Deploy ML Models Using FastAPI

What does Machine Learning model deployment mean to you?

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Why do we need to think differently about Machine Learning model deployment?

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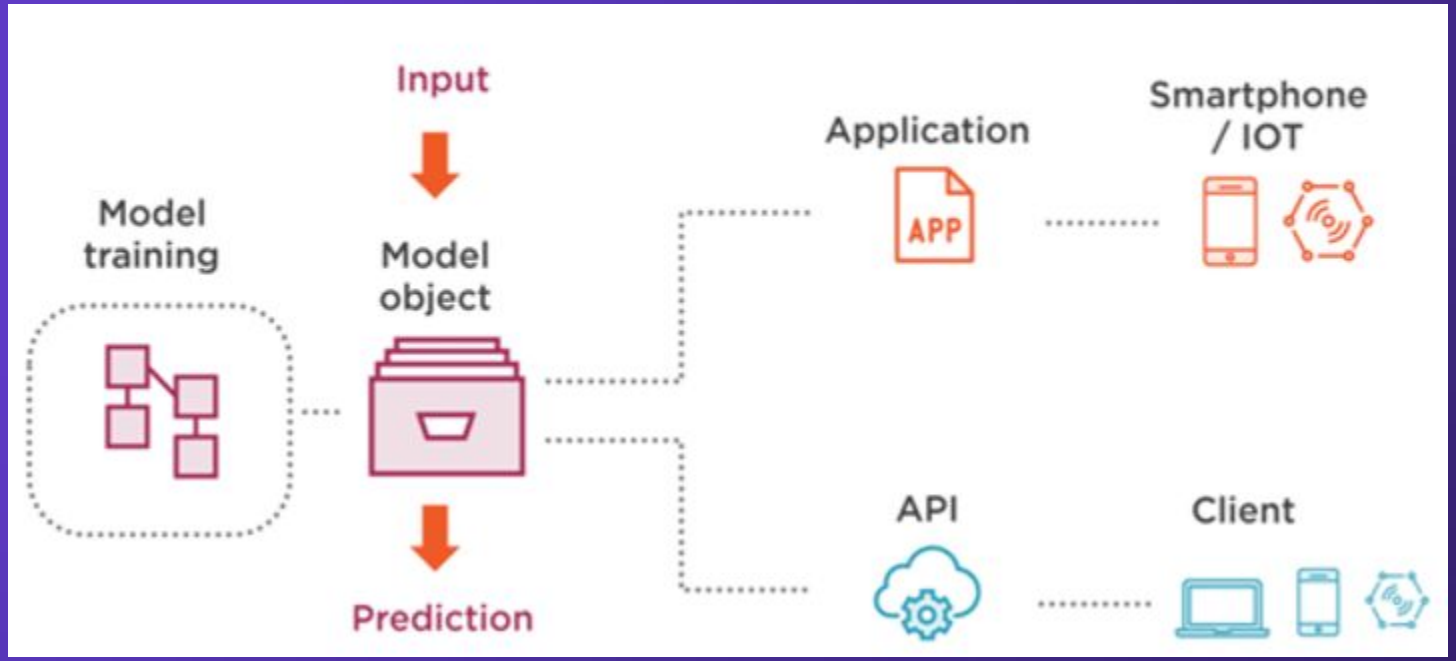
Deploying Deep Learning Models



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Introduction to FastAPI

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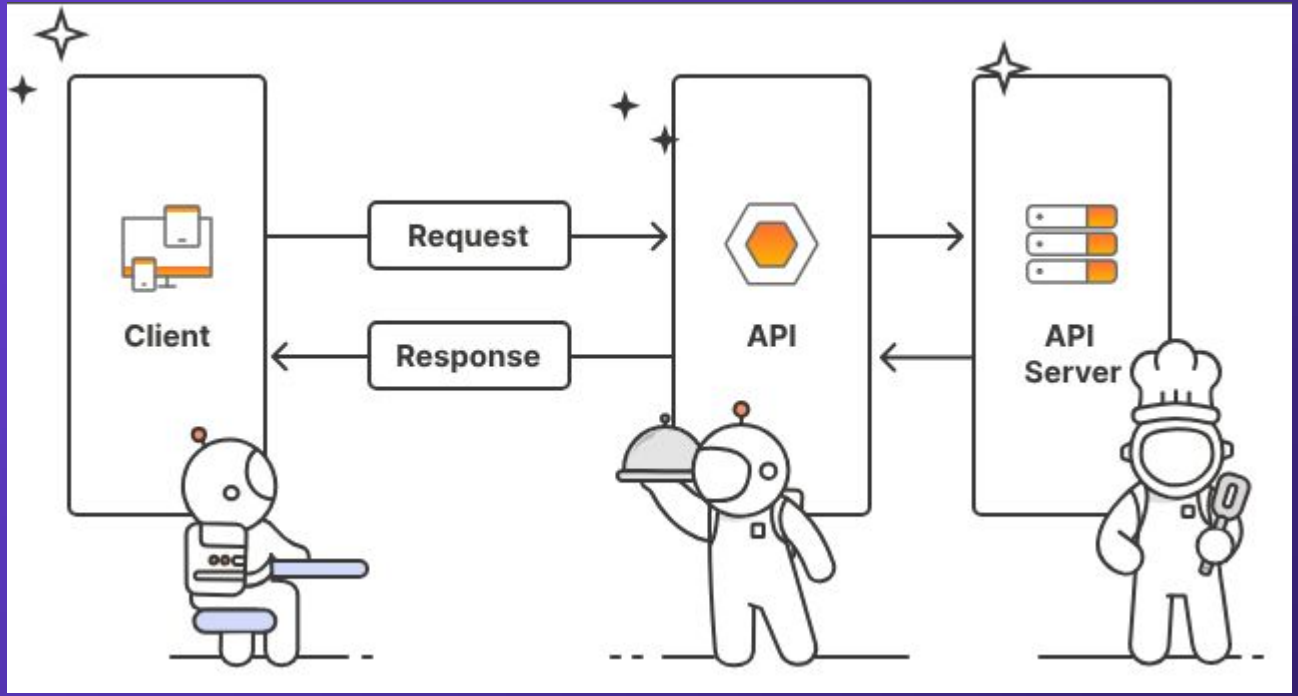
What is an API?



