

Capstone project proposal

Inventory Monitoring at Distribution Centers

Domain Background

Distribution centers often use robots to move objects as a part of their operations. Objects are carried in bins which can contain multiple objects. In this project, I will build a model that can count the number of objects in each bin. A system like this can be used to track inventory and make sure that delivery consignments have the correct number of items.

Problem Statement

Create a solution for counting number of objects in each bin base on a photo of the bin's content.

The datasets and inputs

To complete this project we will be using the Amazon Bin Image Dataset. The dataset contains 500,000 images of bins containing one or more objects. For each image there is a metadata file containing information about the image like the number of objects, it's dimension and the type of object. For this task, we will try to classify the number of objects in each bin.

A solution statement

Use pretrained image classification network to determine number of objects

A benchmark model

As a baseline model I would like to use resnet50 image classification network

Evaluation Metrics

For evaluation the Cross Entropy Loss function will be used

An outline of the project design

The project will be created in AWS domain using Sagemaker notebooks with some options to limit costs of future development and network training.

Main steps to follow in the project consist of:

- fetching data from a database,
- preprocess it and upload the data to S3 container
- tune hyperparameters of the model
- train a machine learning model and observe if there are no anomalies in training.

This project will serve as a demonstration of end-to-end machine learning engineering skills covered in this nanodegree.