**Distance measurement at Sea for autonomous**

Naci Eren Kılıç ISE -20190205002

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# Introduction (*Heading 1*)

1. Autonomous maritime vehicles have gained significant attention in recent years for their pivotal role in revolutionizing maritime operations. These vehicles, equipped with advanced sensor technologies and artificial intelligence, are designed to operate independently, making them well-suited for applications such as navigational optimization, oceanographic research, environmental monitoring, and maritime security.
2. One crucial aspect of ensuring the safe navigation of autonomous maritime vehicles is the ability to detect and measure the distance of objects in their path. This capability is essential for collision avoidance and maintaining a safe operational environment. In this context, the present study focuses on the development of a sophisticated program that specifically addresses the challenge of measuring the distance of objects encountered by a ship at sea.
3. The primary goal of this project is to implement an autonomous system capable of accurately assessing the distance to objects appearing in the path of a maritime vessel. Leveraging state-of-the-art computer vision and object detection techniques, the system will analyze visual data to identify potential obstacles and precisely measure their distance from the ship. This real-time information will empower the autonomous vessel to make informed decisions and navigate safely through dynamic maritime environments.
4. The cornerstone of the algorithm employed in this project is the YOLO (You Only Look Once) object detection model. Renowned for its efficiency in real-time object detection, YOLO provides a comprehensive field of view and can efficiently process images from wide-angle cameras. By applying YOLO, the system aims to detect objects of maritime concern and calculate their distance from the ship, thereby enhancing the overall safety and efficiency of autonomous maritime navigation.

This introduction sets the stage for the subsequent sections of the study, which will delve into the methodology, experimental results, and performance analysis. Through a detailed exploration of the chosen approach, this project aims to contribute to the advancement of autonomous maritime technology and its integration into real-world applications.

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