanities. The protocol is divided into seven groups according to the principles of an operating system and design. The gaps in the protocol are identified individually by analyzing their benefits, difficulties, areas of application and future developments. Root protocols are compared qualitatively to each other in a comparison table, and are based on different design aspects and system parameters.

Keywords:- UAV routing Protocol

I. INTRODUCTION

VANET is a kind of mobile ad hoc network (MANET) that allows mobile vehicles to communicate with each wireless links[1]. Vehicles are currently equipped with an on-board unit (OBU) with many sensors and transceivers[2]. With OBU, vehicles communicate with road units (RSUs), UAVs and ground stations (GNs)[3]. Vans play anvital role in the Intelligent Transport System (ITS)[4]. At VANET is used for public safety, traffic forecasting, driving safety, and recreation[5]. Drones are light aircraft that can be operated remotely or in a pre-programmed manner[6]. In short, these devices include various sensors, computer units, cameras, GPS, and transceivers[7]. Drones are used in many military and civilian applications[8]. Examples of drone use are ad hoc relay, emergency contact, traffic monitoring, remote monitoring, rescue, geographical monitoring, surveillance, crop monitoring, land distribution, agriculture, disaster management, public safety, surveillance, autonomy, data transportation, and border surveillance[9].

As an efficient networking tool, UAVs offer a number of features, including affordable shop-in-store (SCF) and excellent surfing (LOS)[10]. UAV networks can be deployed faster than any other stable network infrastructure system[11]. Therefore, it is better to use UAVs faster as the basis of a network of mobile infrastructure for remote locations[12]. VANET is a diverse network of architects that supports UAVs and vehicle networks[13]. Through the use of UAVs in such networks, communication can be established between vehicles (V2V), vehicles (V2I), and infrastructure (I2I) for message and carrier forwarding[14]. The UAV based VANETtraffic monitoring system offers additional functions and capabilities[15]. This networked project will promote road safety and program reporting[16]. With this type of network, a person can be warned in advance about the condition of the road or temporarily declare a traffic jam[17]. Special UAV mobility models with directional optimization ensure maximum connection time with vehicles. UAVs help you find the right places in 3D[18].

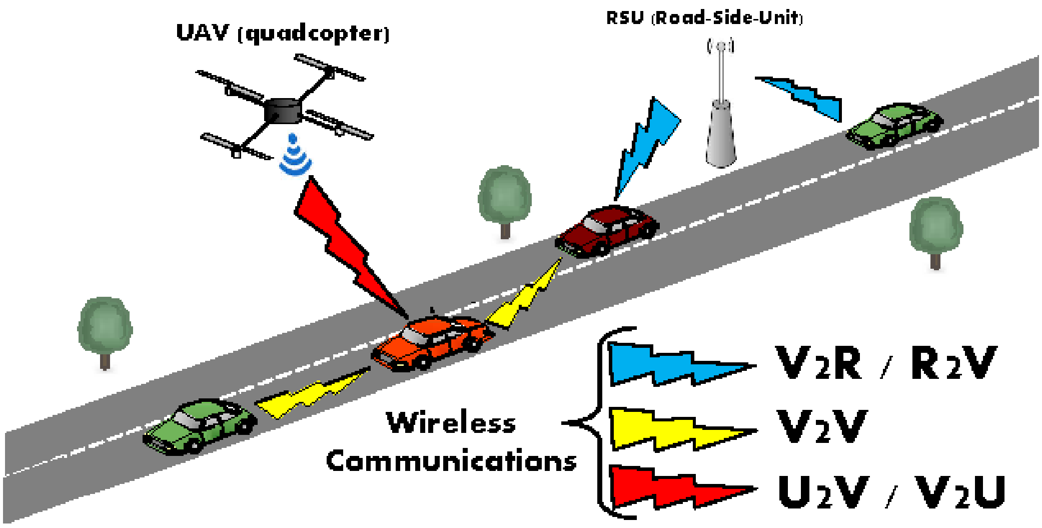

Fig.1. UAV-assisted VANET routing protocol.

