Conquering Fashion MNIST with CNNs using Computer Vision

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Abstract

This project presents a method to conquer the fahion_MNIST dataset. We are making use of various CNN models (lenet, resnet18) and apply intel optimization to improve the efficiency of the code (open vino and intel extension for pytorch)

Introduction

- The MNIST dataset is a used as a basic criteria dataset for observing the performance of various ml models

- We are going to use the fashion MNIST dataset to measure the performance and accuracy of our models(lenet and resnet18)

Motivation behind the problem:

- The motivation is based on the challenge to accurately classify the fashion items accurately according to its labels. This can help in easy maintaining of order and management of various types of wearables.

Background:

- Knowledge on python, sklearn, matplotlib.pyplot

Our Approach:

- We have developed lenet and resnet18 models using cross entropy loss and adam optimizer to update the parameters and then we have used openvino for lenet and ipex for resnet18

Results(best model after 25 epochs):

models	Train accuracy	Val accuracy	Test accuracy	Train loss	Val loss
Lenet	98.99	93.07	92.57	0.03	0.21
resnet18	98.74	91.71	91.95	0.04	0.27

References:

https://www.youtube.com/watch?v=Y1qxI-Df4Lk&t=1092s

https://towardsdatascience.com/a-simple-2d-cnn-for-mnist-digit-recognition-a998dbc1e79a

Link to solution:

github link

model link