Project Proposal: Fashion MNIST RGB Image Classification using CNN

# 1. Project Title

Fashion MNIST RGB Classifier using Convolutional Neural Networks (CNNs)

# 2. Introduction

Fashion MNIST is a benchmark dataset for image classification tasks involving fashion items. This project aims to enhance the model's complexity by converting grayscale images to RGB format and training a Convolutional Neural Network (CNN) to classify them accurately.

# 3. Problem Statement

While the Fashion MNIST dataset is widely used for benchmarking, its grayscale format does not reflect real-world data, which is usually in RGB. This project addresses this limitation by converting images to RGB and training a model to adapt accordingly.

# 4. Objectives

- Convert grayscale images in Fashion MNIST to RGB

- Build a CNN model to classify images

- Evaluate model accuracy and performance

- Implement a prediction script for inference

- Save the model and class mappings for reuse

# 5. Methodology

1. Data Preprocessing: Convert grayscale images to RGB by duplicating channels.

2. Model Architecture: Use Conv2D, MaxPooling, and Dense layers to build the CNN.

3. Training: Train the model using Keras and evaluate its performance.

4. Inference: Develop a Python script to load the model and predict class labels.

5. Packaging: Save model and class labels for external use.

# 6. Expected Outcomes

- A trained CNN model capable of classifying RGB fashion images

- A working inference script

- Evaluation results showing accuracy and performance

- A documented project with training notebook and README

# 7. Tools and Technologies

- Python 3.7+

- TensorFlow/Keras

- NumPy

- Matplotlib

- Jupyter Notebook

- Pickle

# 8. Conclusion

This project demonstrates how to transition a classic grayscale image classification task to RGB, which is more aligned with practical applications. It showcases end-to-end machine learning workflow from data preprocessing to model deployment.