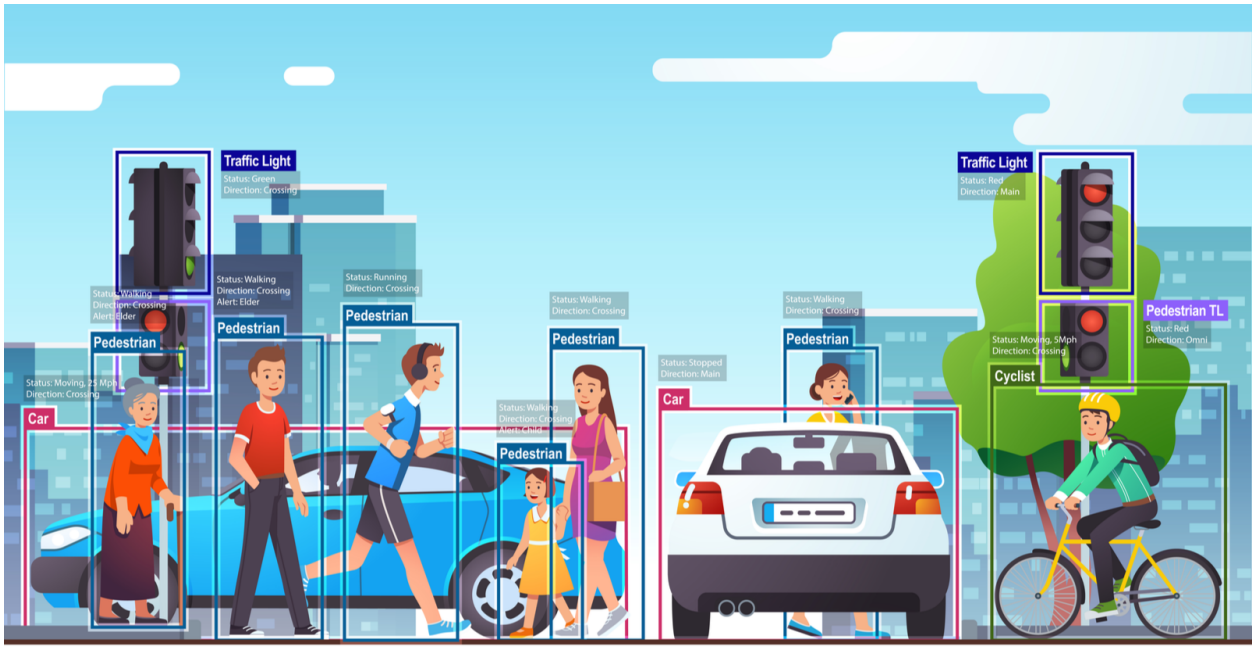
Computer Vision REPORT



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Space Management

INTRODUCTION

Computer vision will be required to obtain the goal of this project. This section of the report will be designated to tools and information that could provide assistance in the data preparation, image classification, and object detection of the project.

DATA PREPARATION

A training dataset is the machine learning tools' study guide to maximize performance in the image classification or object detection process. The tool is shown sample images and labels during the training process so that it can later classify images or detect objects. For object detection there are several ways to prepare and label a dataset for training. Below are two of the most popular methods for formatting the dataset.

METHODS

1. Pascal VOC
2. Microsoft COCO

RESOURCES

1. Object Detection Training - Preparing your custom dataset
    a. Describes the process of preparing dataset using Pascal VOC format
2. Google Cloud - Preparing your training data
    a. Provides a detailed guide on how to prepare training data for AutoML Vision, a Google based software for training machine learning models
        i. Prior to reading this article, our team was unsure of the quality that images should possess for the training dataset. The section under training image characteristics states, "The training data should be as close as possible to the data on which predictions are to be made. For example, if your use case involves blurry and low-resolution images (such as from a security camera), your training data should be composed of blurry, low-resolution images."

DATA PREPARATION TOOLS

Open source software:

FIFTYONE is a software tool used for building high-quality datasets and computer vision models. Some of its main features include: curating datasets, visualizing complex annotations, evaluating models, working with geolocation, removing redundant images, and finding annotation errors. FIFTYONE is also easily integrated with popular coding

tools such as PyTorch, Jupyter, TensorFlow, and Google Colab.

Non-open source software:

IBM Spectrum Conductor Deep Learning Impact is subscription based tool for building a dataset for object detection.

DATA PROCESSING

A potentially useful tool for processing the data is the cvlib Python library.

Why use it?

- Simple high level computer vision library in Python
- Created with the intention of simple and fast experimentation
- Library development was inspired by Keras (deep learning library)

Features?

- Count the number of objects in an image.
    - For example, it can count the number of doors or windows on a building / house. This door and window count could help the machine learning program determine the number of floors and rooms
    - For more information on how to count objects in an image see the clever programmer
- Object detection

How to install?

1. Install OpenCV & Tensor-flow
    a. Use the pip commands:
        i. pip install opencv-python tensor-flow
        ii. pip install cvlib
    b. For more information visit https://www.cvlib.net/