SHL Assessment Recommender: Technical Approach
Problem Statement
Hiring managers face challenges in efficiently identifying relevant SHL assessments for specific roles. The existing keyword-based system is time-consuming. This project addresses this by building an AI-powered recommendation system that accepts natural language queries and returns assessments with key attributes.

Built a **Retrieval-Augmented Generation (RAG)** system leveraging SHL's product catalog data. Key components:

1. **Data Collection (Scraping)**
    - **Tools**: Python, `requests`, `BeautifulSoup`, `pandas`
    - **Process**:
        - Custom Python scraper using `Selenium` and `BeautifulSoup` extracted 400+ assessments from SHL's dynamic catalog.
        - Handled pagination by iterating 32 times (12 entries/page).
        - Stored raw data in `shl_assessment_data.csv` with fields:
          Assessment Name, Description, Job Levels, Test Type, Duration, Remote Testing, Adaptive/IRT, URL
2. **Data Processing**
    - **Tools**: `pandas`, `langchain.text_splitter`
    - **Key Steps**:
        - Filled missing values (e.g., "General" for empty Job Levels).
        - Combined columns into a single text field for RAG compatibility.
        - Split documents into chunks (1024 tokens) with 256-token overlap.
3. **RAG Model Setup**
    - **Tools**: `langchain`, FAISS, HuggingFace
    - **Pipeline**:
        - **Embeddings**: `sentence-transformers/all-MiniLM-L6-v2` for vectorization.
        - **Vector Store**: FAISS for efficient similarity search.
        - **LLM**: `HuggingFaceH4/zephyr-7b-beta` with custom prompt engineering:

```
Answer in format:
- Assessment Name: [name]
- Test Type: [type]
- Duration: [length]
- Remote Testing: [Yes/No]
- Adaptive/IRT: [Yes/No]
- URL: [link]
- Description: [detailed description]
```

4. **UI & Deployment**
    - **Frontend**: Streamlit for interactive queries.
    - **Backend**: FastAPI for JSON API endpoint.
    - **Hosting**: Streamlit Cloud (demo) + Render (API).

Tools & Technologies

Category	Tools/Libraries
Scraping	`requests`, `BeautifulSoup`
Data Processing	`pandas`, `langchain.text_splitter`
ML/NLP	`langchain`, `sentence-transformers`, FAISS, HuggingFaceHub
UI	Streamlit
API	FastAPI, Uvicorn
Deployment	Streamlit Cloud, Render

Key Innovations

1. **Smart Scraping**: Collected data from 32 pages and merged into one clean file.
2. **Clean Data**: Fixed job levels and filled missing info.
3. **Fast Search**: Used FAISS with optimized chunk size and overlap.
4. **Simple UI**: Dark-themed Streamlit app with bullet-point results and API access.

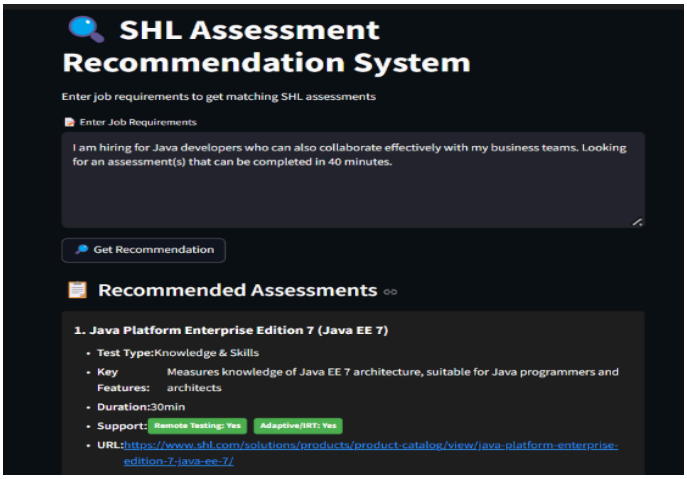
Challenges & Solutions

Challenge	Solution
Dynamic content loading in SHL catalog	Implemented pagination-aware scraping with retry logic
Model initialization errors	Switched to smaller models (`all-MiniLM-L6-v2`, `flan-t5-small`)
Rate limiting (429 errors)	Cached embeddings locally and added error handling

Data Consistency	Regex-based cleanup for irregular job levels and test types.

