Ship detection from infrared video

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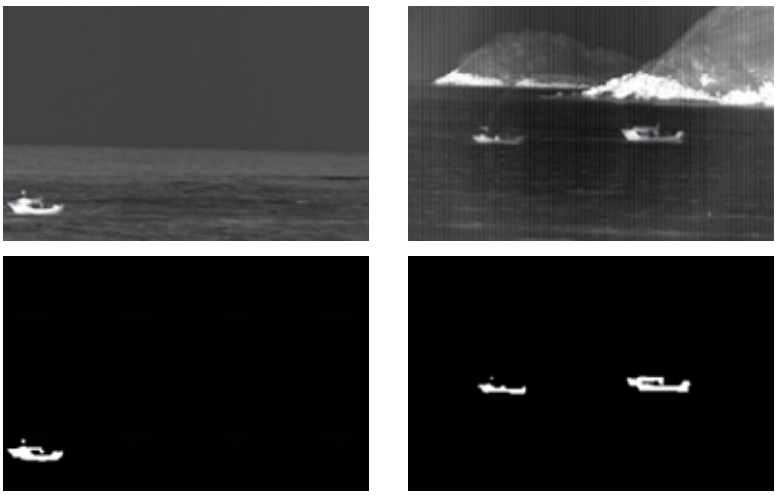

Foreground and background segmentation result

Overview: Moving target detection on the sea surface is a very complicated work. Due to the complex environment of the surface, there are a lot of clutter, so it is difficult to detect the ship on the sea surface. Most of the moving object detection algorithms are applicable to the field of visible light, but visible light imaging is only suitable for daytime work and cannot continuously detect the target at night. Infrared camera can continue to work at night, so it has certain advantages compared with the visible light camera. At present, the moving target detection based on infrared video is a popular research direction. The ship detection from infrared video has wide application value in fishery administration, port monitoring and other fields. In the infrared sea video, the background is more complicated and the waves are irregular, which undoubtedly will increase the difficulty of detecting the ship. Traditional background modeling methods contain Gaussian Mixture Model, Codebook and ViBe, etc. In the process of ship detection from the infrared video, the Gaussian Mixture Model is easy to produce hollow, and it will lead to the detected ship to be incomplete; The Codebook only can adapt to the background of the small periodic motion, unable to cope with the irregular change of the sea clutter; ViBe which uses the single frame for background modeling, can quickly detect foreground targets, but it is prone to ghost and cannot deal with the complex sea environment. Above these algorithms are easily affected by the waves leading to false detection. So this paper proposes a new algorithm framework to detect ship from the infrared video. First of all, the algorithm adopts a Top-Hat operation for preprocessing of the infrared images to suppress the background clutter effectively and highlight the ship target, and then improves ViBe to detect the moving ship target. The paper using adaptive threshold replaces the original fixed threshold of Vibe to deal with the complex environment of the sea surface. In addition, the paper introduces the color distortion as the judgment standard to complete the ship target detection. In the experiment of FPS contrast chart, the algorithm can achieve real-time requirements. In addition, the experimental results show that the algorithm can effectively suppress background noise, and the selection of adaptive threshold can better cope with the complex and varied waves on the sea. Compared with other algorithms, it is shown that the proposed algorithm can achieve better detection results and robustness.

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