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# Infrared small target detection based on directional zero-crossing measure

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## Abstract

Infrared small target detection under complex background and low signal-to-clutter ratio (SCR) condition is of great significance to the development on precision guidance and infrared surveillance. In order to detect targets precisely and extract targets from intricate clutters effectively, a detection method based on zero-crossing saliency(ZCS) map is proposed. The original map is first decomposed into different first-order directional derivative(FODD) maps by using FODD filters. Then the ZCS map is obtained by fusing all directional zero-crossing points. At last, an adaptive threshold is adopted to segment targets from the ZCS map. Experimental results on a series of images show that our method is effective and robust for detection under complex backgrounds. Moreover, compared with other five state-of-the-art methods, our method achieves better performance in terms of detection rate, SCR gain and background suppression factor.

**Keywords:** Infrared image, small target detection, facet model, zero-crossing point, FODD filter

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