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Review of Flying Adhoc Network (FANET) using Clustering Method

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Abstract: ***One of the most important design problems for the Multi unmanned aerial vehicles systems is communication between UAVs. In a multi-UAV system, the communication between UAVs is provided with all UAVs connecting directly to the ground station via satellite or infrastructure. . Infrastructure or satellite-based communication problems of multi-UAV systems can be solved with ad hoc networks among UAVs. This special ad hoc network structure is called as FANET. This paper focuses on highlighting the strengths and limitations of the earlier proposed classification techniques. The paper provides an insight into the reviewed literature to reveal new aspects of research.***
Keywords - Multi UAV systems (MUAV), Flying Ad Hoc Networks (FANET), connectivity, test bed implementation.

I. INTRODUCTION

Communication is one of the troubles most important which has been encounter when difficult to ensure the coordination of multi UAVs systems. One of the methods developed to solve the problem of contact among UAVs is Flying Ad Hoc Networks (FANET) . An ad hoc network is a distributed wireless network structure that allow communication among nodes without the want for infrastructure [1]. In order to solve the range restriction issue, UAVs can be connected to a satellite as a substitute of a ground station. However, in this case, the cost would be high and the heavy satellite communication hardware would require to be mounted to every single UAVs On the other hand, this system will not be able to be used in some assured situations, such as extreme weather conditions. In recent years, UAVs are being used in increasing number of civil applications, such as policing, addition to military applications. Instead of using one large UAV, multiple UAVs are nowadays use for advanced coverage area and accuracy. Therefore, networking models are required to allow two or more UAV nodes to communicate directly or via relay node(s). Flying Ad-Hoc Networks (FANETs) are formed which is mainly an ad hoc network for UAVs. FANETs to visit all target points in a minimum time, while preserving all time network connectivity. One of the most important issues for the multi UAV systems is the communication.

II. LITERATURE REVIEW

A. Dr. Ilker Bekmezci et al [1]

In their paper presented a method FANET test bed implementation study. One of the most important design problems for the multi unmanned aerial vehicles systems is communication between UAVsIn this study, on the implementation of a FANET network architecture test environment are presented. FANET architecture can provide coordination between UAVs in order to complete the mission successfully.
This study presents a cost-effective and easily repeatable test environment implementation.

B. Md. Hasan Tareque et al[2]

in their paper proposed Flying Ad-Hoc Networks are surveyed along by means of its challenges compared to traditional ad hoc networksIn recent years, UAVs are being used in increasing number of civil applications, such as policing, firefighting, etc. FANET must support both peer-to-peer communication and converge cast traffic at the equivalent time. The distances among FANET nodes are much higher than in fANETs or VANETs [2]. so higher range of communication is needed. FANETs are then classified into six major category which are critically analyzed and compared based on various performance criteria.
In this paper researcher issue related to fanet routing protocol to inspire researcher work on these open problems.

C. Ilker Bekmezci et al[3]

In their paper presented a new multi UAV task planning heuristic is proposed for FANETs to visit all target points in a minimum

time, while preserving all time network connectivity. The aim of the connected Multi UAV task planning problem is to collect information from the target points and relay the collected information without any delay by the help of the FANET structure. The number of UAVs in U is denoted as [U]. Even if there is no direct link between the two UAVs, they can communicate with each other by the help of the ad hoc network.

In this study, we have presented an effective connected task planning strategy for FANETs to minimize the total time needed to visit all targets.

D. KuldeepSingh et al[4]

Experimental analysis is carried out on AODV, DSDV and OLSR routing protocol for F ANET environment using NS2 simulator. role of Mobile Adhoc Networks have rapidly evolved. . NS2 can simulate both types of networks wired and wireless and NS2 can simulate various types of communication protocol like UDP, TCP. In FANET, MA Vs changes position very frequently. Due to this there is a rapid change in topology. So it is very necessary challenging task to find a suitable routing technique for FANET

In this paper show olsr protocol is better than other two protocol.

E. Anil Kumar Verma et al[5]

In their paper presented research that aims to apply OLSR routing protocol in FANETs and study of OLSR under different mobility models to optimize the performance of OLSR in FANETs. Keywords: FANET, MAVs, Mobility Models, OLSR. NS-2 simulator is an open source simulator. NS-2 is an application level simulator, written in C++ and it uses OTCL (object oriented extension of tool command language) interpreter as a frontend. NS-2 has support for both wired networks and wireless networks. . Mobility models consider how node's position, velocity and acceleration changes with time.

In this paper cleraly seen that performance of olsr can be optimized by using the pursue mobility model in fanet.

