**Research Assessment #5**

**Date:** February 20, 2023

**Subject:** A Review of Yolo Algorithm Developments

**MLA/APA citation:**

Jiang, P., Ergu, D., Liu, F., Cai, Y., &amp; Ma, B. (2022). A review of Yolo algorithm developments. Procedia Computer Science, 199, 1066–1073. https://doi.org/10.1016/j.procs.2022.01.135

**Assessment:**

In this article, the authors begin by introducing the YOLO algorithm and its key characteristics, such as its real-time performance and the fact that it treats object detection as a regression problem. They then go on to describe the various versions of the YOLO algorithm, starting with YOLO v1, which was first introduced in 2015. Although this article is not the most up-to-date, it is very difficult to find sources that are more recent than last year’s. Now, there are newer versions of YOLO other than the ones being talked about in this article, which was used in the Original Work. This article will still be useful in learning about the differences that different versions can have.

YOLO v1 uses a single neural network to simultaneously predict the bounding boxes and class probabilities for objects in an image. While it was fast and accurate, it had some limitations, such as difficulty in detecting small objects and objects that were close together. To address these limitations, subsequent versions of the YOLO algorithm introduced a range of improvements. For example, YOLO v2 introduced anchor boxes, which allowed the algorithm to handle objects of different sizes and aspect ratios more effectively. YOLO v3 introduced a feature pyramid network, which allowed the algorithm to detect objects at different scales more effectively. YOLO v4, which is the most recent version of the algorithm at the time of the article, introduced a range of improvements, including a focus on increasing the efficiency of the algorithm by using a CSPDarknet53 architecture.

The authors went into detail about each version of the YOLO algorithm and the improvements made in each iteration. They also compared the performance of YOLO with other popular object detection algorithms, such as Faster R-CNN and SSD. Knowing the strengths and weaknesses of different algorithms, it is easier to decide which algorithms to use in various situations.

The authors also discuss the use of data augmentation techniques to improve the robustness of the YOLO algorithm. Data augmentation is the process of generating new training data by applying various transformations, such as rotation, scaling, and translation, to the existing data. They describe how data augmentation can be used to improve the performance of the YOLO algorithm, especially when dealing with limited amounts of training data.

Overall, this paper provides a comprehensive overview of the evolution of the YOLO algorithm and its performance compared to other popular object detection algorithms. The article is a valuable resource for researchers and practitioners in the field of computer vision and deep learning. By characterizing the strengths and weaknesses and the features of each version, users will know what to expect and better understand what to do to make the best use of YOLO. Since YOLO is small-sized and has fast calculation, it is great for using it in real-time on live footage. With the improved versions to make YOLO more accurate and better detect even smaller-sized items, YOLO is an open-sourced algorithm that is great for most general use purposes.