

# 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:** 15<sup>th</sup> 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.

<b>Deliverable</b>	<b>Description</b>
<b>6. Final PDF Report</b>	Comprehensive development report.
<b>7. Presentation Slides &amp; Recording</b>	10-minute demonstration + Q&A readiness.

## 6. Marking Rubric (Total = 100 Marks)

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

## 7. Submission Guidelines

- Submit all files through **LMS** before **15<sup>TH</sup> 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**.