**AI and Agentic Systems**

**Hands-on Lab #1**

**Semantic Search**

A cartoon of a person using a computer

AI-generated content may be incorrect.

Key topics: semantic search, hybrid search, sentence transformers, embeddings, similarity scoring

**Dependencies**

pip install sentence\_transformers numpy scikit-learn matplotlib pandas chromadb openpyxl colorama

**Context**

Traditional keyword-based search often falls short of helping job seekers uncover the full spectrum of relevant career opportunities. This lab introduces semantic search—a powerful technique that leverages natural language understanding to match job descriptions with job seekers’ queries more meaningfully. By exploring vector embeddings, similarity scoring, and context-aware retrieval, you will learn how to build smarter search systems that go beyond surface-level matches.

**Lab-specific activities**

Step 1: Generate embeddings with various sentence transformers

Step 2: Inspect and visualize embeddings

Step 3: Ingest external data for embedding generation

Step 4: Return top-n matches using various similarity approaches

**Post-lab follow-up**

By tomorrow night, complete the question(s) associated with this lab In LearningSuite.