AI-KnowMap

Building a Cross-Domain
Knowledge Mapping AI System

Infosys Springboard Virtual Internship

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AI-KnowMap: Overview

An intelligent system that builds dynamic, explorable knowledge graphs connecting diverse domains like science, technology, and humanities using advanced NLP and AI technologies.

Semantic Mapping
Connect related ideas across domains automatically

Knowledge Graphs
Visualize complex relationships between concepts

Intelligent Search
Find connections through semantic understanding

Interactive System
Explore and navigate knowledge intuitively

Milestone 1: Secure Foundation

Authentication & Dataset Ingestion

Establishing a secure, production-ready system where users can safely register, authenticate, and upload their knowledge sources. This foundational layer ensures data integrity and user privacy through industry-standard security protocols.

1

User Authentication

JWT-based login system with encrypted credentials

2

Secure Storage

SQLite database for user profiles and metadata

3

Data Pipeline

Upload Wikipedia articles, news, or custom documents

Milestone 2: NLP Pipeline

Entity & Relation Extraction

The intelligent core of AI-KnowMap: extracting meaningful knowledge triples from unstructured text. Using state-of-the-art transformers and NLP models to identify entities, relationships, and construct graph-ready knowledge structures that machines can understand and reason about.

Named Entity Recognition

Identify people, places, concepts, and technologies within text using spaCy and transformer models

Relation Extraction

Discover connections between entities: (Einstein – developed – Theory of Relativity)

Milestone 3: Graph Visualization & Search

Making Knowledge Explorable

Transforming extracted knowledge into interactive, navigable experiences. Users can explore concept relationships through visual graphs and discover connections using semantic search powered by advanced embedding models that understand meaning and context.

Interactive Visualization

PyVis-powered graphs showing concept relationships and knowledge networks

Semantic Search

Find connections like "Painkiller for migraine" → "Aspirin treats headache"

Smart Navigation

Explore k-hop neighborhoods and ego graphs around any concept

Milestone 4: Admin Dashboard & Deployment

Enabling Continuous Improvement

A complete management layer where administrators validate relationships, refine the knowledge graph through user feedback, and prepare the system for production deployment. Real-time feedback loops ensure AI-KnowMap continuously learns and improves from user interactions.