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Introduction to FastAPI

- A modern Python web framework designed explicitly for building high-performance RESTful APIs

- Why FastAPI for ML deployment?
  - Performance
  - Data Validation
  - Documentation

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Hands-on activity

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Introduction to Docker

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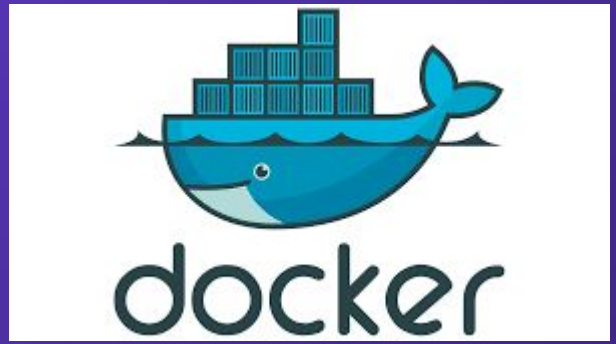
What is Docker?

- Docker is a platform for developing, shipping, and running applications / projects as containers

- By using containers, Docker allows you to package up an application with all parts it needs, such as libraries and other dependencies, and ship it all out as one package



https://docs.docker.com/get-started/

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Understanding Containers

- Containers package the ML project's code, libraries, and settings into a single unit
- Containers share the underlying operating system, making them lightweight and efficient
- Containers ensure your project runs the same exact way on any machine

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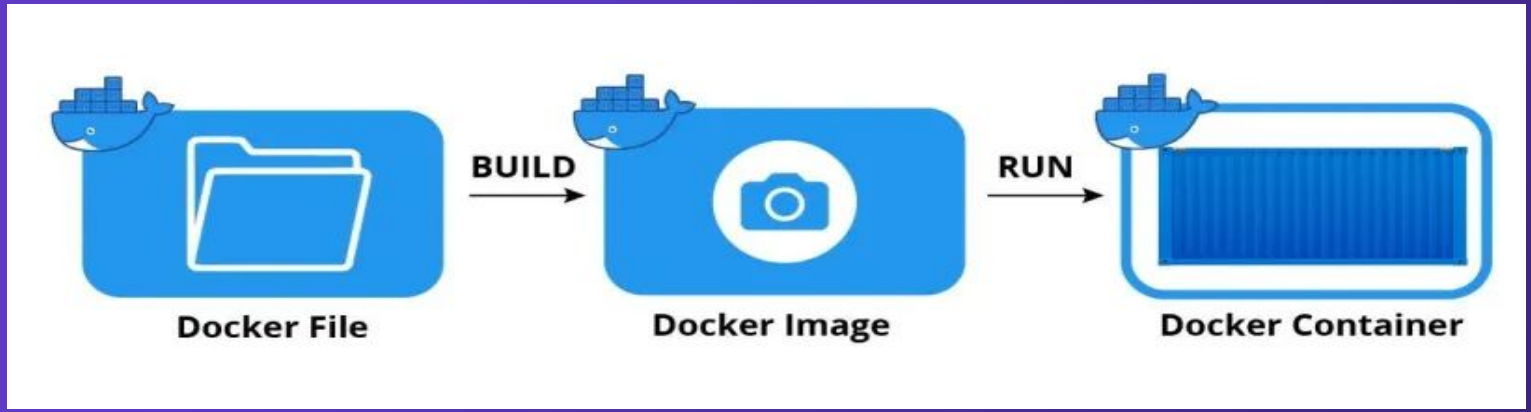
Problems Docker Solves

- "Works on My Machine" syndrome
- Dependency conflicts
- Hardware incompatibility
- Deployment roadblocks

Docker Workflow



Dockerfile:

A recipe file with instructions to build a Docker image, like a blueprint for your container's setup.

