

Flying Ad-Hoc Networks (FANETs): A Review

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Abstract

INTRODUCTION: FANETs are a type of wireless communication network consisting of Unmanned Aerial Vehicles (UAVs) or drones that work collaboratively to process data and attain optimal results. These networks have achieved significant attention due to their potential applications in diverse engineering fields. The paper provides a comprehensive analysis of FANET, covering various aspects related to its classification, architecture, communication types, mobility models, challenges, characteristics, and design. It also discusses the importance of routing protocols and topology in FANETs. Furthermore, this paper identifies and presents open issues and challenges in the field of FANETs, urging researchers to focus on exploring and addressing these essential parameters and research areas.

OBJECTIVES: This paper will aim to promote further investigation and advancement in the field of FANETs and similar networks, enabling researchers to explore and overcome the challenges to unleash the full potential of these UAV-based ad-hoc networks shortly.

METHODS: The data used in this paper was gathered from various research papers. A brief comparison among FANETs, MANETs, and VANETs has been shown and highlighted the main points. This paper also elaborates the general architecture, mobility models, routing, routing protocols in FANETs.

RESULTS: It was discovered that the use of both deterministic and probabilistic techniques is suggested to enhance the performance and efficiency of FANETs. By combining these methods, the paper suggests that better results can be achieved in terms of network reliability, adaptability, and overall performance.

CONCLUSION: This paper discusses the importance of routing protocols and topology in FANETs. Furthermore, this paper identifies and presents open issues and challenges in the field of FANETs, urging researchers to focus on exploring and addressing these essential parameters and research areas.

Keywords: FANETs, Drones, Mobility Model, Routing Protocol, UAV

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1. Introduction

UAV systems have become increasingly popular in recent times due to the rapid technological advancements in electronic, sensor, and communication technologies [1]. UAV systems provide a great range of applications in both civil and military fields allowing for autonomous or unmanned remote operation that offers excellent flexibility.

1. UAV technology has been used in various applications including but not limited to border surveillance, disaster monitoring, search and rescue operations, ad-hoc networks, remote sensing, and traffic monitoring. Over the decades of use of UAV

technology, it has been clearly understood that a group of small UAVs prove more beneficial than the development of one large UAV [2]. The coordination and collaboration of multiple UAVs largely escalates their capability beyond what can be accomplished by a single UAV.

2. **Expandability:** Multi-UAV systems can be scaled up to extend the range of applications very easily whereas a larger UAV has only limited a limited amount of coverage increases [3].
3. **Speed:** The speed of completion of missions is observed to be much higher in multi-UAV systems.
4. **Survivability:** Multi-UAV systems allow for the flexibility of altering the operations and continuing the mission even after the failure of one of the UAVs

