Internship Assignment: AI/ML-Based Image Search Feature

Position: Engineering Intern (AI/ML)
Duration: 7 Days
Submission: GitHub

Objective

Develop an **AI/ML-powered image search feature** that allows users to upload an image and retrieve visually similar images from a dataset. The solution should leverage machine learning models for feature extraction and similarity matching.

Key Tasks

1. **Dataset Acquisition**
    - Download a suitable image dataset from **Kaggle** (e.g., Fashion-MNIST, CIFAR-10, or any relevant dataset).
    - Preprocess the dataset (resize, normalize, augment if needed).
2. **Feature Extraction with AI/ML**
    - Use a **pre-trained CNN model** (e.g., ResNet, VGG, or MobileNet) to extract image embeddings.
    - Implement a feature vector database (can use **FAISS, Annoy, or Scikit-learn's Nearest Neighbors** for efficient search).
3. **Similarity Search Implementation**
    - Build a function that takes an input image and returns the top **N most similar images** from the dataset.
    - Use **cosine similarity or Euclidean distance** for matching.
4. **User Interface (Optional but Recommended)**
    - Develop a simple **Flask/FastAPI** backend to upload images and display results.
    - (Bonus) Create a basic **Streamlit/React frontend** for interaction.

5. **Optimization & Evaluation**
    - Measure search accuracy (e.g., Precision@K).
    - Optimize for speed (reduce search latency).

Deliverables (Submit via GitHub)

GitHub Repository with:

- Well-documented code (README.md with setup instructions).
- Jupyter Notebook / Python script for model training & testing.
- Backend API code (if applicable).
- Sample test images & output examples.

Tech Stack Suggestions

- **Languages:** Python
- **Libraries:** TensorFlow/PyTorch, OpenCV, Scikit-learn, FAISS/Annoy
- **Backend (Optional):** Flask/FastAPI
- **Version Control:** Git/GitHub

Evaluation Criteria

✓ **Functionality** (Does the search work accurately?)
✓ **Code Quality** (Clean, modular, well-documented)
✓ **Performance** (Speed vs. accuracy trade-offs)
✓ **Innovation** (Any extra features like filters, UI improvements)

Submission Deadline: A week from Today.

Note

Feel free to use any libraries or frameworks you find suitable for the image processing and recognition and UI development. The goal is to create a functional and well-documented application that meets the specified requirements.

Good Luck! Let's build something awesome!