



BHARATIYA ANTARIKSH HACKATHON

2025

Powered by **H2S**



Team Name : **GravitasOps**

Team Leader Name : Dinesh Yadav

Problem Statement : AI-based Help Bot for Information Retrieval from a Knowledge Graph
Based on Static/Dynamic Web Portal Content

Team Members

Team Leader:

Name: Dinesh Yadav
College: Cluster Innovation Centre,
University of Delhi, Delhi

Team Member-2:

Name: Anushka Jain
College: Maharaja Agrasen Institute of
Technology, Delhi

Team Member-1:

Name: Sachin Munjar
College: Cluster Innovation Centre,
University of Delhi, Delhi

Team Member-3:

Name: Aditya Raj
College: Cluster Innovation Centre,
University of Delhi, Delhi

Brief about the Idea:

An AI-powered conversational smart virtual assistant that makes the MOSDAC portal easy to use. It connects all types of satellite data and documents into a single, organized system, so users can ask questions in plain language and instantly get up-to-date answers.

We are building **MOSDAC AI Knowledge Navigator Chatbot for MOSDAC Web** .

Opportunity & Differentiation:

- **Key Differentiator:** Leverages a knowledge graph and conversational AI instead of traditional portals or keyword-based search, enabling natural-language access to MOSDAC's satellite data.
- **Problem Solving Approach:**
 - Unifies real-time and archived data into a semantic knowledge graph.
 - Allows plain-language queries with context-aware, explainable answers.
 - Bridges the gap between complex data formats and non-technical user access.
- **Unique Selling Proposition (USP):**
 - First conversational AI for Indian satellite data.
 - Supports real-time updates, multilingual interaction, and interactive visualizations.
 - Offers traceable reasoning paths for transparency and trust.
 - Empowers a wide range of users—researchers, policymakers, and students.

Key Features – MOSDAC AI Knowledge Navigator

- Natural-language interface for intuitive, plain-language queries
- Knowledge graph backbone integrating structured and unstructured satellite data
- Retrieval-Augmented Generation (RAG) engine for accurate, explainable responses
- Real-time data integration from live MOSDAC feeds
- Interactive visualizations including maps, charts, and graph views
- Explainable reasoning paths showing how each answer is derived
- Contextual follow-up handling for multi-step queries and comparisons
- Multilingual support for both queries and responses
- Multi-modal content delivery with links to imagery, data files, and documents
- Custom alerts and notifications based on user-defined conditions
- Role-based access control for secure and personalized data access
- Extensible plugin framework for adding new data sources and tools

Focus Area :

For queries we need Multi-Modal Query Processing which will take care of -

- Factual questions about satellite data specifications
- Temporal queries about weather patterns and trends
- Spatial queries about geographic regions and phenomena
- Complex multi-hop questions requiring reasoning across multiple entities

