Intelligent Risk Target Sensing For Anti-Collision Of Bridges Using Computer Vision

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Owing to the increasing risk of ship-bridge or vehicle-bridge collision, the risk target sensing has become a critical issue in structural health monitoring. Inspired by the successful application of computer vision in many fields, this paper proposes a vision-based intelligent sensing method for risk targets in bridge areas. Full high-definition (FHD) cameras installed above the channel or lane at the bottom of the girders are employed to monitor and obtain video data from ships or vehicles that will pass over the bridge. The proposed intelligent risk target sensing method comprises three parts: (1) target detection in FHD videos using the proposed novel detector, namely Redetection Feature Fusion Single Shot multi-box Detector (Re-FSSD); (2) target tracking using a Kalman filter considering context information; and (3) assignment between the detection and tracking results using the Hungarian algorithm. An FHD video dataset of ship tracking from a real bridge is employed to illustrate the accuracy and efficiency of the proposed method.