

## SkillSense — AI-Driven Skill and Career Recommendation System

### Overview

SkillSense is an intelligent recommendation engine that helps learners and professionals find the most relevant courses and jobs based on their existing skills and interests.

It combines machine learning-based text embeddings with semantic similarity search to match users to opportunities.

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### Core Components

#### 1. Data Sources

- Coursera, edX, Skillshare, and Udemy course data.
- Job listings from multiple domains.
- Each dataset includes attributes like course title, institution, skills, duration, and level.

#### 2. Preprocessing

- Course data is cleaned and unified into a common structure.
- Skills are extracted, formatted, and standardized.
- Missing attributes such as duration or rating are filled with defaults.

#### 3. Embedding Generation

- Uses **SentenceTransformer: all-MiniLM-L6-v2** to convert job and course descriptions into numerical vectors.
- Embeddings capture semantic meaning, enabling similarity-based matching.

#### 4. Vector Indexing

- FAISS (Facebook AI Similarity Search) indexes the embeddings.
  - Separate indices are created for jobs and courses.
  - Enables millisecond-level retrieval of top matches.
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### Recommendation Logic

When a user enters a skill or interest (e.g. “I know Networks”):

1. The input is embedded using the same model.
  2. FAISS searches for top-N most similar jobs and courses.
  3. The system returns ranked lists of:
    - o **Recommended Jobs** — matched by required skills and description similarity.
    - o **Recommended Courses** — matched by course content and skill tags.
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## Example Output

### Input:

“I know Networks”

### Recommended Jobs:

1. Network Engineer — Skills: Networking, Cisco, Linux
2. Systems Administrator — Skills: Networks, Infrastructure, Security
3. Cloud Support Associate — Skills: AWS, Networking, Virtualization

### Recommended Courses:

1. “Computer Networks” (Coursera) — Skills: Networking, TCP/IP, Routing
  2. “Introduction to Network Security” (edX) — Skills: Firewalls, VPN, Security Basics
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## Technologies Used

Component	Description
Pandas	Data loading and preprocessing
SentenceTransformers	Text embeddings using MiniLM
FAISS	Vector similarity search
Python	Core programming language
Google Colab	Development environment

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## Key Features

- Multi-platform course integration (Coursera, edX, Skillshare, Udemy)
  - Semantic job and course matching
  - Reusable and scalable architecture
  - Personalized recommendations
  - Lightweight and deployable on local systems
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### **Future Scope**

- Integration with LLMs for conversational recommendations
- Real-time resume parsing
- Adaptive learning path generation
- Expanded dataset integration