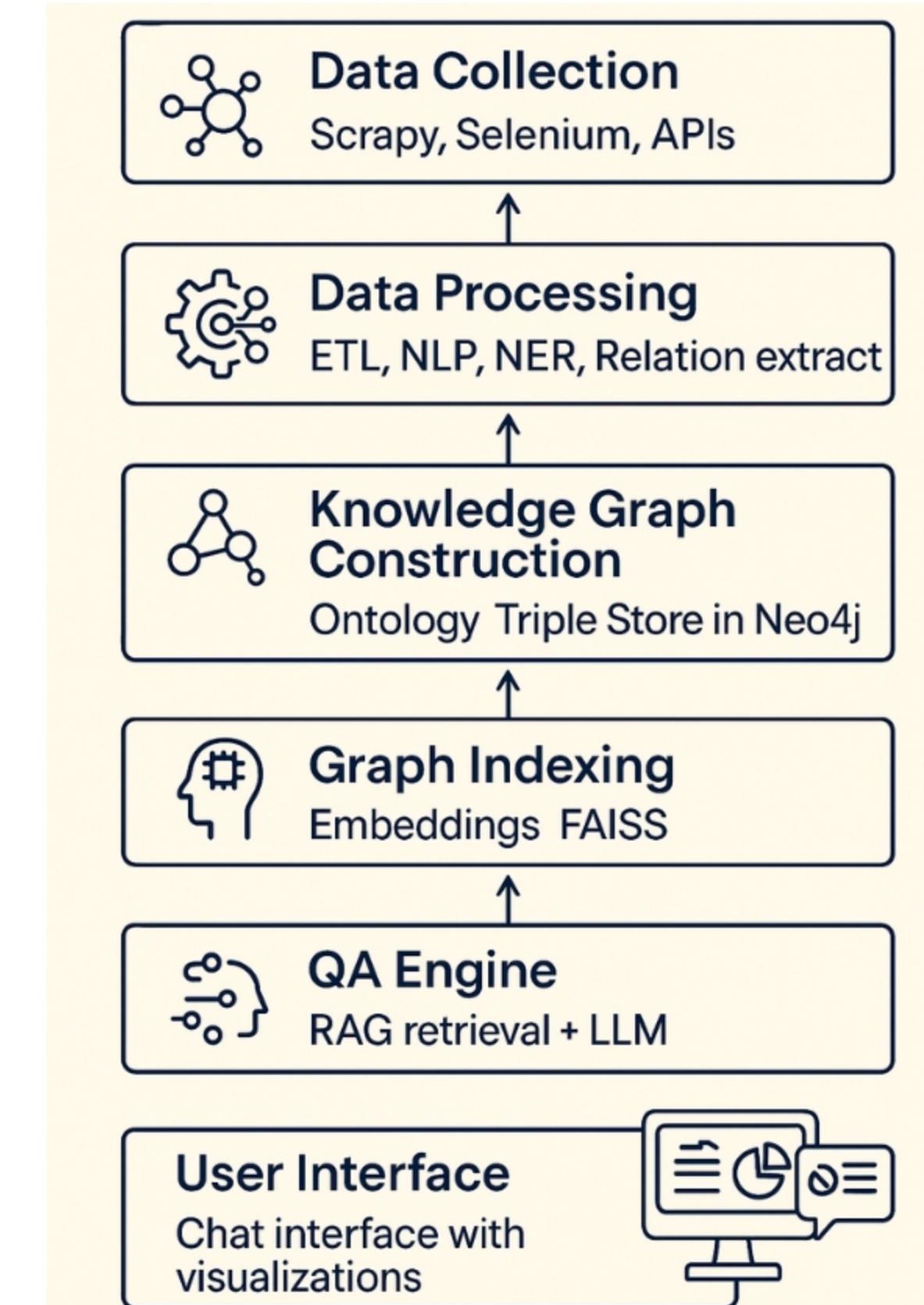
And then a conversational AI assistant which will -

- Maintain conversation history using knowledge graph context
- Provide explainable responses by tracing reasoning paths through the graph
- Support follow-up questions and clarifications
- Adapt to user expertise levels (researchers vs. general public)

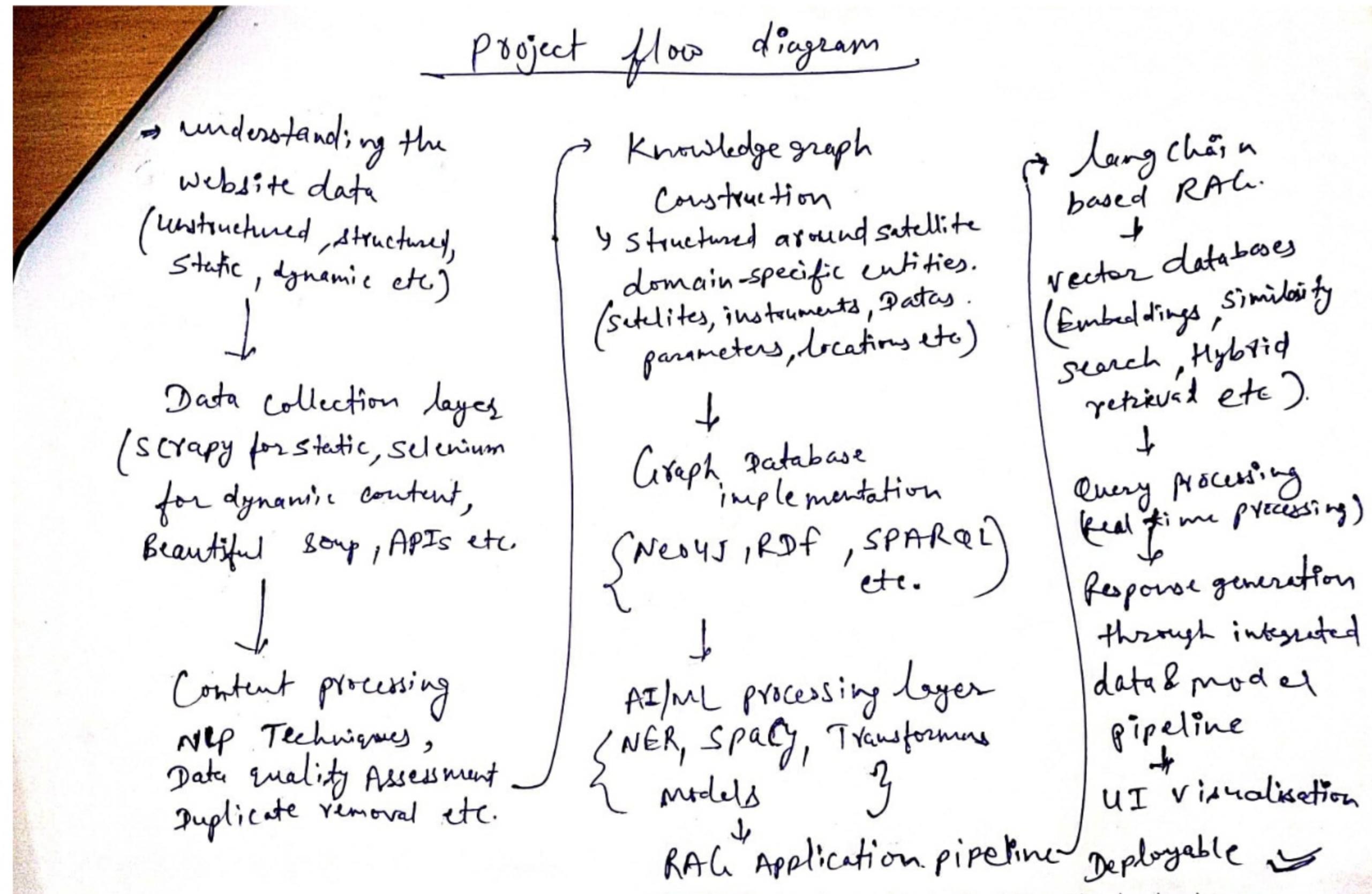
This RAG based pipeline should be able to incorporate new information as it becomes available on the MOSDAC portal.

