2024
Batch

Information Retrieval Course Work

2024 BATCH MSC DATA SCIENCE

Module: MSc in Computer Science – Information Retrieval [Individual]
Title: Intelligent Strategic Plan Synchronization System (ISPS)
Deadline: 15th February 2026
Submission Mode: LMS (PDF + Hosted Application Link)
Weight: 100 Marks
Submission Type: Individual Coursework
Word Count: Equivalent to 5,000–6,000 words (excluding code and screenshots)

1.Coursework Scenario

Modern businesses rely on strategic and action plans to achieve organizational goals. However, assessing the *synchronization* between these plans is complex and time-consuming. With the advent of **Large Language Models (LLMs)**, **Retrieval-Augmented Generation (RAG)**, **Ontologies**, and **Agentic AI**, intelligent systems can analyze, reason, and enhance strategic alignment in a smart, explainable manner.

You are required to **design and develop a smart AI-based system** capable of analyzing the *synchronization* between a chosen organization's **Strategic Plan** and **Action Plan**, providing insights, intelligent improvements, and visual analytics to aid decision-making.

2. Scenario Requirements

Domain Selection

Choose a domain and business of your interest (e.g., Healthcare, Education, Finance, Manufacturing, Retail, Energy, etc.).

Input Data

- A **Strategic Plan** (not less than 5 pages in content and complexity).
- A corresponding **Action Plan** (not less than 5 pages), aligned with the strategic plan.
  You may create your own or adapt an existing real-world example (with proper citations).

3. System Requirements

Your system should include the following functional and intelligent components:

3.1 Synchronization Assessment (Overall)

Assess how well the overall *Action Plan* aligns with the *Strategic Plan*.
Use NLP-based similarity detection, embedding analysis, or ontology mapping (using **Vector Databases** such as Pinecone, FAISS, or Chroma).

3.2 Strategy-wise Synchronization

Analyze alignment *per strategic objective*, identifying which actions support which strategy and their degree of fit.

3.3 Intelligent Improvement Suggestions

Use an **LLM or RAG pipeline** to propose improvements for poorly aligned strategies and actions (e.g., new KPIs, modified timelines, or missing tasks).

3.4 Smart Dashboard

Design an interactive **dashboard** (e.g., Streamlit, Gradio, or Flask-based) that:

- Displays synchronization metrics and insights.
- Provides actionable recommendations.
- Includes guidance messages for decision-makers.

3.5 Innovative Features

Integrate additional intelligent components, such as:

- **Agentic AI reasoning layer** (autonomously exploring improvement suggestions).
- **Ontology-based mapping** between strategic and operational concepts.
- **Knowledge graph visualization**.
- **LLM-based summarization and reporting.**

3.6 Hosting Architecture

Propose and justify a **secure hosting architecture**, considering:

- Data protection & GDPR compliance.
- LLM integration options (e.g., OpenAI API, local model hosting).
- Vector DB and backend deployment (e.g., AWS, Azure, GCP).

3.7 Public Deployment

Host the final application publicly (e.g., Streamlit Cloud, HuggingFace Spaces, or custom domain) with an attractive UI/UX.
Provide the **live link** in your report.

3.8 Testing and Evaluation

Propose and implement a **system accuracy testing strategy**, e.g.:

- Ground truth mapping comparison.
- Expert validation of AI recommendations.
- Precision/recall metrics for text alignment.

3.9Final PDF Report

Compile a professional PDF report including:

- Introduction and background.
- Literature review (LLMs, RAG, Ontologies, NLP, Vector Databases).
- Methodology and architecture.
- Development phases (with screenshots).
- Results, evaluation, and discussion.
- Security and deployment notes.
- Conclusions and future work.

3.10 Presentation

Prepare a **10-minute recorded or live presentation** (plus 5 minutes Q&A), summarizing your system, findings, and dashboard demonstration.

4. Suggested Technologies

Category	Recommended Tools
LLM / NLP	OpenAI GPT, HuggingFace Transformers, LangChain, spaCy, NLTK
RAG / Vector DB	Chroma, FAISS, Pinecone, Weaviate
Ontologies / Knowledge Graphs	RDFLib, Neo4j, Protégé
Dashboard	Streamlit, Dash, Gradio, Flask
Hosting	Streamlit Cloud, HuggingFace, AWS, Azure, or Vercel
Evaluation	Precision, Recall, Cosine Similarity, Semantic Matching

5. Deliverables

Deliverable	Description
1. Strategic & Action Plans	Two documents (≥5 pages each).
2. Application Prototype	Functional hosted app link.
3. System Architecture Diagram	High-level design including RAG/LLM flow.
4. Dashboard Design	UI with data visualization.
5. Testing & Evaluation Results	Accuracy metrics and validation.

Deliverable	Description
6. Final PDF Report	Comprehensive development report.
7. Presentation Slides & Recording	10-minute demonstration + Q&A readiness.

6. Marking Rubric (Total = 100 Marks)

Criteria	Description	Marks
1. Understanding & Background Research	Quality of research on IR, NLP, LLMs, RAG, Ontologies, and related technologies.	**10**
2. Strategic & Action Plan Preparation	Complexity, realism, and coherence of plans.	**10**
3. System Design & Architecture	Logical structure, LLM/RAG integration, ontology or vector DB usage.	**15**
4. Implementation & Functionality	System accuracy, completeness, and robustness.	**20**
5. Dashboard & User Interface	Aesthetic design, interactivity, and usability.	**10**
6. Intelligent Features & Innovation	Novel use of Agentic AI, ontology mapping, smart suggestions.	**10**
7. Hosting & Security Considerations	Proper deployment, security awareness, and accessibility.	**10**
8. Evaluation & Testing	Clear testing methodology and performance validation.	**10**
9. Report Quality & Documentation	Structure, clarity, references, and screenshots.	**5**
10. Presentation & Q&A Performance	Delivery, clarity, engagement, and technical responses.	**10**
TOTAL		**100 Marks**

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7. Submission Guidelines

- Submit all files through **LMS** before **15TH Feb 2026 (23:59 GMT)**.
- **Late submissions are not accepted.**
- Include all necessary links (app, GitHub, slides) in your PDF report.
- Plagiarism above **15%** will result in academic penalty.
- Reference all sources using **Harvard referencing style**.