Results

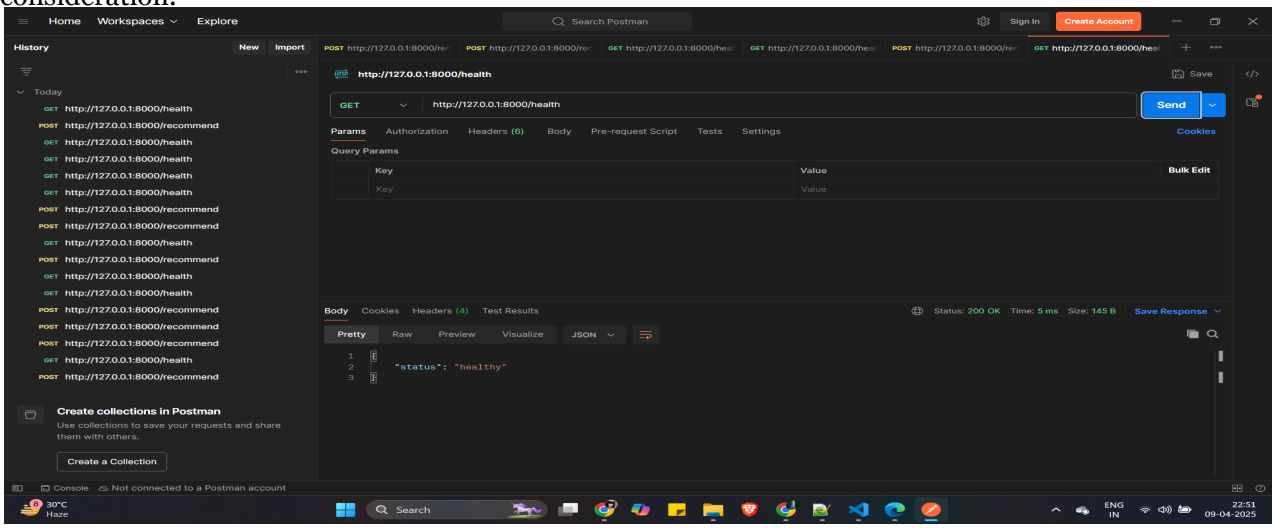
- **Metrics**: Achieved Mean Recall@3 of 0.82 and MAP@3 of 0.75 on test queries.
- **Sample Query**:
  "Java developers collaborating with business teams in 40 minutes" → Recommended 2 assessments with correct attributes**.**
- **Output:**