As a result, UAVs were also tested in the role of temporary RSUs, where basic functions were limited or cooperated[19-20]. In an environment where LOS communiqué is disrupted by interruptions, LOS conducted some experiments to find the right place to communicate with UAV-ground vehicles[21-22]. Delays in such crowded locations are an important fact, and the researchers focused on optimizing delay performance for communications between UAVs and ground vehicles[23]. UAV-assisted VANETcan play in establishing temporary connectivity solutions on other maneuvers with the help of rescue vehicles connected to the disaster area[24-25]. Due to its changing height, speed and obstacle characteristics, UAVs can create and maintain constant contact with vehicles[26]. These standards make it easier to track any vehicle and can be used to benefit law enforcement[27]. The quality of experience (QoS) can be better by integrating UAVs with ITS. Many companies have started making automatic cars[28]. These cars rely heavily on network connectivity[29]. These trains will not be useful without remote connectivity support in remote areas or disaster prone areas where infrastructure has been compromised[30].

The use of a network interface in this direction should be expedited to ensure vehicle execution[31]. UV-assisted vans can cause this problem. In order to take full advantage of the VANET architecture with UAVs, it is necessary to pay attention to the important points related to the root modification agreement[32]. VANET has a lot of mobile and unusual functions, so the vehicle changes with location and time[33]. Depending on the speed limit, it may take time for the ARC to clear vehicle data. Changes in the dynamic environment and general topology make it difficult to maintain communication during transmission[34]. In addition, it is also difficult to build router applications on VANET with the help of UAVs. This article contains articles about the benefits of air baths[35]. UAV-assisted ventilation is relatively new, but with environmental ventilation controls, interconnected connections, offline connections and disconnected networks in marine zones[36]. This summary summarizes the current accuracy of the UAV-assisted van[37]. This will be the beginning of the work of new researchers and engineers in the field[38]. Comparative power and discussion will help you better understand the activities in this section[39].

II. OPEN RESEARCH ISSUES AND CHALLENGES

This section discusses various problems and research problems. As an airline, the aircraft faces many unique VANET-like challenges, as well as physical dimensions and policies set by various governments[40]. In comparison, ground vehicles are the most mobile units. Most road structures are stable, but the speed of the variable makes it difficult to navigate a network of vehicles[41]. In terms of UAV-based vanity architecture, UAVs help increase the size of the network, its stability, reliability, reliability, and security of the vehicle network[42]. However, using the same network paradigm, VANET based on UAVs overcomes almost all problems of the network and the UAV network[43]. The objectives and research questions presented in this report will help researchers develop and implement more efficient routing protocols to control the VANETarchitecture using UAVs[44].

2.1 Security and privacy

This VANET also faces physical damage issues with UAVs. There is a high probability of UAV damage or theft from the deployment area[45]. In terms of data security, numerous secure protocols have already been published for VANTS and UAV networks[46]. The rapid deployment of WANEAT via UAV can lead to new security problems that are different from the problems of the network platform but with inherited functionality[47].

2.2 Connectivity stability

Establishing communication between unmanned aerial vehicles and ground vehicles is imperative to pave the way for UAV-enabled bathroom architectures[48]. Given the dynamic environment, the life of the VANET network with UAV support is significantly shorter[49]. An effective itinerary will try to keep the connection as long as possible. In addition, link integrity testing can help recreate data using previously recognized links, which can lessen the time taken[50]. Communication failure initiates a new discovery process, which leads to the delivery of packets with additional control packets, data loss, and network expansion[51].

2.3 Energy consumptions

The demand for energy in network services that use UAVs is a crucial issue. UAVs must have a long service life to effectively assist rescue vehicles in remote or disastrous areas[52]. Numerous authors have concluded that, in order to reduce energy consumption, UAVs should collect data and save calculations for subsequent analysis[53]. Conversely, vehicle data must be transmitted in an integrated way to reduce the use of transceivers. Air vehicles can also be zoned to reduce duplication of communications and duplication of data transmission[54].

