SHL Assessment Recommender Demo

This is a write-up about a demo application which recommends **SHL Individual Test Solutions** based on a natural language query or job description or a URL containing job description. The development of this application can be divided into three parts:

1. **Web scraping**: Identifying and getting the required data (outlined in the problem statement) from the web.
2. **Data Ingestion**: Storing the scraped data in an appropriate form i.e., vector embeddings, in an index for querying.
3. **Infenrence**: Developing an API endpoint (back-end) and a front-end application to query the data.

Web scraping

Libraries used: `requests`, `beautifulsoup4`, `pandas`

The basic data (Name, URL, Remote Testing, Adaptive/IRT, Test Type) about each assessment solution is present in a tabular format with pagination on the website. Using `beautifulsoup4` and Python built-in `requests` library, the appropirate data is scraped and loaded into a pandas dataframe and finally stored in a CSV file. A detailed description of each product is found in their product page which was scraped and augmented to the CSV file. Further, features like **assessment time** were later extracted from the product description using *regular expressions*.

Data Ingestion

Libraries and models used: `pinecone`, `llama-text-embed-v2` (vector dim: 1024), `sentence-transformer`, `pandas`

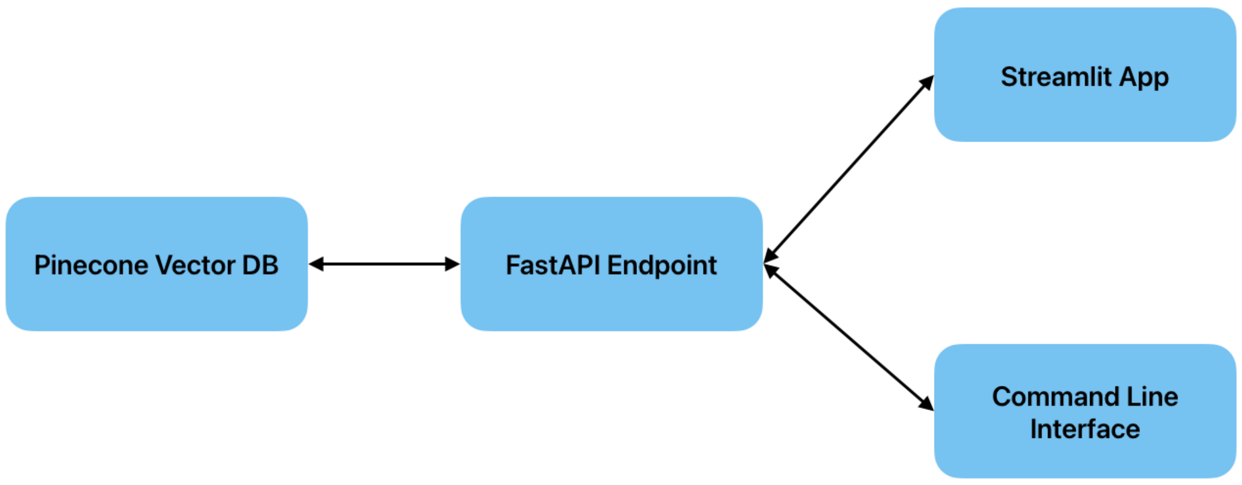
The product descriptions in the CSV file are used for generating vector embeddings using the `llama-text-embed-v2` model hosted on Pinecone. The vectors and along with the meta data are then *upserted* into the Pinecone vector database. Alternatively, the embeddings can also be obtained using a `sentence-transformer` model like `all-MiniLM-L6-v2` to generate the embeddings. However, using the already hosted models is faster.

Inference

Libraries used: `pinecone`, `fastapi`, `streamlit`, `sentence-transformer`, `google-genai`, `re`, `requests`

The input user query is first checked for URLs and the job descriptions are extracted using `requests` library and `gemini-2.0-flash` model using a prompt. This extracted text is augmented to the query and the vector embedding is generated using the same feature extraction model used in the data ingestion stage.

Using Pinecone's inference menthods, the top-k matches (15 in this case) are retrieved based on the *cosine similarity* metric. Then using a reranker model (`bge-reranker-v2-m3`), the results are further reranked and the top 10 results are returned.



Inference pipeline

Frontend

The frontend is a **Streamlit** application which takes a user input and displays the best matches.

Backend

The backend is built using **FastAPI** which serves requests from both the Streamlit app and other clients. The endpoint currently takes a query parameter based on which the recommendations are made.

Name	Link
API endpoint	https://shl-assessment-recommender-lx8s.onrender.com/search
Streamlit app	https://shl-recommender-streamlit.onrender.com
Github	https://github.com/Sushanth99/shl-assessment-recommender.git

NOTE: The API endpoint and the Streamlit app are deployed on Render. The server goes to sleep after 15 minutes of inactivity and it may take upto one minute when you're accessing the links for the first time.