

VERSATILE OBJECT DETECTION USING ML & OPENCV

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Modern technology depends on object detection due to its ability to enable automated identification of objects contained within images and video footages. The technology finds its applications across security monitoring and independent navigation systems and medical equipment detection and industrial systems tracking. This research study developed a detection system that utilizes OpenCV and TensaorFlow and Pytorch functionalities under the python programming environment. Real-time object detection capabilities that achieve high performance can be enabled through the implementation of pre-trained YOLO(You Only Look Once) and Faster R-CNN models. A detection system achieves better effectiveness by combining steps of dataset preparation with model training and hyperparameter tuning processes. Research teams evaluated their system performance through precision, recall and interface time measurement tests of available benchmark datasets. Research studies validate that detection system tools based on Python provide the ability to create scalable robust detection systems. The document analyzes traditional challenges pertaining to lighting adjustments and partial object blocking and also addresses identification of tiny objects and nearby objects. The research presents its detection enhancement conclusions about complex settings before exploring future healthcare system and environmental monitoring system applications.