1 Introduction

Computer Vision is a scientific field in computing in which they study how to make computers gain understanding regarding images and videos [1], often times using machine learning and artificial intelligence help. The aim for these researchs is to make computers able to automate task that has make use of human eye capability. Many companies and big firms alike have interest in doing and/or implementing these researchs, mostly those that dwells in social media platforms or data gathering services.

The research of computer vision have gotten far and by now there's already many research that can be considered implementable, with some of them are implemented into an open-source computer vision called "OpenCV". OpenCV is an "an open source computer vision and machine learning software library which was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products". [2] OpenCV has various implemented image/video related algorithms that can be used by everyone, since it is licensed as open-source software. Many researchs on computer vision field can be found inside OpenCV as implemented function algorithm. One of such researchs is called "YOLO", which stands for "You Only Look Once", which is a object recognition dataset that is made to be used with "Darknet", a convolutional network made by the same researcher that make YOLO. One other YOLO dataset, called "YOLO-LITE", is a version of YOLO dataset by different researcher which aims to be able to be used on lower end computers that isn't able to utilize GPU.

On the other hand, Arduino is a family of device that is stated as "open-source electronics platform based on easy-to-use hardware and software" [3] that makes use of microcontrollers and able to work with other devices such as sensors, cameras, computers, and many more using its pins for communications. On telematics field, Arduino is a well-known device that is often used as prototyping device for various projects, be it academical level or hobbyist level. Arduino make use of C++ for its codes with its own Arduino-specific libraries, and make use of a dedicated IDE that compiles the codes and uploads the program into the device using COM port from the computer.

1.1 Background

Object Recognition System is a field in which it deals with identifying and classifying objects based on the trained data of the system itself and has many potentials to use. The potential for this system to be used with telematics-based projects is plenty, and may provide more research material for the field when implemented. Arduino as a commonly used telematics device also provides some potential to be used with object recognition system field. The combination of both object recognition system and Arduino is very possible, and have probably been researched before. All that's left to do is to try and see if it's viable and applicable for an Arduino device to work alongside the said system. Also to not make it biased on one method, it would be good if two similarly performing methods can be tested when used alongside an Arduino device and see which one has the most applicable performance with the device.

1.2 Problem Identification

Object Recognition System, and Computer Vision algorithms in general, has its accuracy measured using *mean-average precision* (mAP) method, which was defined in PASCAL VOC 2012 Competition, thus the results are standardized. The other performance metrics, however, may vary between one device to another. More common metrics such as processing speed, average confidences across detected objects, and other metrics are not in mAP calculation. So based on that, the first mission is to test out the object recognition systems and see how it performs based on the more common metrics. The second mission is to test out if Arduino implementation of the system is possible or not, which will be based on how the Arduino system performs basic image processing task and if the addition of the object recognition system conflicts with the Arduino system or not.

1.3 Goals

The aim of this research is to compare the performance between YOLO-LITE and YOLOV3, two similarly performing object recognition method based on YOLO against each other as well as to try and implement them alongside telematics device such as Arduino.

1.4 Writing Organization

The next sections are organized as follows:

Literature Review	: includes related researchs and papers, which is may be referred in this paper.
System Arrangement	: the explanation of the system's structure that is used in the current experiment.
Evaluation	: includes the results and the analyzation of the experiment.
Conclusion	: the final analysis of the experiment and what can be derived from it.