F. İlker Bekmezci et al[6]

In this paper persented the location information between UAVs is circulated through tokens to resolve the problem of location information sharing in multi-UAV system. This study shows the effectiveness of multi token usage for location information sharing in Fanet. Location Information Sharing (LIS) is the most important challenges in FANETs. . In order to achieve LIS with minimum delay, it is planned to increase the number of UAVs, and the number of tokens circulating in the network simultaneously . . Token package circulation in FANET is an alternative solution for location information sharing in multi UAV systems. Information to be contained in the token to be circulated through the FANET .

This study shows the effectiveness of multi token usage for location information sharing in FANETs.

G. Juergen Eckert et al[7]

In their paper presented deployment of a Flying Ad-Hoc Network (FANET) using foot-launched gliders. . The main idea presented in this paper is the exchange of thermal information between foot-launched gliders such as hang or paragliders via inter-aircraft communication. This setup enabled us to cover distances of over 5 km For simulations, the free-space path loss model subtracting a penalty of 10 dB can be used, but should be extended using a fast-fading model or random distributions to account for suboptimal antenna placement.

Future work includes addressing discussed open challenges and finding a suitable network stack for exchanging and processing data.

H. Stefano Rosati et al[8]

In their paper presented In this paper we compared the performance of POLSR and that of OLSR in a FANET composed of small fixed-wing UAVs. In the case of a calamitous event, when ordinary communication infrastructure is out of service or simply not available, a group of small flying robots can provide a rapidly deployable and self-managed ad hoc Wi-Fi network to connect and oordinate rescue teams on the ground. OLSR is currently one of the most popular proactive routing algorithms for ad hoc networks. It is based on the link-state routing protocol.

In this paper, presented partially-connected mesh ad hoc networks that enable the UAVs to use multi-hop communication to extend the operative area.

I. Leena S. Parabet al[9]

In this paper sparsity in form of number of UAVs is exploited and compressed sensing is implemented on coordination information which is shared between nodes data with reliable results compared to supervised methods. It is preferred for dangerous and time consuming tasks because of its long endurance where manned missions may be risky and put some constraints.

J. SamilTEMEL [10].

In this paper they presented a investigate how HAP&FANET architectures can be usefully employed in such scenarios Also HAP systems have the advantages of flexible deployment, wide area coverage and line-of-sight propagation.

The paper is presented LODMAC presents increased network utilization and provide all the nodes in the topology with exact GPS location of its neighbors.

Future scope of this paper will include optimising connectivity with high velocity of UAVs and deployment patteren.

TABLE 1: Comparison of Different Methods

S.r No.	Author	Year	Method Used	Advantage	Disadavantage
1.	Nazmal Islam	IEEE2016	Group key distribution protocol for fanet.	Simplify the presentation of protocol and flow on its goal.	In which not including secure routing protocol for fanet.
2.	Emerson A.marconato	IEEE2016	Use the LARISS arect. And using real uav mobility process.	Provide the efficiency and accuracy to whole network.	It is consume high power and it is very costly.
3.	Leena s,parab	IEEE2016	UAV is exploited and compressed sensing is implemented on coordination information.	Optimize the connectivity in Fanet arect.	Optimize connectivity with low velocity.
4.	Stefano roasti	IEEE2015	Test bed composed of two autonomus fixed-wing uavs and node.	The GPS information to predict how the quality of the wireless links will Evolve.	Routing protocol mostly fail in making the evolution of network topology.
5.	Kuldeep Singh	IEEE2015	AODV,DSDV and OLSR routing protocol for fanet using NS2 simmulator.	Performance of Fanet can be optimized by choosing OLSR protocol.	AODV,DSDV is not provide better performance.

6.	Md. Hasan tareque	IEEE2015	In which fanet are surveyed along with its challenges compared to traditional ad-hoc network.	Uav increase the realibility of the system and reduce accomplishment time.	Uav sustem outside the coverage area of the ground station,it becomes disconnected.	
7.	Eyup Emre ulku	IEEE2015	Exchange of LIS between uav performed by a token in fanet .	It resolve the problem of LIS sharing in uav system.	When the no. of uav larger so resulting location error increase.	
8.	Ilker bekmezci murat	IEEE2015	Fanet test bed implimantation study is presented.	Multi uavwhich small and inexpansive and resolve the communication problem.	It is not in some certain conditions such as extreme wheather condition.	
9.	Anil kumar verma	IEEE2014	OLSR protocol Is applied under different mobility model in fanet.	It reduce size of control Packet sand reduce the whole network traffic.	End to End delay of OLSR with pursue mobility models is low	
10.	Juergen Eckert	IEEE2013	Foot –launched gliders rely on thermal column in order to study in the air.	This setup enabled us cover distance of over 5 k.m.	This does not enable application such as measuring and exchange of air information.	

