**Research Assessment #3**

**Date:** January 30, 2023

**Subject:** Mobile Application Object Detection using YOLO

**MLA/APA citation:**

Priyankan, K., and T. G. I. Fernando. "Mobile Application to Identify Fish Species Using YOLO and Convolutional Neural Networks." Proceedings of International Conference on Sustainable Expert Systems: ICSES 2020. Springer Singapore, 2021.

**Assessment:**

Object detection is a rising field of computer vision, and has a lot of potential use in everyday life. For example, whether or not a proper use of personal protective equipment (PPE) is in place could be detected using mobile applications for safety officers to monitor. In this paper, the authors talk about how the YOLO algorithm could be used to detect fish species on mobile applications, which is created to address the problem of shoppers not recognizing species of fish correctly. Since this problem is not addressed practically in other studies, mobile applications were developed using deep learning that can detect fish and species with additional information such as vitamins, minerals, prices, and recipes.

In a previous study that addressed a similar problem by Eiji et al., a neural network was developed to identify the fish species in Japan using reference points. This was an effective measure to identify fish species based on different characteristics, however, this study only conducted research for 3 species of fish. Another study by Michael Chatzidakis used a convolutional neural network (CNN) to identify fish species using images. While this network was very effective, it only considered 8 species of fish and required high-performance computing devices which could not be obtained on the go using mobile devices. A variety of other studies have been also analyzed, however, nearly all of them had a limited amount of fish species available and had not considered mobile implementation, which limited the applicability of the algorithm in everyday life.

To address the problem, the authors first gathered a large sample of images from consumers, fishermen, and fish market owners. Then, the images were sorted into different categories, which are front or behind the display box, single or group of fish, and different view angles. After distributing the images in each category, there were not enough images collected, and to gain more images for the dataset, the authors used translation, rotation, and flipping. After gathering the dataset, the images were annotated to be detected. Using the YOLO algorithm, the author then runs CNN to increase accuracy. The product resulted in an accuracy of 77%, and while this may not be as accurate as other studies, it was available from a mobile device and had a quick detection time, making it much more applicable in the real world.