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## RESEARCH ON OBJECT DETECTION INSPIRED BY VISUAL PERCEPTUAL BASED ON EVA

**Abstract**

Extravehicular activity (EVA) is an important way to explore space for humans. Due to the atrocious conditions and limited supply, the EVA task must be completed in a limited time, and with the development of the human space exploration, EVA tasks are becoming much more complex. All of this means it is imperative to improve the intellectualization and informatization of EVA tasks, and this can improve the efficiency of EVA tasks further. In this paper, we propose an approach inspired by visual perceptual theory of human for object detection to improve the efficiency of EVA. First, we use an eye tracker to track the astronaut's eyes activities and collect certain area of image that the astronaut is gazing at as the interesting area, then we extract the feature maps of binarization normed gradient about the interesting area. Finally, we input the feature maps into the convolutional neural networks to recognize object category and refine the object location. We evaluate the approach by experiments in the dataset built by ourselves. The results show that the proposed approach can achieve 85% mean average precision (mAP), the average compute time for one image is 0.051s. This approach can be integrated into the extravehicular space suit to assist the astronauts to improve the work efficiency of EVA. The proposed approach lays the foundations for the intellectualization and informatization of the EVA, and draws into a new concept to improve the efficiency of EVA, which has important implications for more complicated EVA missions in the future.