

DEVELOPING A WEB-BASED RIPAWARE SYSTEM FOR CURRENT RIP DETECTION USING YOU ONLY LOOK ONCE VERSION 11 WITH VISUALIZATION AND HISTORY STORAGE FEATURES

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ABSTRACT

Beaches are among the most popular tourist destinations due to their natural beauty. However, hidden hazards, such as rip currents, pose significant risks to visitor safety. Rip currents are powerful ocean currents that can suddenly pull swimmers away from shore and are often difficult to detect with the naked eye. Many drownings occur as a result of rip currents, primarily due to a lack of public awareness about their dangers and characteristics. Additionally, current detection methods rely heavily on direct observation by lifeguards or volunteers, which can delay the dissemination of critical information. To address these challenges, this study developed a web-based RipAware system that detects rip currents using You Only Look Once Version 11 (YOLOv11). The system automatically processes beach images and videos, featuring visualization tools and a database to store detection history. Test results show that the YOLOv11 model achieved a precision of 90.6%, recall of 85.7%, and mAP50 of 90.4%. This system effectively detects rip currents and provides a web interface for storing and displaying detection history. It is expected to enhance public awareness and support efforts to reduce maritime accidents caused by rip currents.

Keywords: Object Detection, Coast, Rip Current, Detection History, Web-Based System, You Only Look Once Version 11