**Project Title:** Object detection using Mask R-CNN on a custom dataset of tumbling satellite

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**Abstract:**

Object detection is one of the most important aspects in remote applications like space docking, uncooperative satellite locating, etc. Most of the technologies employ this task using various Machine Learning as well as Deep learning Models. The main criteria that differentiate these models are their performance, accuracy, and doing the prediction successfully. Some of the widely used models for Object detection are CNN-based, like ResNet, YOLO model, etc. Object detection plays a key role in locating satellite objects in images and thereby helping in the estimation of their relative pose. The main objective of this paper is to explore the Object detection operation using a Region-based based Convolutional Neural Network(R-CNN) model called Mask Region-based Convolutional Neural Network (Mask R-CNN) on a custom dataset. Our dataset consists of tumbling satellite images, captured using a 3-axis motion simulator. The detection result is then utilized by the SORT Object tracker to track the tumbling satellite in the video frames. Here we are exploiting the masked output from the model and then performing corner detection to trace them in continuous frames using SORT tracker.