INFO-6146 project proposal

Image classification of fashion items using CNNs in pyTorch

Project description:

This initiative employs a convolutional neural network (CNN) to categorize grayscale images of clothing products utilizing the Fashion-MNIST dataset. Fashion-MNIST serves as a contemporary substitute for MNIST, featuring 70,000 grayscale images of size 28×28 across 10 categories including shirts, pants, sneakers, and bags.

The objective is to create a deep learning pipeline that preprocesses the data, constructs and trains a CNN, fine-tunes hyperparameters, and assesses the model using various performance metrics. The ultimate model needs to perform effectively on unfamiliar test data and offer clear insights through visual representations of incorrectly classified examples.

Why I chose this project:

- It is simple, standardized and used widely in deep learning community
- Dataset size is manageable
- Reflects real world applications

Implementation plan:

1) Data preprocessing
2) Model development
3) Training
4) Tuining
5) Evaluation

Dataset:

- torchvision.datasets.FasionMNIST
- 60,000 trainnig images and 10,000 test images
- 10 balanced classes

Evaluation plan:

Quantitative: accuracy, F1-score, precision, recall

Qualitative: visualization of learning curves and misclassified samples