A server-based real-time privacy protection scheme against video surveillance by Unmanned Aerial Systems

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Abstract

Unmanned Aerial Systems (UAS) have raised a great concern on privacy recently. A practical method to protect privacy is needed for adopting UAS in civilian airspace. This paper examines the privacy policies, filtering strategies, existing techniques, then proposes a novel method based on the encrypted video stream and the cloud-based privacy servers. In this scheme, all video surveillance images are initially encrypted, then delivered to a privacy server. The privacy server decrypts the video using the shared key with the camera, and filters the image according to the privacy policy specified for the surveyed region. The sanitized video is delivered to the surveillance operator or anyone on the Internet who is authorized. In a larger system composed of multiple cameras and multiple privacy servers, the keys can be distributed using Kerberos protocol. With this method the privacy policy can be changed on demand in real-time and there is no need for a costly on-board processing unit. By utilizing the cloud-based servers, advanced image processing algorithms and new filtering algorithms can be applied immediately without upgrading the camera software. This method is cost-efficient and promotes video sharing among multiple subscribers, thus it can spur wide adoption.

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