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Dynamic Edge/Cloud Computation Offloading and Control for Drone Video Analytics

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Unmanned aerial vehicles (UAV) or drone systems equipped with cameras are extensively used in different surveillance scenarios and often require real-time control and high-quality video transmission. However, unstable network situations and various transport protocols may result in impairments during video streaming, which in turn negatively impacts user's quality of experience (QoE). In this position statement, we present dynamic edge/cloud computation offloading and control framework requirements to handle video processing from IoT devices in the field for public safety and precision agriculture use cases. The framework features image impairment detection under various available network bandwidth conditions and adapts transport protocols (e.g., QUIC) for air-to-ground, air-to-air and ground-to-ground data transfers. We present results from a preliminary implementation of our framework viz., DyCOCo in a testbed setup on the GENI infrastructure. Our demo results show that our DyCOCo framework approach can efficiently choose the suitable networking protocols and orchestrate both the camera control on the drone, and the computation offloading of the video analytics over limited edge computing/networking resources.

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