

## Object Localization Using RGB-D Camera and YOLOv3

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**Abstract** – In recent years, there has been a proliferation of techniques focusing on obstacle recognition and distance estimation. These techniques use enhanced laser-based detection technologies ultrasonic sensors or RADAR fused with RGB sensor. In order to integrate low-cost solutions, real-time image recognition capabilities, and high efficiency. This research paper outlines an object detection and localization system that can be implemented on an AGV (Automated Guided Vehicle) to locate objects in image using RGB-D camera Kinect version 1 and deep learning algorithm. The color information is captured using a standard CMOS sensor and is used to provide high-quality color images of the environment and the depth sensor can capture depth information at a resolution of 640x480 pixels and a frame rate of 30 frames per second. YOLO uses a single CNN to output all the bounding boxes by extracting features from the full image and predicting all the boxes simultaneously for every class in a single image. YOLOv3 (You Only Look Once) algorithm is employed to find objects in the RGB image captured by the Kinect v1 and draw bounding box around the object showing the 2D coordinate of the object (X,Y), and the depth image is used to estimate the distance and position of the recognized objects. The results indicate the efficiency of using YOLOv3 alongside with the depth image to measure the coordinate (X, Y, Z) of the object and tested in real time.

*Keywords – YOLO v3; Kinect v1; AGV; RGB-D; Deep learning.*

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