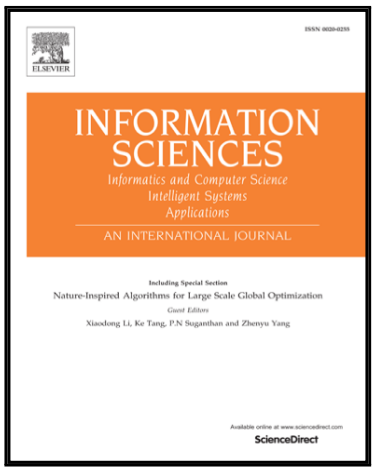

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A Novel Spatio-Temporal Saliency Approach for Robust Dim Moving Target Detection from Airborne Infrared Image Sequences

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Highlights

- ✓ A closed-form local adaptive contrast operation is proposed.
- ✓ The motion consistency characteristic is explored for the first time.
- ✓ Spatio-temporal saliency is specifically modeled for dim moving target detection.
- ✓ The proposed approach can outperform existing approaches remarkably.

***Abstract*—Dim moving target detection from infrared image sequences, which lags behind the visual perception ability of humans, has attracted considerable interest from researchers due to its crucial role in airborne surveillance systems. This paper proposes a novel spatio-temporal saliency model to cope with the infrared dim moving target detection problem. Based on a closed-form solution derived from regularized feature reconstruction, a local adaptive contrast operation is proposed, whereby the spatial saliency map and the temporal saliency map can be calculated on the spatial domain and the temporal domain. In order to depict the motion consistency characteristic of the moving target, this paper also proposes a transmission operation to generate the trajectory prediction map. The fused result of the spatial saliency map, the temporal saliency map, and the trajectory prediction map is called the "spatio-temporal saliency map" in this paper, from which the target of interest can be easily segmented. A diverse test dataset comprised of three infrared image sequences under different backgrounds was collected to evaluate the proposed model; and extensive experiments confirmed that the proposed spatio-temporal saliency model can achieve much better detection performance than the state-of-the-art approaches.**

***Index Terms*—Infrared dim moving target detection, spatio-temporal saliency, regularized feature reconstruction, the local adaptive contrast operation, the transmission operation.**