Object Detection Using Machine Learning

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Abstract:

Efficient and accurate object detection has been a important topic in advancement of computer vision systems. With the advent of deep learning techniques, the cure for object detection has increased drastically. The project aims to incorporate state-of-the-art technique for object detection with the goal of achieving high accuracy with a real-time performance. A major challenge in many of the object detection systems is the dependency on other computer vision techniques for helping the deep learning based approach which leads to slow and non-optimal performance. In this project, we use a completely deep learning approach to solve the problem of object detection in an end-to-end fashion. The network is trained on the most challenging publicly available dataset on which a object detection challenge is conducted annually. The resulting system is fast and accurate those applications which require object detection. Experimental analyses are also provided to compare various methods and draw some meaningful conclusions. Finally, several promising directions and tasks are provided to serve as guidelines for future work in both object detection and relevant neural network based learning systems. Due to object detection’s close relationship with video analysis and image understanding, it has attracted much research attention in recent years. Traditional object detection methods are built on handcrafted features and shallow trainable architectures. Their performance easily stagnates by constructing complex ensembles which combine multiple low-level image features with high-level context from object detectors and scene classifiers. With the rapid development in deep learning, more powerful tools, which are able to learn semantic, high-level, deeper features, are introduced to address the problems existing in traditional architectures.

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