


Chapter 16

Privacy–Preserving Techniques for Drone Surveillance Systems

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ABSTRACT

Drones are widely used in modern surveillance for urban surveillance, disaster response and border patrolling. But the data they are collecting is chock-full of private and personal information and may be at risk for hacking or misuse. This information has to defend itself, but at the same time must also let drones perform effectively. We present some privacy-preserving solutions based on the mention's paradigm including encryption, data anode edge computing and storage with blockchain. It further describes sufficiently fencing these mechanisms to ensure that surveillance data remains secure, trustable and tamper evident. Maintaining the privacy of an individual yet achieving effective surveillance is a challenge, and in some work (using drones with IOT and blockchain). The chapter also considers the available challenges.

1. INTRODUCTION

Drones or as part of Unmanned Aerial Vehicles (UAVs)); which in terms of performance supplants ushers as essential corollary in the modern surveillance setups the technology is not the only one that can mitigate them. We observe that aerial surveillance vehicles can be highly beneficial due to their potential for overhead views, and being able to monitor in real time and visit dangerous or hard-to-reach locations that range in application from disaster management, law enforcement as well as traffic monitoring, agriculture and border protection (Bisio et al., 2024). Compared to conventional monitoring

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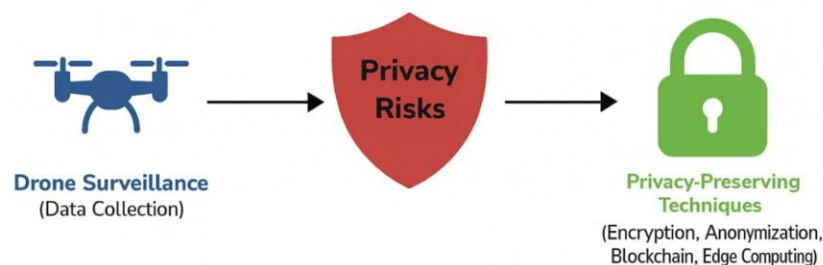
measures, drones have the advantages of low cost, outspread coverage and rapid data acquisition, which has led to the increasing application for many civil-military purposes. However, the popularization of unmanned aerial vehicles also brings serious problems such as privacy and data security (Berdibayev et al., 2024). The information recorded often involves personal and / or sensitive details of individuals or organizations. It can be intercepted, interpreted, or used without permission, which presents a variety of security hazards.

For example, identification by facial recognition from overhead video shots will identify individuals. There is a danger that mission-the safety of unmanned aerial vehicles in the long term may still be compromised due to intercepted communication links and tampered or manipulated drone/helicopter data (Jeon, 2024). You are not noticing them in the data that would be most relevant if you were to follow what's happening, on the risk side Reports on 10-year development plan includes environmental factor and stops waste. The risks mentioned above highlight the pressing need for a good balance in effectiveness of surveillance versus strength of privacy preserving tools. These are grounds for hope but also new challenges to which we must all meet (Chang, Yang, Wu, et al., 2018).

But applying those mechanisms in drones poses a whole new set of problems. The fuel is short; the processing capacity is small. and those whose late wants were relieved must for a long-distance carry with them disturbances little short of starvation as to food and rest! Then of course, there are those missing regulatory standards and ethical guidelines in place to deploy — legally and responsibly let alone discover science (sic)!

In this chapter we will explore some of the advances in technology which are being used to uphold user privacy in online surveillance systems that involve drones and escribe and grade their pros and cons. It is the Node Model and it combines drone(s) with blockchain, which mainly comes from Security or Internet of thing. The model will provide a result in terms how users could get more than just secure Security but respect for each person 's human rights. Figure1. shows a **data flow pipeline** — from drone-based data collection to privacy risk exposure and finally to the application of privacy-preserving solutions.

Figure 1. Flow of drone surveillance and privacy preservation



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