

Image stabilization technology for active bridge-vessel anti-collision monitoring system

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Abstract

In recent years, the active anti-collision system using new technologies such as image target recognition between ship and bridge becomes a new research hotspot. Due to camera jitter, it is not easy to deeply mine the monitoring image data. This paper puts forward an anti-jitter algorithm to obtain the ship monitoring track in the sea area removing the camera jitter. It uses electronic image stabilization, sea-sky line anti jitter filtering, and other methods to process the on-site monitoring video, then compares the effect of each technique, and finally obtains high-quality ship tracking data. Through this method, a high-quality ship monitoring track in the bridge area can be obtained.

Keywords: active anti-collision; image stabilization; image recognition.

1 Introduction

The bridge is an important channel to cross the obstacles. Frequent ship collision accidents seriously endanger the bridge structure safety and people's lives and property, and cause great adverse effects on the normal operation of the economy and society by raising the interruption of road traffic and expensive maintenance costs. At present, with the development of video recognition technology, an active anti-collision monitoring system based on a video sensor is a feasible, cheap, and easy way to solve the problem[1]. However, the camera jitter problem exists in the actual application scene of video monitoring. At the same time, compared with the scene of vehicle detection, the size of the ship target is larger, and the instability of the detection model has a greater impact on the positioning accuracy of the target, which makes a negative

impact on the subsequent track analysis and ship collision risk assessment.

This paper uses some methods to remove the Jitter, such as electronic image stabilization technology, sea-sky line, filtering, and other ways to solve these problems. The effect of each method is compared and the method with less calculation and high processing quality is selected to obtain high-quality ship tracking data.

2 Image stabilization method

Mechanical image stabilization technology and optical image stabilization technology are relatively mature, but mechanical image stabilization requires a certain installation space. Visual image stabilization technology has been widely used in the existing shooting elements. In contrast, an electronic image stabilization algorithm only processes the captured video, which has the advantages of easy operation and low energy consumption. The electronic image stabilization