01

Admin Panel

Manage, validate, and edit knowledge triples in real time

02

Feedback Collection

Gather user ratings and comments to improve accuracy
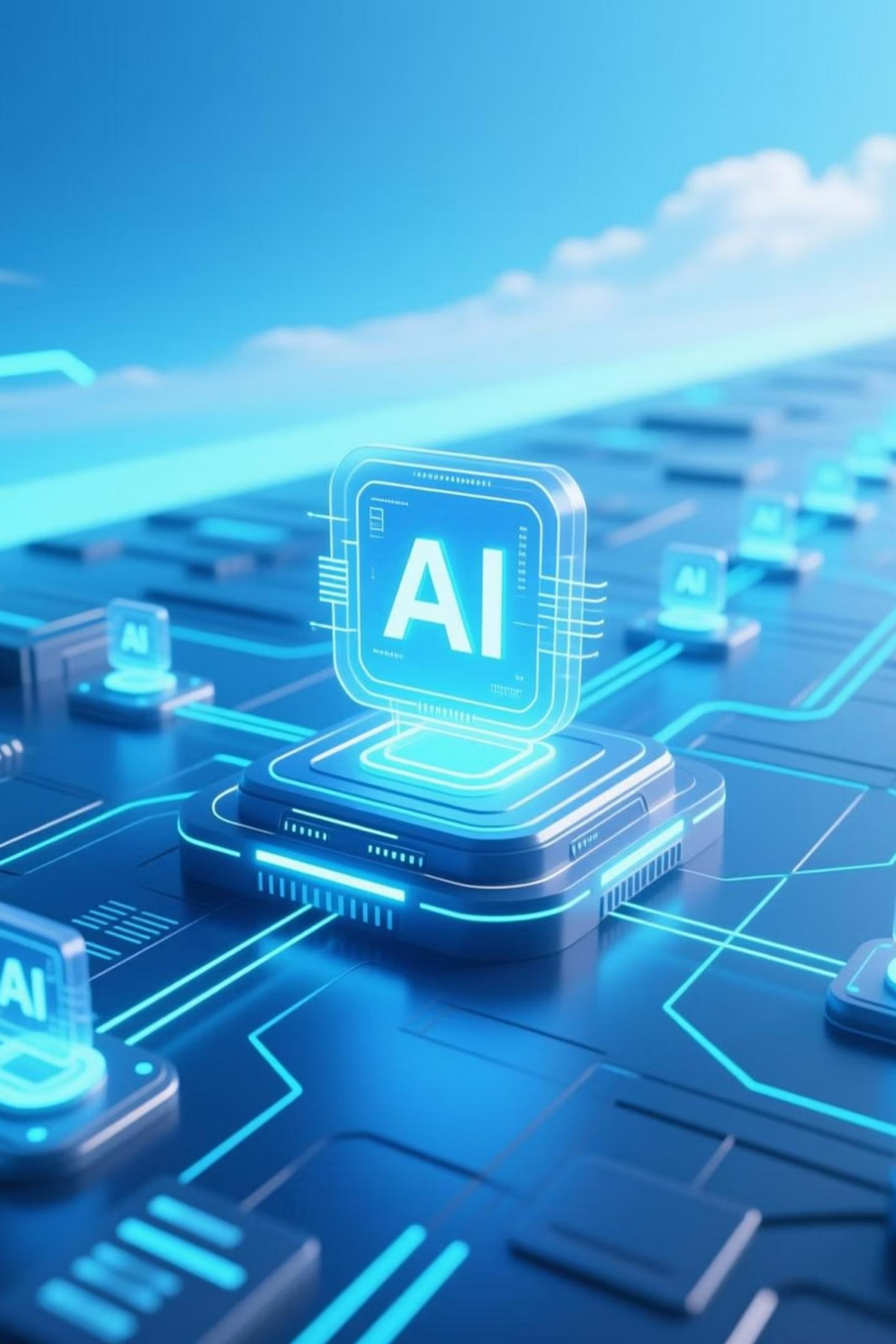
03

Model Refinement

Use feedback to retrain and enhance NLP models

04

Docker Deployment

Containerized application for scalable, global distribution

The Journey: From Data to Discovery

Embark on a transformative journey with AI-KnowMap, progressing through four meticulously designed milestones. Each stage seamlessly builds upon the last, culminating in a robust, intelligent ecosystem that turns raw data into actionable knowledge and profound discoveries.

1. **M1: Secure Foundation - Authentication & Profile Management User** authentication, profile management, and JWT-based security that establishes the trust layer.

2. **M2: NLP Pipeline - Entity & Relation Extraction NLP engine powered by** transformers and BERT for dialogue management.

3. **M3: Graph Visualization & Search - Interactive Knowledge Exploration** Advanced NLP, multilingual knowledge base, and clinical communication standards.

4. **M4: Admin Dashboard & Deployment - Continuous Learning and** Improvement Admin dashboard and feedback loop enabling continuous learning and improvement.

Final Outcome & Future Vision

AI-KnowMap has achieved its core objective: a functional, scalable AI-driven knowledge graph system that connects concepts across domains, making complex relationships visible and searchable.