Process flow diagram

- Ingest: Auto-fetch MOSDAC content via APIs and scrapers
- Preprocess: Clean and normalize structured and unstructured data
- Extract: Use NLP to generate triples and build a knowledge graph
- Embed: Vectorize entities for semantic search
- Respond: RAG engine retrieves context; LLM generates answer
- Display: UI shows responses with charts and graphs
- Update: Live data continuously refreshes the graph

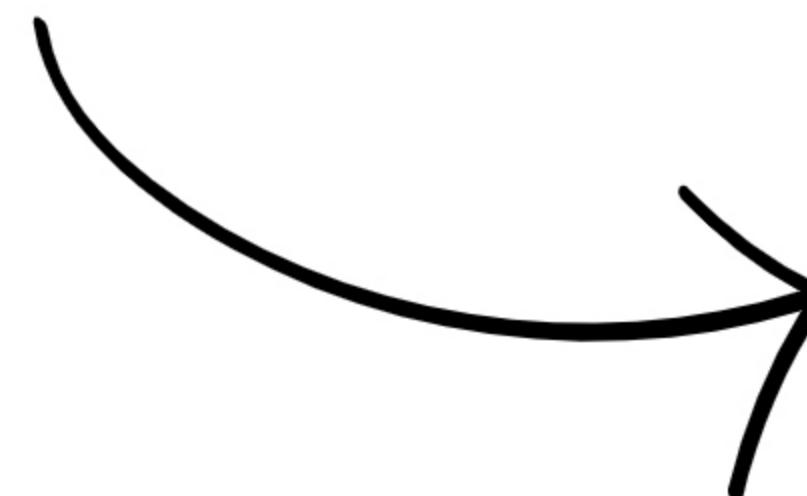


Wireframes/Mock diagrams of the proposed solution:

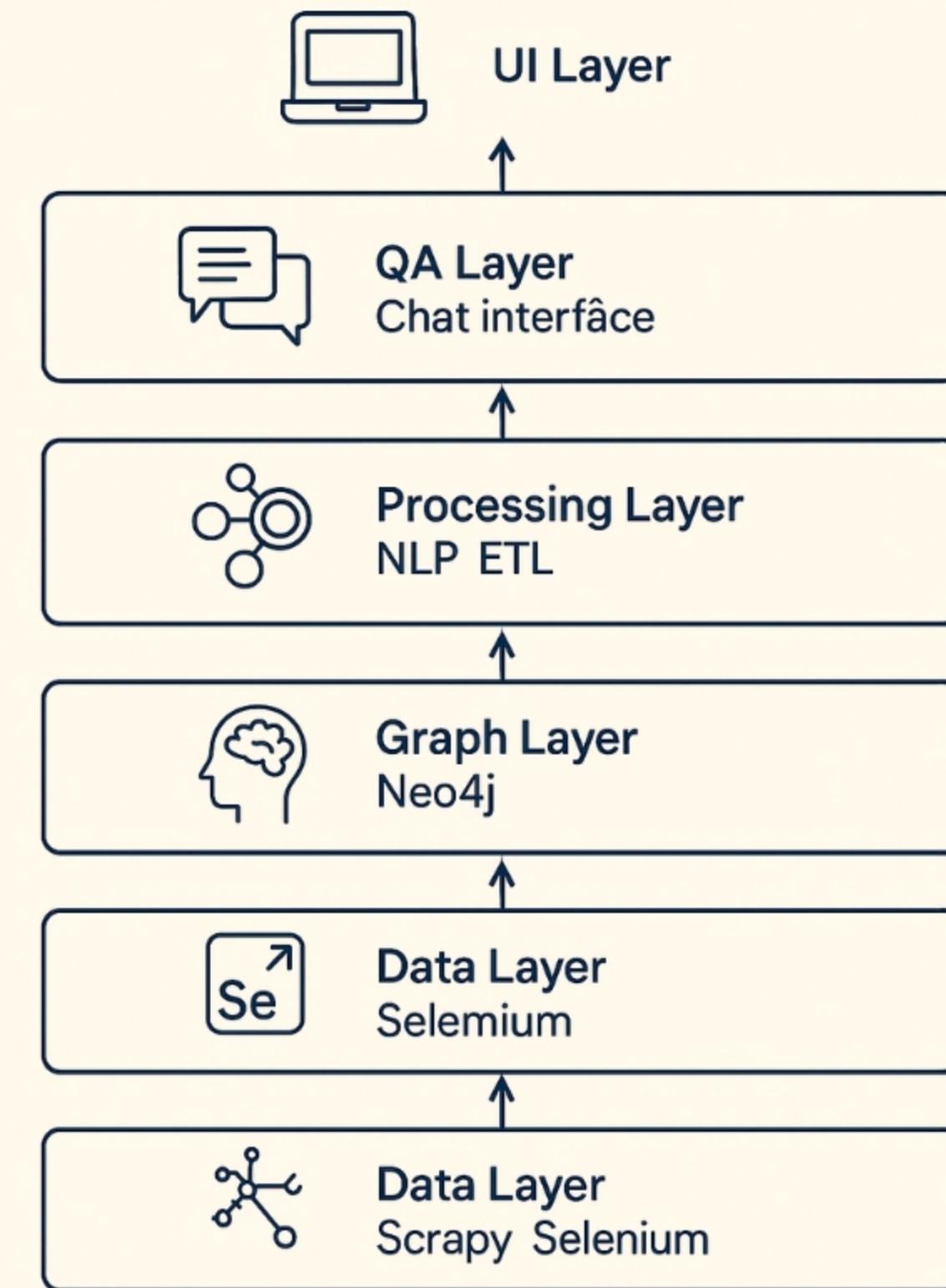


Architecture diagram of the proposed solution :

Shows how MOSDAC data is ingested, processed into a knowledge graph, and served via QA API



MOSDAC AI Knowledge Navigator



Technologies to be used in the solution:

- **AI/ML:** GPT-4 (LLM) {or any other LLM which suits us cost and usability-wise},
SciBERT, spaCy NER, LangChain RAG
- **Graph DB:** Neo4j + RDFLib + SPARQL endpoint
- **Vector Store:** FAISS/Pinecone for embeddings
- **Data Ingestion:** Scrapy, Selenium, Airflow ETL
- **Backend:** FastAPI, PostgreSQL, Redis, RabbitMQ
- **Frontend:** React+TypeScript, D3.js, WebSocket
- **Infra:** Docker, Kubernetes on AWS/GCP, Prometheus/Grafana

Expected Outcomes & Impact:

- 80% reduction in time spent on data discovery
- Broadens MOSDAC usage to educators, policymakers, students
- Accelerates research by providing contextual, explainable answers
- Supports ISRO's mission to democratize satellite data

Cost Estimate

- **Primary cost drivers:**
 - Usage of Large Language Models (LLMs) based on token consumption
 - API access for external services (e.g., translation, visualization, alerts)
 -
- **Estimated cost for this project:** ₹3,000 – ₹8,000
 - Optimized through selective querying and efficient model usage
 - Scalable based on actual demand and user volume



Powered by **H2S**
HACK2SKILL

BHARATIYA ANTARIKSH HACKATHON

2025

THANK YOU