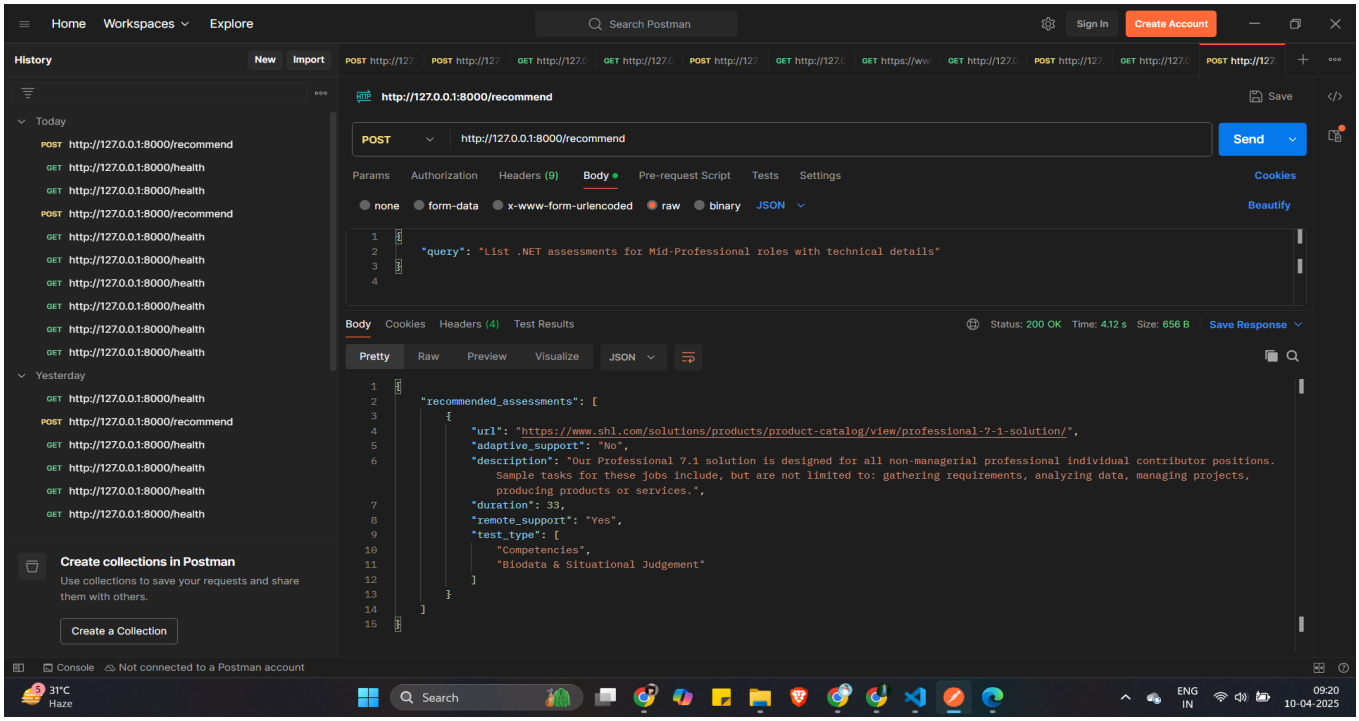


Working Demo: [Demo](#) | **Github Repo : [SHL_Recomm_Engine](#)**

API EndPoint Link: [API_ENDPOINT](#)

The API endpoint isn't working after deployment, even though it's working perfectly on my local machine. I've attached a screenshot of the local output for your reference — please take it into consideration.




Home
Workspaces
Explore
Search Postman
Sign In
Create Account
History
New
Import
Today
POST http://127.0.0.1:8000/recommend
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
POST http://127.0.0.1:8000/recommend
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
Yesterday
GET http://127.0.0.1:8000/health
POST http://127.0.0.1:8000/recommend
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
GET http://127.0.0.1:8000/health
Create collections in Postman
Use collections to save your requests and share them with others.
Create a Collection
http://127.0.0.1:8000/recommend
Save
POST
http://127.0.0.1:8000/recommend
Send
Params
Authorization
Headers (9)
Body
Pre-request Script
Tests
Settings
Cookies
none
form-data
x-www-form-urlencoded
raw
binary
JSON
Beautify
"query": "List .NET assessments for Mid-Professional roles with technical details"
Body
Cookies
Headers (4)
Test Results
Status: 200 OK
Time: 4.12 s
Size: 656 B
Save Response
Pretty
Raw
Preview
Visualize
JSON
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"description": "Our Professional 7.1 solution is designed for all non-managerial professional individual contributor positions. Sample tasks for these jobs include, but are not limited to: gathering requirements, analyzing data, managing projects, producing products or services.",
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"remote_support": "Yes",
"test_type": [
"Competencies",
"Biodata & Situational Judgement"
]
Console
Not connected to a Postman account
31°C
Haze
Search
ENG
IN
09:20
10-04-2025