III. CONCLUSION

Unmanned Aerial Vehicles have promising role in a large operation zone with complicated missions. For the region that are reasonably isolated from the ground and to accomplish complex tasks, UAVs require cooperation with one another an effective connected task planning strategy for FANETs to minimize the total time needed to visit all targets. This study presents a cost-effective and easily repeatable test environment implementation to support FANET research studies. In conclusion, it has been demonstrated that the FANET system is a low cost system that can be employed in all universities to realize the test environment.

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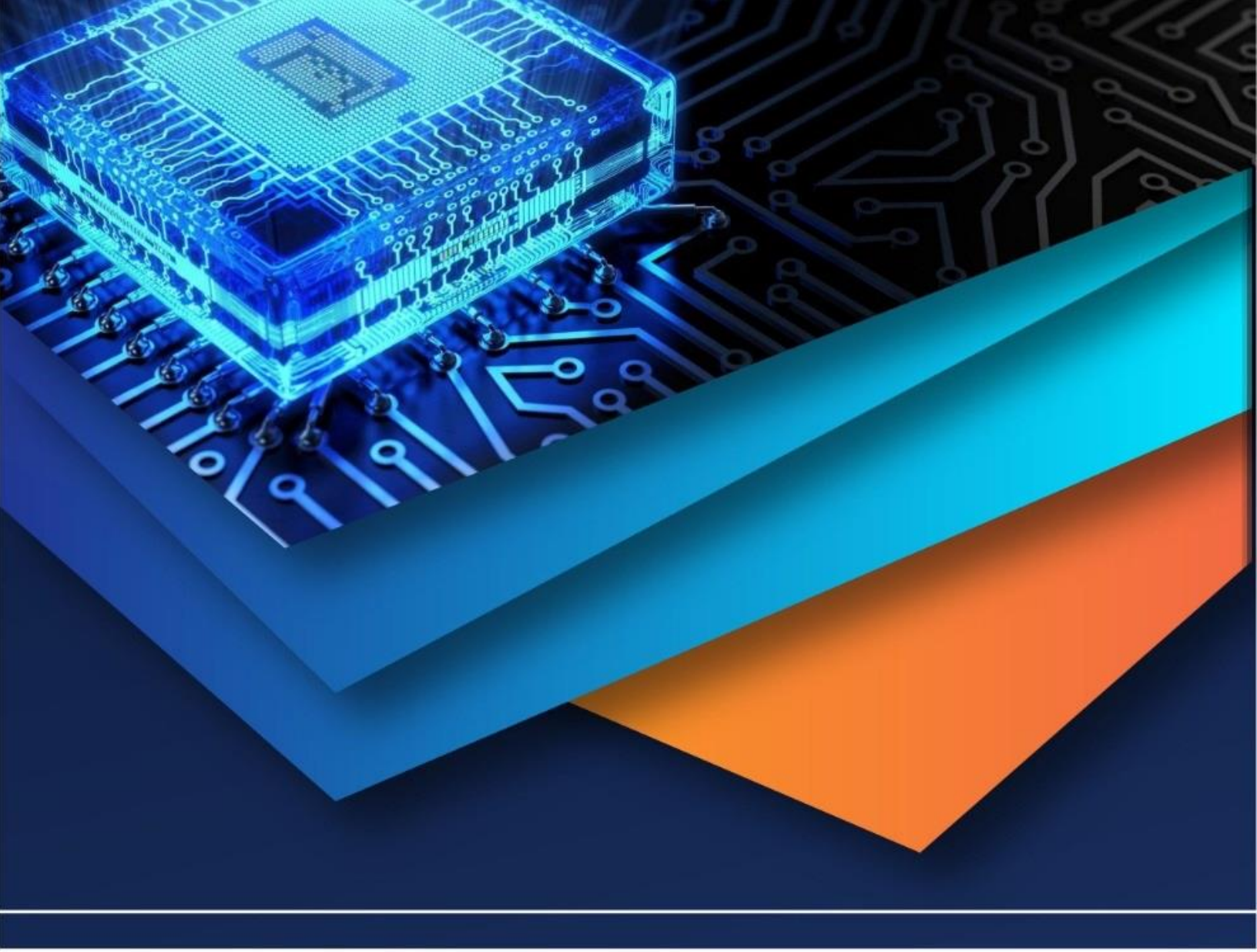

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