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Enhancing Network-edge Connectivity and Data Security in Drone Video Analytics

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Unmanned Aerial Vehicle (UAV) systems with high-resolution video cameras are used for many operations such as aerial imaging, search and rescue, and precision agriculture. Multi-drone systems operating in Flying Ad Hoc Networks (FANETS) are inherently insecure and require efficient and end-to-end security schemes to defend against cyber-attacks. Providing a framework that can defend against three common attack vectors in UAV systems, Man-in-the-middle (MITM), Replay and Denial of Service (DoS) attacks, in this project, we propose a cloud-based, intelligent security framework viz., "DroneCOCoNet-Sec" that provides network-edge connectivity and data security for drone video analytics. Our framework ensures communication and data transmission between UAV systems and edge-server, including three main modules: (ii) a secure hybrid testbed management module that synergies simulation and emulation via an open-source network simulator and a research platform for mobile wireless networks, (ii) an intelligent and dynamic Machine Learning decision algorithm to detect anomaly events in the system without decreasing the performance in a real-time FANET deployment, and (iii) a web-based experiment control module that features a graphical user interface to assist users in the execution/visualization of repeatable and high-scale experiments. Our performance evaluation experiments result demonstrated the effectiveness of our framework, defending against MITM, Replay and DoS attacks, and ensuring the Network-edge Connectivity and Data Security in Drone Video Analytics.