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DYNAMIC ROUTING FOR FLYING AD HOC NETWORK

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Abstract:

The conventional border patrol systems suffer from intensive human involvement. Recently, unmanned border patrol systems employ high-tech devices, such as unmanned aerial vehicles (UAVs), unattended ground sensors, and surveillance towers equipped with camera sensors. These nodes rebroadcast the received beacon until it reaches all UAVs in the network. During their propagation, when passing by the UAVs, the beacons carry the identification of the UAVs that relay them. Like this, when a UAVs receives a beacon, it is able to update the list of its neighbors and the distance, in number of hops, to the tail node. The proposed algorithm FANET is used to improve the packet delivery and reduce delay time between sources to destination for UAVs network. In this approach, a node maintains the topology information involving its one-hop neighbors. During a reconfiguration process following a path break, improve FANET protocol has the unique property to limit the control packets to a small region of network. The implementation of FANET routing protocols in UAVs networks serves to fulfil the purpose of reservation of sufficient resources along a route so as to meet the QoS requirements of a flow.

Keywords: Unmanned Aerial Vehicles (UAVs), Flying Ad Hoc Networks (FANET), Optimized Link State Routing Protocol (OLSR), Traffic Aware Routing (TAR).

1. INTRODUCTION

Unmanned Aerial Vehicles (UAVs) are considered a promising alternative to piloted aircrafts both in civil and military applications. These vehicles are especially useful in dangerous missions where human lives might be put at risk or even in dull tasks where most of the functionalities of a human pilot can be automated. There is a wide range of potential applications in which UAVs can substantially improve the efficiency and costs of the mission such as border surveillance, search and rescue, environmental monitoring and military tactics to name a few. During the last century, there has been a remarkable research effort to investigate new ways of endowing UAS with higher levels of autonomy and to properly manage the inevitable changes generated in their operability. This effort has been clearly led by United States with an ambitious investment of money and resources in this technology. The rapid evolution in the performance of unmanned vehicles has not always been accompanied by the required technical analysis of the maturity and efficiency of the algorithms and technologies developed. Therefore, proper test and validation campaigns are necessary to consolidate the latest advances in the field of automation and autonomy. FANETs are a special case of mobile ad hoc networks (MANETs) characterized by a high degree of mobility. In a FANET, the topology of the network can change more frequently than in a typical MANET or vehicle ad hoc network (VANET). As a consequence, the network routing becomes a crucial task. The network routing algorithms, which have been designed for MANETs, such as BABEL or the optimized link-state routing (OLSR) protocol, fail to follow the evolution of the network topology. It is possible to bypass this problem by considering star networks with static routing. However, star architectures restrict the operative area of groups of UAVs, because the nodes cannot fly out of the communication range of the control center. Recently, unmanned border patrol systems employ high-tech devices, such as unmanned aerial vehicles, unattended ground sensors, and surveillance towers equipped with camera sensors. In this proposed system to improve the packet delivery based on packet delay in the path and traffic on the path going to calculate. The proposed work can efficiently calculate the communication delay of a packet across an UAVs network is the path selection based on score value and less delay path only selected to send by a packet to reach the destination from the source.

2. RELATED WORK

As pointed out, FANETs are a special case of mobile ad hoc networks (MANETs) characterized by a high degree of mobility. In a FANET, the topology of the network can change more frequently than in a typical MANET or vehicle ad hoc network (VANET). As a consequence, the network routing becomes a crucial task.

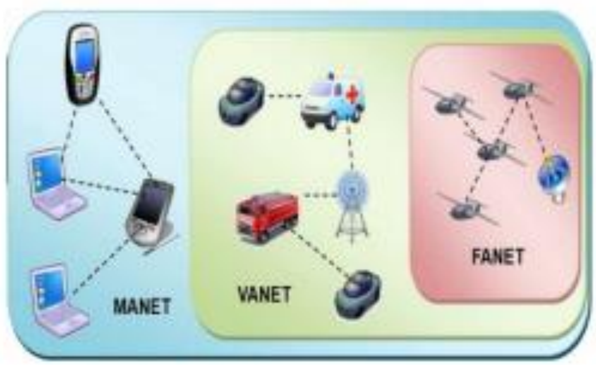

Fig.1.Network Routing

The network routing algorithms, which have been designed for MANETs, such as BABEL or the optimized link-state routing (OLSR) protocol fail to follow the evolution of the network topology. It is possible to bypass this problem by considering star networks with static routing. However, star architectures restrict the operative area of groups of UAVs, because the nodes cannot fly out of the communication range of the control centre. In this paper, we focus on partially connected mesh ad hoc networks that enable the UAVs to use multi-hop communication to extend the operative area. In this case, the problem of highly dynamic routing must be faced. The Optimized Link State Routing (OLSR) protocol for mobile ad hoc networks. The protocol is an optimization of the classical link state algorithm tailored to the requirements of a mobile wireless LAN. The key concept used in the protocol is that of multipoint relays (MPRs). MPRs are selected nodes which forward broadcast messages during the flooding process. This technique substantially reduces the message overhead as compared to a classical flooding mechanism, where every node retransmits each message when it receives the first copy of the message. In OLSR, link state information is generated only by nodes elected as MPRs. Thus, a second optimization is achieved by minimizing the number of control messages flooded in the network. As a third optimization, an MPR node may choose to report only links between itself and its MPR selectors. Hence, as contrary to the classic link state algorithm, partial link state information is distributed in the network. This information is then used for route calculation.

