

Visual Product Matcher — Assignment Documentation

Project Overview

Visual Product Matcher is a full-stack application that allows users to upload an image and find visually similar products from a dataset using a deep learning model.

The system is built with:

- **Frontend:** React + Vite + TailwindCSS
- **Backend:** FastAPI (Python) with TensorFlow (MobileNetV2)
- **Database:** MongoDB Atlas
- **Deployment:** Render (Backend) + Vercel (Frontend)

Objective

To create an AI-powered image similarity application where users can:

- Upload product images
- Automatically extract embeddings using MobileNetV2
- Retrieve visually similar images based on computed embeddings
- Use secure authentication (Signup/Login) with JWT

Technologies Used

Layer	Tools & Frameworks
Frontend	React.js, Vite, TailwindCSS, Axios, Framer Motion, React Hot Toast
Backend	FastAPI, TensorFlow (MobileNetV2), Pydantic, JWT, Cloudinary
Database	MongoDB Atlas
Deployment	Render (Backend) + Vercel (Frontend)
Version Control	GitHub

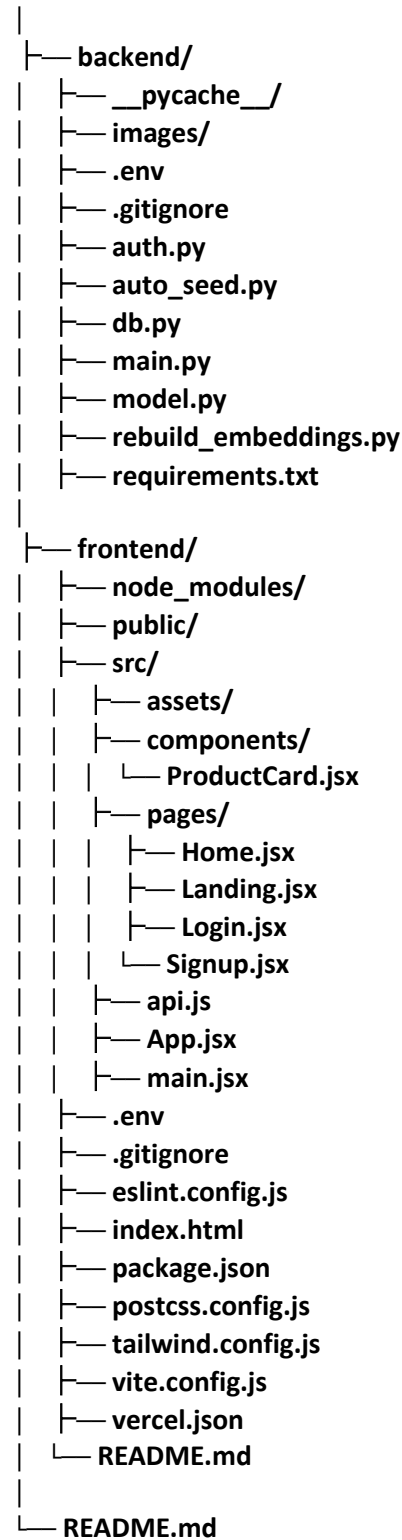
Project Architecture

Workflow:

1. User logs in via the frontend (React)
2. Frontend communicates with the FastAPI backend via REST APIs
3. Images are uploaded to Cloudinary
4. The backend uses MobileNetV2 to extract embeddings
5. MongoDB stores image metadata and user details
6. The backend returns visually similar products to the frontend

Project Architecture

visual-product-matcher/



Backend Deployment

Platform: Render

URL:

<https://visual-products-matcher.onrender.com/>

API Docs:

<https://visual-products-matcher.onrender.com/docs>

Command:

```
uvicorn main:app --host 0.0.0.0 --port ${port}
```

Frontend Deployment

Platform: Vercel

URL:

<https://visuals-product-matcher.vercel.app/>

Build Command:

```
npm run build
```

Output Directory: dist

Environment Variable:

```
VITE_API_BASE_URL=https://visual-product-matcher-backend-33ks.onrender.com
```

Environmental Variables

Backend .env

```
MONGO_URI=your_mongo_uri
JWT_SECRET=your_jwt_secret
CLOUDINARY_URL=your_cloudinary_api_url
```

Frontend .env

```
VITE_API_BASE_URL=https://visual-products-matcher.onrender.com/
```

Features

- ✓ User Authentication (JWT)
- ✓ Image Upload via Cloudinary
- ✓ Deep Learning-based Image Matching
- ✓ Responsive UI with TailwindCSS
- ✓ Toast Notifications and Animations
- ✓ Fully Deployed (Vercel + Render)

Testing & Validation

- Verified /auth/signup and /auth/login endpoints using Postman.
- Confirmed backend availability via /docs.
- Checked frontend API integration with correct .env variables.
- Tested end-to-end image upload and retrieval process.

Conclusion

The **Visual Product Matcher** successfully integrates AI-powered visual similarity detection with a modern web interface.

It demonstrates the ability to deploy and integrate **FastAPI, MongoDB, and React** into a cohesive, production-grade application.

Submission Details

Item	Description
GitHub Repo Link	https://github.com/Satyam216/visuals-product-matcher
Branch	main
Deployment Links	Backend (Render), Frontend (Vercel)
Excluded Files	node_modules/, .env, dist/, .vscode/
Project Size	Within GitHub limits