



Data Security and Privacy Concerns in Drone Operations ⓘ

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Abstract

The widespread use of drones across various industries is leading to significant transformations. However, the resulting concerns about data security and privacy are quite significant. This section offers a thorough exploration of these important issues, providing insights into the challenges they pose and potential ways to address them. Starting with an overview of the increasing utility of drones, this chapter highlights the importance of strong protocols for data security and privacy. By examining the complexities of data collection and storage, it reveals the different types of data that drones gather, delves into storage techniques, and reveals vulnerabilities, setting the stage for effective countermeasures. At the core of this discussion are cybersecurity risks, which range from cyberattacks on drone systems to unauthorized access and tampering of data. To sum up, this chapter serves as a comprehensive guide to understanding, addressing, and mitigating concerns related to data security and privacy in drone operations.

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Introduction To Data Security And Privacy In Drone Operations

1.1 Overview of Drones and Their Increasing Use in Various Industries

Drones, also referred to as unmanned aerial vehicles (UAVs), are flying devices capable of operation without an onboard pilot. Their versatility, affordability, and capacity to access remote and challenging locations have garnered significant attention and utility across a spectrum of industries. From being predominantly associated with military functions, drones have evolved to become indispensable instruments in realms such as agriculture, construction, surveillance, and disaster management.

In the realm of agriculture, drones have sparked a revolution in crop monitoring and control. Outfitted with sensors and cameras, these devices offer real-time insights into crop health, soil conditions, and irrigation necessities (Khang, 2023; Sharma et al., 2022; N. A. Khan, Jhanjhi, Brohi, & Nayyar, 2020). This empowers farmers to make well-informed choices regarding fertilization, pest management, and water consumption, resulting in heightened productivity and resource efficiency. Similarly, the construction sector has welcomed the adoption of drones for tasks like site surveys and monitoring project progress, leading to reductions in time and expenses associated with these activities (Trappey et al., 2023; Anandan et al., 2021). In the sphere of disaster management and relief operations, drones have proven indispensable. During natural calamities, drones swiftly assess the scale of damage and identify areas necessitating aid (Islam, 2023; N. A. Khan et al., 2021). Such information facilitates resource allocation and the strategizing of rescue efforts. Additionally, drones play a vital role in environmental monitoring, assisting scientists in the study of wildlife, tracking deforestation, and gauging air and water quality (Mourtzis et al., 2023). Even the retail industry has embraced the potential of drones for deliveries. Companies like Amazon have experimented with drone delivery services, promising swifter and more efficient product distribution (Sakthivel et al., 2023). Furthermore, drones serve the purpose of aerial photography and filmmaking, capturing stunning shots that were once challenging to attain (Kolluru et al., 2023). In the field of medicine, drones offer substantial benefits. Remote areas with limited access to healthcare can receive crucial medical supplies via drones, ensuring prompt delivery (Al-Wathinani et al., 2023; N. A. Khan, Jhanjhi, et al., 2020)). Moreover, drones are being explored as a means of swiftly transporting organs for transplantation, potentially saving lives (Merei et al., 2023). However, the heightened utilization of drones gives rise to concerns about privacy, security, and regulatory complexities. Privacy issues stem from the potential for unauthorized surveillance (Emimi, 2023; N. A. Khan et al., 2020). Ensuring the safe integration of drones into airspace is imperative to avert accidents and collisions (Shan et al., 2023). Figure 1 shows example of the drone.

In conclusion, drones have brought about a transformation in numerous industries by presenting efficient, cost-effective, and innovative solutions. Their applications span from agriculture to disaster management, retail to filmmaking, with ongoing expansion. With technological advancements and evolving regulations, drones are poised to play an even larger role in shaping industries, offering heightened productivity, safety, and convenience.

Figure 1. Drone



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