

Week 3: Docker + OpenSearch

Full Stack RAG with Local LLM

Semester 2/2568

Agenda

1 Docker Fundamentals

2 Vector Database

3 OpenSearch Setup

4 Lab 2

What is Docker?

Containerization Platform

- Package applications with dependencies
- Run anywhere (Windows, Mac, Linux)
- Isolated environments
- Lightweight containers

Key Concepts:

- **Image** - Blueprint/template
- **Container** - Running instance

Docker Commands

List images and containers

```
docker images  
docker ps -a
```

Run container

```
docker run -d --name my-app -p 8080:80 nginx
```

Stop and remove

```
docker stop my-app  
docker rm my-app
```

What is Vector Database?

Database for Embeddings

- Store high-dimensional vectors
- Similarity search
- Essential for RAG systems

We use OpenSearch:

- Open Source
- Self-Hosted
- Hybrid Search support

Run OpenSearch

```
docker run -d --name opensearch-node \
-p 9200:9200 -p 9600:9600 \
-e "discovery.type=single-node" \
-e "DISABLE_SECURITY_PLUGIN=true" \
opensearchproject/opensearch:2.11.1
```

```
# Verify
curl http://localhost:9200
```

Lab 2: Docker + OpenSearch (3.75%)

Tasks:

- ① Install Docker Desktop
- ② Run OpenSearch container
- ③ Setup Hybrid Search Pipeline
- ④ Verify cluster health

Deadline: Sunday 23:59

Questions? See you in Lab 2!