

A Comprehensive Review of IoT Frameworks in Unmanned Defense Systems

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Abstract

The Internet of Things (IoT) space is evolving rapidly as modern defense systems heavily rely on unmanned platform technologies such as drones, Unmanned Aerial Vehicles (UAVs), Unmanned Ground Vehicles (UGVs) and Unmanned Surface Vehicles (USVs). They leverage the synergy between persistent sensing, sharing of information, and seamless computation to empower decisions during real time monitoring, self-organized coordination, or mission-critical evaluation. Yet, effective IoT frameworks design in unmanned defense environments is not viable yet not only due to scalability and interoperability problems but also due to lack of cybersecurity and latency constraints. This paper provides a systematic literature review (SLR) of IoT frameworks in the field of unmanned defense systems. The work reviews recent research contributions by looking into architectural designs of data-processing, communication models, and enabling technologies such as edge computing and artificial intelligence. Key performance metrics including communication efficiency, scalability, intelligence integration and security are then used to compare the results. The results indicate major shortcomings in existing frameworks, particularly towards seamless integration of heterogeneous platforms, resilience against cyber-attacks and real-time data processing capability in dynamically changing operational environment. From these insights, the paper identifies key research gaps and presents avenues of future research towards developing scalable IoT architectures that are strong enough, smart enough and nimble enough to support next generation autonomous defense systems.

Keywords

Internet of things, unmanned defense systems, uav networks, iot architecture, autonomous systems.