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Unmanned aerial vehicles for crowd monitoring and analysis

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Abstract

Crowd monitoring and analysis has become increasingly used for unmanned aerial vehicle applications. From preventing stampede in high concentration crowds to estimating crowd density and to surveilling crowd movements, crowd monitoring and analysis have long been employed in the past by authorities and regulatory bodies to tackle challenges posed by large crowds. Conventional methods of crowd analysis using static cameras are limited due to their low coverage area and non-flexible perspectives and features. Unmanned aerial vehicles have tremendously increased the quality of images obtained for crowd analysis reasons, relieving the relevant authorities of the venues' inadequacies and of concerns of inaccessible locations and situation. This paper reviews existing literature sources regarding the use of aerial vehicles for crowd monitoring and analysis purposes. Vehicle specifications, onboard sensors, power management, and an analysis algorithm are critically reviewed and discussed. In addition, ethical and privacy issues surrounding the use of this technology are presented. © 2021 by the authors. Licensee MDPI, Basel, Switzerland.

Author keywords

Crowd detection; Crowd dynamics; Crowd estimation; Drones

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