Docker Image:

A self-contained package that stores the code, libraries, and configuration for your application – think of it as a software snapshot.

Docker Container:

A running instance of a Docker image, like an isolated workspace where your application executes.

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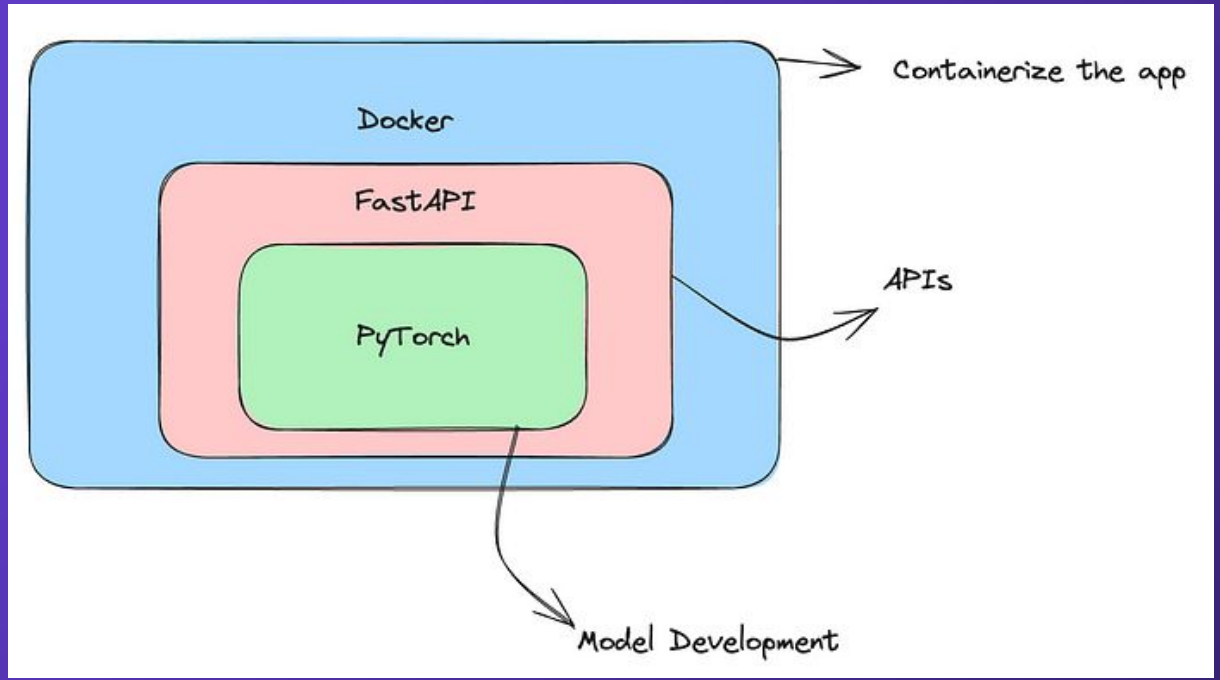
Containerizing a Machine Learning App



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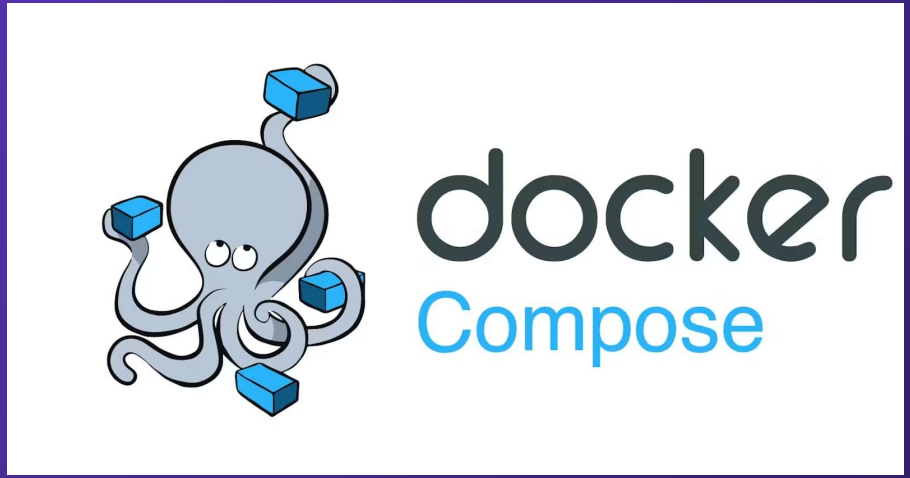
Docker Compose

- Define and manage multi-container Docker applications
- All services and their configurations are defined in a single `docker-compose.yaml` file
- Benefits:
  - Consistent deployment environments
  - Easy scaling of services
  - Simplifies multi-container orchestration



Docker Compose

Without Compose

- Build and run one container at a time
- Manually connect containers together
- Must be careful with dependencies and start up order

With Compose

- Define multi-container app in .yaml file
- Single command to deploy entire app
- Handles container dependencies

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Hands-on activity

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