

Chapter 0: Introduction to Web APIs & FastAPI

Chapter 0: Introduction to Web APIs & FastAPI Ecosystem

Learn what APIs are, how Web APIs work, where FastAPI fits in, and how it connects to ML/DL/CV/LLMs. Set up your environment.

Chapter 1: Python Web Server with FastAPI

Build your first FastAPI server, understand routing, HTTP methods (GET/POST), async vs sync, and serve simple JSON responses.

Chapter 2: Request & Response Handling

Learn about query params, request bodies, headers, status codes, and custom responses. Validate data using Pydantic.

Chapter 3: Building ML/DL APIs with FastAPI

Integrate your ML or DL models with FastAPI. Load models, receive input, return predictions. Project: Image Classification API.

Chapter 4: File Uploads, Image Processing & OpenCV Integration

Learn how to upload images/files through API and process them using OpenCV or PIL. Project: Face Detection API.

Chapter 5: Authentication & Authorization

Use OAuth2, JWT tokens, and security schemes in FastAPI. Secure routes. Project: Login/Register API for ML Dashboard.

Chapter 6: Dependency Injection & Middleware

Use dependency injection to manage reusable logic (like DB connection, auth checks). Learn middleware to modify requests/responses.

Chapter 7: Dockerizing FastAPI Applications

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Learn Docker basics. Create Dockerfiles to containerize your ML/DL/CV APIs. Project: Dockerized Object Detection API.

Chapter 8: CI/CD with GitHub Actions + FastAPI

Set up CI/CD pipelines for your FastAPI apps. Automatically test, build, and deploy APIs when you push code.

Chapter 9: Streaming & Real-time Inference APIs

Use WebSockets, Server-Sent Events (SSE), and async generators for real-time inference. Project: Live Video Object Tracking.

Chapter 10: Integrating LLMs & Chat APIs (Open Source + OpenAI)

Use models like LLaMA, Mistral, OpenAI to build chat, Q&A, and summarization APIs. Project: Medical QA LLM API.

Chapter 11: FastAPI + Frontend Integration

Connect FastAPI backend with React/HTML templates. Project: Image Captioning Web App.

Chapter 12: Production Setup (Gunicorn + Nginx + HTTPS)

Deploy your FastAPI apps using Gunicorn, Uvicorn, and Nginx. Enable HTTPS, static files, and high-performance settings.

Chapter 13: Monitoring, Logging, and Error Handling

Integrate logging, Prometheus, and Grafana. Add global error handling and alerts for failed ML predictions or crashes.

Chapter 14: Capstone Project: ML/DL/CV/LLM API System

Build a full-stack, production-ready API system with ML model + FastAPI + Docker + CI/CD + LLM integration.