Capstone Project Proposal
By
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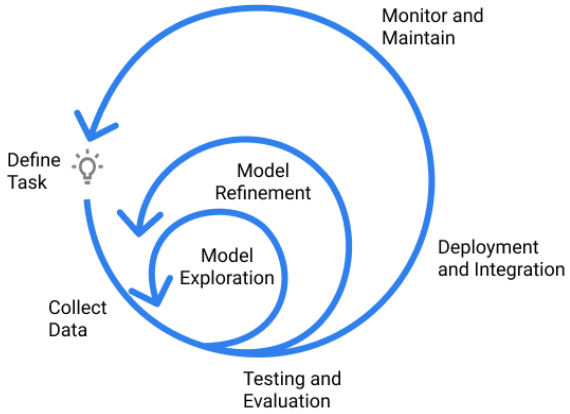
Domain Background

Online fashion market is a constantly growing sector, and an algorithm capable of identifying different clothes can help companies(small, medium and large) in the clothing sales sector to understand the profile of potential customers and focus on sales targeting specific trends, as well as the taste of their customers and to also improve user experience. In this capstone project, I used the Fashion-MNIST(fashion modified national institute of technology) dataset. The fashion-MNIST dataset is made to help researchers find models to classify products such as clothes and in this project I used the Fashion-MNIST for image classification to create an efficient model with convolutional neural network. The aim of this capstone project, is basically to master the use of image classification models using aws sagemaker resources with pytorch to perform a computer vision task.

Problem statement

I work as a data annotator and one of my tasks is to manually label clothes into their different categories using an online data annotation platform. I believe Computer vision can replicate and automate tasks that the human visual system can do thereby solving the problem of clothing image classification. With the help of a convolutional neural network(CNN) I will build a model to sort clothes into 10 different categories. I will load the data set into s3 and perform training on the preprocessed data sets. The diagram below gives a general idea of the lifecycle of this project



Source: https://www.jeremyjordan.me/ml-projects-guide/#data

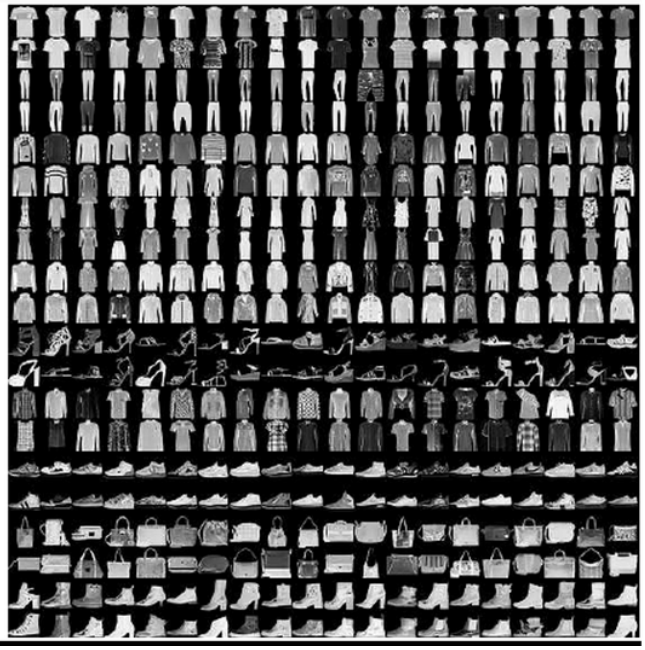
Label	Description	Examples
0	T-Shirt/Top	
1	Trouser	
2	Pullover	
3	Dress	
4	Coat	
5	Sandals	
6	Shirt	
7	Sneaker	
8	Bag	
9	Ankle boots	

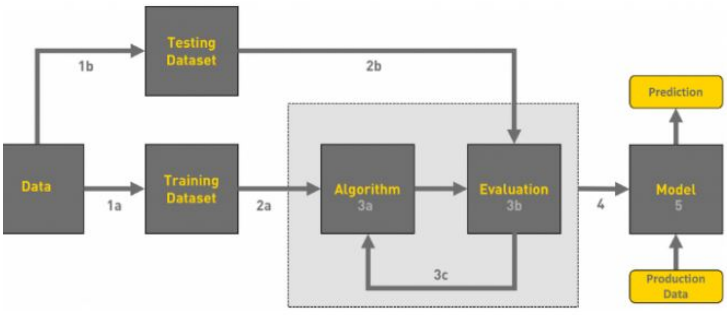
Image gotten from google

Datasets and inputs

The dataset that would be used for this project is the MNIST dataset, made publicly available. It consists of about 60000 images grouped in 10 classes of fashion wear. This dataset contains grey scale images of sizes 28 by 28. For easy usage and processing, I will split the data into train, valid and test folders, containing subfolders subsequently. In training the model, I will use inputs such as pre-trained models (ResNet18, VGG-16 whichever gives the best performance) to perform training and evaluation as well. After preparing the data, I will upload it to AWS S3 where training was carried out with pyTorch

Solution statement

The proposed solution is to create a deep learning model that is able to accurately identify different clothing categories with a high percentage accuracy by using amazon sagemaker. To finish this project, i will have to perform the following tasks:
Upload Training Data: First I will have to upload the training data to an S3 bucket.
Model Training Script: Once I am done, I will have to write a script to train a model on that dataset.
Train in SageMaker: Finally, i will use SageMaker to run that training script and train your model
The different to be taken to achieve this solution is as follows:



Overview of the Workflow of ML

Benchmark model

As I work on solving this problem, the benchmark I will try to beat is the model accuracy of 90 percent. This target should be achievable with pre-processing of train dataset and proper hyperparameter tuning and other feature engineering that could be discovered during the project

Evaluation metrics

The approach to evaluate the performance of this project is by getting its accuracy with the confusion matrix. The confusion matrix has 4 categories: true positives, true negatives, false positives, and false negatives which is used to determine the efficiency of the model. My aim is to achieve a high accuracy after completing this project.

Project design

The workflow to approach the solution is as follows: With the right exploratory data analysis, I will explore the data to understand, prepare and clean up the data (if necessary), making it easy to train the model. Since it is an unbalanced dataset, pre-processing techniques such as data augmentation would be done thereby enhancing the model's performance to obtain the desired solution. After specifying the sagemaker environment, I will commence training the model with a RESNet18 and a python script as entry point, creating a pytorch estimator, setting hyperparameters(the learning rate and batch size) before calling model.fit(). Sagemaker debugging and profiling will also be done on the model. The model will be finally deployed to an endpoint.

Reference

- Alisson Steffens Henrique, et al. Classifying Garments from Fashion-MNIST Dataset Through CNNs http://www.astesj.com/
- Han Xiao, et al. Fashion-MNIST: a Novel Image Dataset forBenchmarking Machine Learning Algorithms https://www.researchgate.net/publication/319312259_Fashion-MNIST_a_Novel_Image_Dataset_for_Benchmarking_Machine_Learning_Algorithms
- https://towardsdatascience.com/how-to-train-an-image-classifier-in-pytorch-and-use-it-to-perform-basic-inference-on-single-images-99465a1e9bf5