

CONQUERING FASHION MNIST WITH CNNs USING COMPUTER VISION



TensorFlow

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OpenVINO™

Abstract:

The Fashion MNIST dataset consists of 60,000 grayscale images belonging to 10 different fashion categories, with an additional 10,000 images for testing. Our proposed methodology leverages the power of CNNs, a class of deep learning models known for their ability to capture spatial hierarchies in images.

Introduction:

Fashion MNIST is a dataset that serves as a drop-in replacement for the traditional handwritten digit recognition task of the MNIST dataset. In recent years, Convolutional Neural Networks (CNNs) have emerged as a powerful technique for image classification tasks. The Fashion MNIST dataset has emerged as a popular benchmark for evaluating image classification algorithms, specifically in the domain of fashion recognition.

Why:

Conquering the Fashion MNIST dataset using CNNs is a significant task with real-world relevance. As fashion recognition has numerous practical applications, accurately classifying clothing items is essential for e-commerce, fashion industry, and visual search systems. Moreover, the Fashion MNIST dataset presents a challenging problem due to the similarity of clothing categories, demanding robust and discriminative features from the model. Leveraging the proven effectiveness of CNNs in computer vision tasks, our approach capitalizes on the advancements in deep learning to achieve state-of-the-art performance in fashion item classification.

Prior Work:

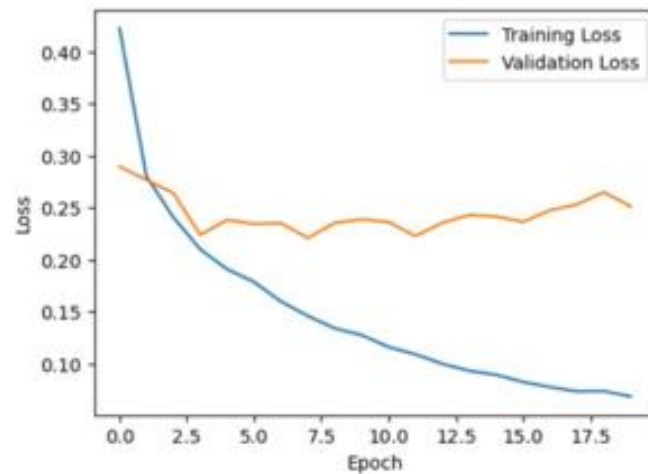
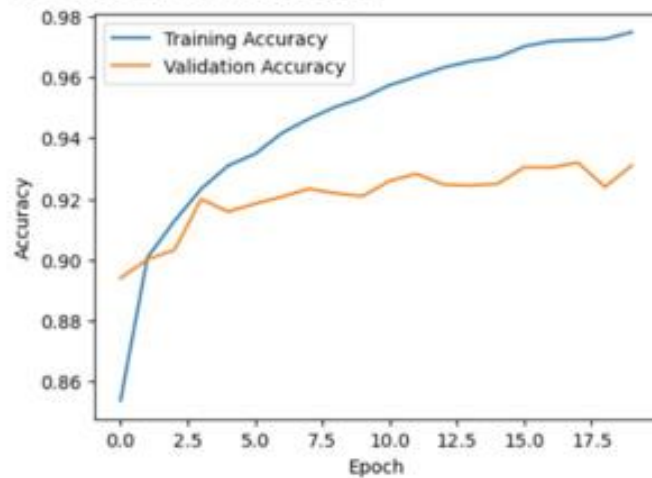
Previous studies have extensively explored the application of Convolutional Neural Networks (CNNs) in computer vision tasks. These works have demonstrated the effectiveness of CNNs in tasks such as image classification, object recognition, and semantic segmentation. Researchers have employed various CNN architectures with different layers, activations, and optimization techniques to achieve state-of-the-art performance. Our work builds upon this prior research to develop a CNN model for the FashionMNIST dataset, aiming to classify clothing items into ten categories with high accuracy.

Our Approach:

In this study, we propose our own CNN model specifically designed for the FashionMNIST dataset. Unlike using pre-trained models, we developed our architecture from scratch to ensure it aligns with the unique characteristics of the dataset. Through training and evaluation, we aim to achieve high accuracy in classifying fashion items into ten distinct categories.

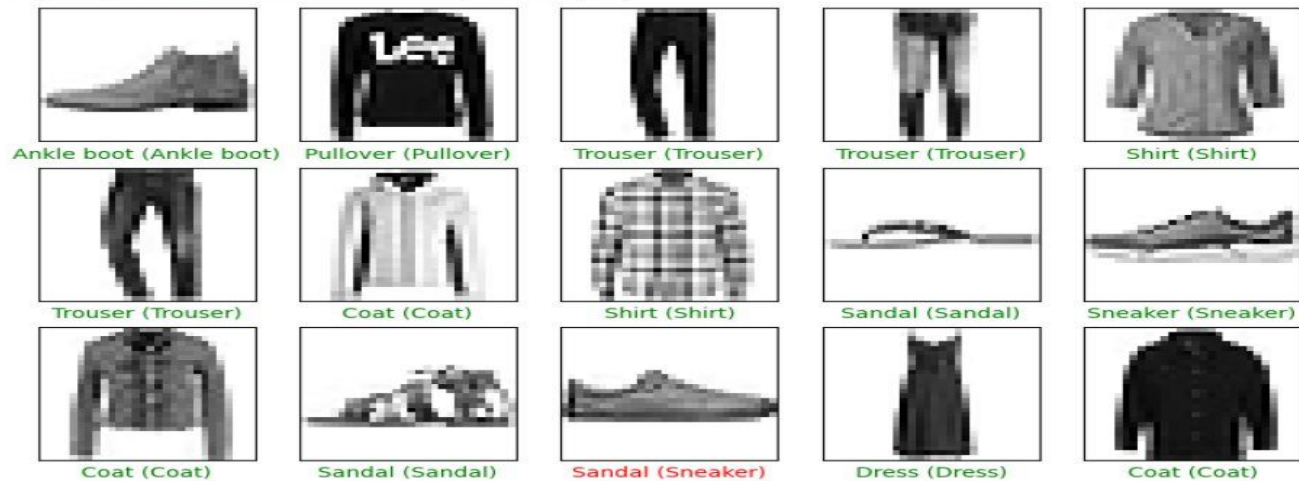
Result:

Training result:



Test Results:

313/313 [-----] - 2s 6ms/step



Test Accuracy:

313/313 - 2s - loss: 0.2513 - accuracy: 0.9311 - 2s/epoch - 5ms/step

Test accuracy: 93.11000108718872

◉ Reference:

- Google
- Youtube : <https://www.youtube.com/watch?v=kY9nZbX1DWM&list=PLg-UKERBljNxdIQir1wrirZJ50yTp4eHv>
- Books : Make Your own neural network, Deep learning from Scratch

◉ Link to solution:

Github :

https://github.com/AntonyNishio/TechWizards_KarunyaInstituteofTechnologyandScience_ConqueringFashionMNISTwithCNNsUsingComputerVision.git