Fake Logo Detection System using OpenCV and AI

1. Introduction

Counterfeit branding is a major issue in the fashion and retail industry. This project aims to build an AI-powered system capable of detecting fake vs real logos using YOLOv8, a state-of-the-art object detection model, combined with OpenCV for image preprocessing.

2. Objective

To develop a deep learning-based system that can:

- Detect brand logos in images
- Classify them as Real or Fake
- Work efficiently in real-time scenarios

3. Tools & Technologies

- YOLOv8 (Ultralytics)
- OpenCV
- Google Colab
- Python
- Google Drive (Storage)

4. Dataset

- Classes: Adidas, Adidas_Fake, Nike, Nike_Fake, Puma
- Train/Validation/Test split was maintained for model evaluation
- Format: YOLOv8 annotation format

5. Methodology

1. **Dataset Preparation:**
    - Created a Dataset
    - Uploaded to Google Drive
    - Structured into train, valid, and test folders
2. **Training:**
    - Used yolov8n.pt for initial training
    - Trained using Ultralytics library in Colab
    - 30 epochs, image size: 640x640
3. **Testing:**
    - Ran predictions on 11 test images
    - Detections were saved in /runs/detect/train
4. **Evaluation:**
    - Detected multiple logos correctly
    - Confident results for Nike and Adidas logos

6. Conclusion

This project demonstrates how computer vision and deep learning can be effectively used for fake logo detection. With further tuning and a larger dataset, this model can be deployed in real-world scenarios like quality control or e-commerce verification.

7. Future Work

- Add more brand classes
- Train on larger, more diverse datasets
- Build a Streamlit UI or mobile app for on-the-go logo verification
- Integrate OCR to read embedded text on logos