用于UAV视觉导航的跑道检测与跟踪

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摘　要：

跑道检测与跟踪是UAV视觉导航研究的重点内容。针对UAV着陆过程中跑道变化情况，提出一种新的方法，利用单目视觉信息，基于距离跑道的远近不同采用不同的策略实现跑道检测与跟踪，帮助UAV自主降落在安全区域。当距离较远时，利用地平线检测和模板匹配的方法对跑道进行定位；结合模板更新策略实现跑道跟踪；当距离较近时，在融合远距离跑道方位信息的基础上利用改进型Canny算子和Hough变换对跑道边缘进行更精确的描述。实验结果表明，利用该方法可以有效地对跑道进行检测和跟踪，并且具有较快的处理速度。

关键词：跑道检测与跟踪；分段策略；模板匹配；边缘描述；无人机

Runway detection and tracking for UAV visual navigation

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Abstract:

Runway detection and tracking was important in the study field of UAV visual navigation. Considering the runway change, based on monocular image information, a new method was presented to help UAV autonomously land on safe region, which took different strategy according to different distance. When UAV was far away from the airport, the runway was detected by horizon detection and template matching, and tracked by template updating. With the primary location information Canny Operator and Hough Transform were used for more accurate edge description when UAV was near the runway. The experiment results showed that the algorithm could effectively detect and track runway and run quickly.

Keywords: runway detection and tracking; subsection strategy; template match; edge description; UAV

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