AI Enabled UAV Route-Planning Algorithm with Applications to Search and Surveillance

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BACKGROUND

Portable UAVs such as quad-copters have made huge inroads in the last several years in various fields of aerial photography and surveillance. Drones can efficiently and cheaply hover over/follow a target of interest and capture unique perspectives of wildlife, real-estate, sporting events and operational environments such as law enforcement or military. More challenging however is the application of UAVs for large area search and surveillance. In these scenarios, a search pattern must be established which can cover many square miles and is far too expansive for a UAVs typical battery to sustain. To make UAVs more broadly effective in large area search and target identification, new path planning algorithms are needed to efficiently eliminate areas of low probability while focusing on search areas most likely to contain the subject of interest. Likewise, improved image classifiers are needed to aid in separating targets of interest from background terrain, thus expediting the search within given battery limitations

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a novel set of path planning and image classifying algorithms for use with a UAV. These algorithms apply machine learning to optimize path-planning given battery constraints. Leveraging advanced image classifiers, a UAV can accurately classify low resolution objects from a high-altitude broad field-of-view, quickly eliminating negative sectors while conserving power for closer inspection of positive findings. Using intelligence at the edge, UAVs enabled with this technology will cover greater search fields with higher accuracy than state-of-the-art methods, given a set battery budget.

STATE OF DEVELOPMENT

A prototype system has been built and field tested.

INTELLECTUAL PROPERTY INFO

Patent pending and available to license

RELATED MATERIALS

- Yongxi Lu ; Zeyangyi Wang ; Ziyao Tang ; Tara Javidi. Target Localization with Drones using Mobile CNNs. 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 10/5/2018 10.1109/IROS.2018.8594163 - 10/05/2018

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

UAV's, drones, edge-computing, hardware, deep learning, AI, computer vision algorithms

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