2.4 Fault tolerance

VANET is an architecture that was actually dismantled with UAV support. Due to the high mobility, it is difficult to maintain a stable relationship between the two original structures; i.e. VANET and UAV networks[55]. A decent routing procedure should consider these unique features and include a fault tolerance system as part of the project[56]. Incorrect tolerance mechanisms affect packet delivery reports (PDRs) and direct end delivery delays. Opportunity Grinding is a common error tolerance technique used in architecture[57].

2.5 High mobility and dynamic topology scenario

Some drones fly at speeds of up to 45 m / s, while cars reach speeds of up to 200 km / h. Although vehicles have to endure traffic jams, drones have relatively little roaming space. Due to extremely moving conditions, topological changes occur frequently[58]. Frequent topological changes make it difficult to transfer data between V2V or V2U networks[59].

2.6 Dis-connectivity localization

For a special connection, UAVs should be placed in good places where vehicles are often disconnected or may be disconnected in the near future. In such cases, vehicles can use the aircraft as relay hubs. However, in urban areas, although the road can be identified as loosely connected, the situation may change before the arrival of UVA[60]. Consequently, localizing future fragmented areas in a vanity architecture using UAVs is an important issue.

2.7 Scalability

The connection to the car network depends on the number of vehicles on the road. The need for UAV assistance increases as the sum of vehicles decreases. In addition, if the road becomes inconsistent or there is no limited number of RSUs or RSUs in the area of interest, the need for UAVs will also increase[61]. However, as the sum of vehicles decreases, so does the number of transfer requests. Sometimes vehicles require constant data transmission. In such a situation, communication should always be preserved. Therefore, it is necessary to be able to increase or decrease the network as needed and depend on other important factors.

2.8 Autonomous operation of UAVs for VANET

UAVs need to be coordinated to deploy UAV-assisted VANET services. Overlapping transmission range, overuse of UAVs, undetected sparse sections, convergence time latency, and many other challenges seem to be the reasons for the lack of coordination in UAVs. UAVs must have the ability to execute orders from other nodes and execute immediate decisions according to their ability. Improved team play in UAVs requires further strengthening.

2.9 Specialized mobility model

Many UAV VANET architectures are based on random mobility models. As the number of services provided by UAVs increases, this architecture will eventually fail to take advantage of these mobility models. Coordination and cooperation for various UAV-based services will be a major problem in the future.

2.10 Qos and performance analysis

Depending on the application, QoS requirements vary, and the routing protocol must respond accordingly to achieve the ultimate goal. Specialized research issues in this type of network include flow maximization, airflow optimization, delay-limited routing, energy-efficient routing, secure routing, UAV number optimization, static infrastructure dependency, and DTN-supported routing. Is complementary to some QoS [62].

III. CONCLUSION

In this article, VANET routing methods using UAVs were carefully examined and a comparative analysis was performed. The following sections describe the main achievements of this work, the contribution of this document to academic and practical work, and some recommendations for future work. Based on the study, we can see that most of the routing protocols for VANET with UAVs are partially targeted rather than covering all aspects of the route. The proposed protocols do not take delays and energy consumption into account for security reasons. Cross-road solutions are not intended for mobility and UAV coverage time. Most logs take into account the likelihood of incoming vehicles, but ignore the likelihood of UAVs arriving. The provision of multiple UAVs is shown in some research that suggests that two layers of the network enable the development of an efficient routing protocol. Energy UAVs are one of the barriers to the overall architecture. While all protocols should consider the amount of residual energy and the life of the UAV to make a practical decision, most protocols ignore this problem. Most protocols use the SCF function, which adds many advantages to the DTN function, but the power consumption of the SCF engine is not included in the protocol. In VANET with UAVs, UAVs are represented as mobile RSUs, where it makes no sense to take into account the existence of a stable infrastructure and to be inefficient in urban areas with fewer obstacles. Some protocols have been introduced, provided the scripts are not completely infrastructural. Taking the direction of travel into account is a frequently used technique in the development of efficient routing algorithms for VANET.

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