3. PROPOSED SYSTEM

The advent of commercial drones or unmanned aerial vehicles (UAVs) is expected to facilitate the deployment of a plethora of UAVs-based applications. This new routing protocol relies on choosing, at each moment and ahead of time, the most connected path among others available and avoid available paths that can be quickly broken. Connectivity paths are done and undone due to the high mobility of the vehicles and to the encountered obstructions and obstacles. A path is considered most connected based on the traffic density and the connectivity of the vehicles within a road segment. A path connectedness is measured through (1) periodic Hello messages exchanged between vehicles, or (2) by forwarding the data packets directly to UAVs within range when there are no available routing paths and then forward the data packet directly to the destination if it is within the transmission range of the UAV, or (3) to the vehicle located at the most appropriate intersections where there are available connected road segments leading to the destination. This scheme overcomes the presence of obstacles when calculating the traffic density, connectivity and the packets delivering. This protocol is to find the shortest and the most reliable segment among others available beforehand based on a score calculated permanently by the vehicles situated at the intersections for all the segments around. In addition, the UAVs have a global vision of all the intersections surrounding them (in range). Consequently, the UAVs can immediately deduct the most connected segment based on the best scores given at each intersection which are shared through the periodical exchange of Hello messages by the vehicles located at the intersections. The can select UAVs as forwarding node instead of road segment in the case where the UAVs detect a score on another intersection better than calculated by another UAVs located at the current intersection.

4. ANALYSIS

Dynamic source routing protocol (DSR) is an on-demand protocol designed to restrict the bandwidth consumed by control packets in ad hoc wireless networks by eliminating the periodic table-update messages required in the table-driven approach. The major difference between this and the other on-demand routing protocols is that it is beacon-less and hence does not require periodic hello packet (beacon) transmissions, which are used by a node to inform its neighbors of its presence. The basic approach of this protocol (and all other on-demand routing protocols) during the route construction phase is to establish a route by flooding Route-Request packets in the network. The destination node, on receiving a Route-Request packet, responds by sending a Route-Reply packet back to the source, which carries the route traversed by the Route-Request packet received. Topology formation is an important issue in a flying adhoc network. Performance parameters such as energy consumption, network lifetime, data delivery delay, sensor field coverage depend on the network topology. Flying adhoc network mainly used for monitoring the events such as disaster tactical in military surveillance. In order to the higher mobility, degree, topology changed frequently. The communication between UAVs has also broken frequently; because the higher speed, or if the UAV is out of the range because location changing occurs rapidly. At each UAV connection failure, update processing is needed. Wireless Mesh Network (WMN) is a mesh network implemented over a wireless network system. ANET can be defined as a new form of MANET in which the nodes are UAVs. According to this definition, single UAV systems cannot form a FANET, which is valid only for multi-

UAV systems. On the other hand, not all multi UAV systems form a FANET. The UAV communication must be realized by the help of an ad hoc network between UAVs.

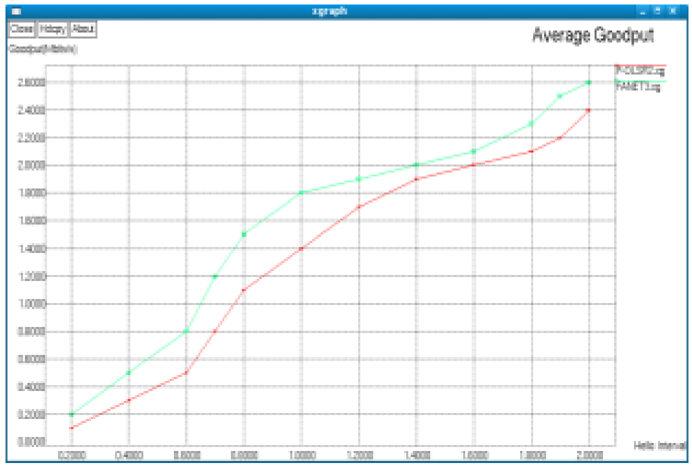

Fig.2.Output

Therefore, if the communication between UAVs fully relies on UAV-to-infrastructure links, it cannot be classified as a FANET. For example, aerial robot team is a collaborative and autonomous multi-UAV system, and generally, its network architecture is ad hoc. In this sense, ad hoc based aerial robot teams can also be viewed as a FANET design. However, aerial robot team studies mostly concentrate on the collaborative coordination of multi-UAV systems, not on the network structures, algorithms or protocols.

CONCLUSION

In a FANET, one of the objectives of the movement is to maximize region coverage. One of the basic services provided by a wireless detector network is monitoring the specified region. We addressed the problem of dynamic routing in mobile client partitioning by applying the mobile target detection technique in mobile Fly devices name as UAV based Seamless Connectivity Solution.The proposed a enhanced solution for our basic FANET model to avoid the Fly Rob failure. The proposed system extra- mobile fly's for failure recovery unit. Here successfully tested our proposed system with NS2. The algorithm of FANET improves the packet delivery and reduce delay time between source to destination for UAVs network. In this approach, a node maintains the topology information involving its one-hop neighbors. The goal of this work is to optimize the network performance in a de-centralized manner, assuming that the relevant parameters such as the network topology and traffic demands are known at a central entity. Due to the high-mobility of the nodes, these networks are very dynamic and the existing routing protocols partly fail to provide a reliable communication.

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