# Capstone Project

Machine Learning Engineer Nanodegree

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# PROJECT DEFINITION

## Project Overview

Distribution centers often use robots to move objects as a part of their operations. Objects are carried in bins which can contain multiple objects. The goal of this project is to 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. The goal will be accomplish using the ***Amazon Bin Image Dataset.*** This 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 type of object. The task here is to classify the number of objects in each bin.

## Problem Statement

The goal is to create a system that is powered by a machine learning model to enable the counting of the number of objects in each bin during operations. This will be accomplished with the following tasks:

* Download and Preprocess the Amazon Bin Image Dataset
* Train a classifier model to classify the number of objects in each bin.
* Deploy the model to SageMaker endpoint and query it with an image to get a prediction.

## Metrics

### *Accuracy*

Accuracy is the conventional method of evaluating classification models. Accuracy is defined as the proportion of correctly classified examples over the whole set of examples. (Anon, 2021). It is also very easy to interpret.

### *F1 Score*

This metric is the harmonic mean of precision and recall. It balances precision and recall and is a useful metric when both false positives and false negative are equally important, which is the case for this classification problem.

# ANALYSIS

ASDD