ABSTRACT

DESIGN BOAT CONTROL SYSTEM FOR COLLISION AVOIDANCE USING IMAGE PROCESSING

Boat accidents can be caused by various factors, one of them is human error. According to Indonesian Shipping Court, in 2015 there are 21% of accidents caused by a collision of boats, the rest are caused by natural factors and technical factors.

To reduce human error, that can be designed automatic control system on the ship. USV (Unmanned Surface Vehicle) is a boat shaped robot without a crew that works automatically depend on program design. To support the work of system on USV needed some kind of sensor, that is camera. The camera works by recording images in front of the ship, then to be processed by Single Board Computer by using HSV Filter to identify object and using Fuzzy Logic method to determine the angle of ship turn when avoiding the object.

This system can identify the distance, coordinates and direction of objects in front of the ship. The object is ball shapped with diameter 20 cm. From the test results, this system can work well at sufficient light intensity (1,000 – 25,000 lux). The optimal distance measurement of object is from 0 to 200 cm with ideal degree between 75^o to 105^o. The average error of object coordinate is 2,17 %, while the average error angle of object is 7,45 ^{o}/cm. The maximum rotation angle of motor servo is ±45^o from the initial state (90^o). This system works very well at speed of boat 0,2 m/s, with the object in front of the ship is not moving or moving with a speed of 0.115 m / s.

Keywords : *Unmanned Surface Vehicle, Collision Avoidance, Image Processing, HSV filter, Single Board Computer.*