Current Achievements

- **Fully functional prototype with end-to-end pipeline**

- **Interactive visualization of cross-domain relationships**

- **Production-ready backend architecture**

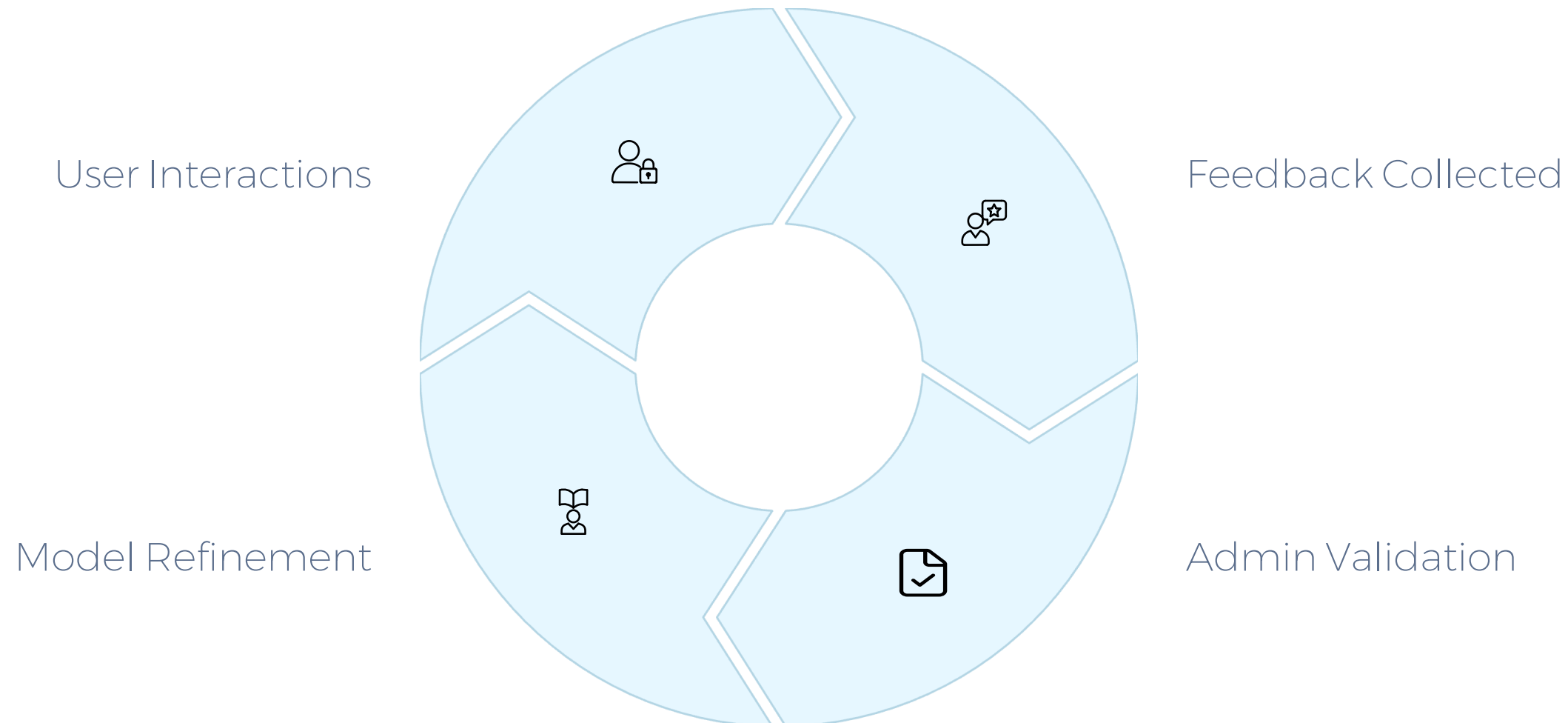- **Comprehensive admin and feedback systems**

Future Enhancements

- **Multilingual knowledge graph support**

- **Real-time graph updates and synchronization**

- **Advanced semantic reasoning and inference**

- **Enhanced recommendation engine**

Learning & Continuous Improvement

The Feedback Loop: AI-KnowMap Grows Smarter

AI-KnowMap evolves through real user interactions. Every search, rating, and correction strengthens the system. Administrators merge duplicates, validate high-confidence relationships, and flag errors. This feedback continuously retrains models, improving NLP accuracy, entity recognition, and semantic search relevance—creating a virtuous cycle of knowledge refinement.

User Interactions

Feedback Collected

Model Refinement

Admin Validation

Ready for Global Knowledge

AI-KnowMap has evolved from concept to a fully functional, scalable, production-ready AI knowledge mapping system. Its modular architecture supports multilingual expansion, ethical data usage, and continuous learning—empowering global knowledge discovery.

100+
Domains Connected
Science, Technology, Humanities

JWT
Enterprise Security
Encrypted Authentication & Storage

24/7
Always Available
Global Knowledge Mapping Access

The final result is a production-ready application that connects, visualizes, and empowers knowledge discovery across the world—bridging ideas, domains, and minds through intelligent AI mapping.