Amazon Bin Image Dataset

Definition

Project Overview

Amazon Fulfillment Centers use robotic and computer vision technology to deliver millions of goods to customers in over 100 countries around the world. The Amazon Bin Image Dataset comprises photos and metadata from bins in an Amazon Fulfillment Center that is currently operational. The bin photos in this dataset were collected while robot units were transporting pods as part of typical Amazon Fulfillment Center operations.

Problem Statement

Each picture has a metadata file that contains information about the image such as the number of objects, the dimensions, and the kind of item. We will attempt to categorize the number of items in each bucket for this challenge. We will use a model to accomplish the categorization. We can utilize a pre-trained convolutional neural network or our own neural network design, and SageMaker to train our model.

Metrics

The Evaluating Metrics I used for this project are the accuracy and the RMSE and compared them to another project accuracy and RMSE.

Analysis

Data Exploration

The Amazon Bin Image Dataset comprises over 500,000 photos and metadata from bins in an Amazon Fulfillment Center that is currently operational. The bin photos in this dataset were collected while robot units were transporting pods as part of typical Amazon Fulfillment Center operations.

Exploratory Visualization

I have split the data into train, test and split. Also splited the pictures according to the number of the objects in it

Algorithms and Techniques

I made a Deep Learning model that would assist in counting the items in each image by utilizing a pre-trained model like Resnet. This model, which is pretrained and can be tweaked to categorize photos from various use cases, is commonly used for image classification. Several training tasks will be run in AWS SageMaker notebook to adjust this pretrained model to our use case.

Benchmark

I will compare my results with this person, he is using the same data set and he got 55.67 accuracy
https://github.com/silverbottlep/abid_challenge

Methodology

Data Preprocessing

I have first downloaded the dataset and then put the photos and metadata in the same directory. It is a simple classification network for counting tasks. The image will be classified as one of the categories by the deep CNN (0-5). It is trained using the resnet 50 layer architecture.

Implementation & Refinement

Firstly I downloaded the data and then I uploaded it to the s3 bucket. Then I made an estimator for training. After that I made a training job and got the hyperparameter tuning values. Then I made another training job with the new hyperparameters.

Results

Model Evaluation and Validation & Justificatiion

I have made hyperparameter tuning and it gave better results at the end. There are multiple more ways to get better results like using bigger fine tuning data sets (I used RESNET 50). And also after deploying the model it can be accessed and utilized across several amazon web services like lambda and others.