Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Students Kit

Objective

This project aims to build a cloud-based system that integrates document summarization and code-based analysis using machine learning models. The project is distributed among three team members with different responsibilities:

- Member 1: Responsible for Text Summarization.
- Member 2: Responsible for Code-Based Analysis.
- Member 3: Responsible for Cloud Integration

Requirements Specification (RS)

No.	Requirement	Essential / Desirable	Description of the Requirement	Remarks
RS1	Text Summarization Model	Essential	The system should use NLP/LLM models for document summarization.	This is the core functionality of the project.
RS2	Code Analysis Tool	Essential	Integrate a code analysis tool to check for bugs, code complexity, and performance.	This ensures scalability and accessibility.
RS3	Cloud Infrastructure	Essential	The system must be deployed on a cloud platform (AWS, Azure, GCP).	It helps in maintaining and optimizing code quality.
RS4	Web-Based User Interface	Desirable	A web-based user interface should be developed to provide users with access to project components like text summarization and code analysis in an intuitive, user-friendly way.	Enhances the look and feel of the project, making it more accessible and visually appealing to users.

High Level/Detailed Design (HLD/DD)

Overview of the system

The project is composed of three core components:

1. **Text Summarization Module:** This module generates summaries from text documents using LLMs.
2. **Code-Based Analysis Module:** Analyses code for complexity, bugs, and optimization using tools.
3. **Cloud Integration Module:** This component focuses on deploying and managing the entire system in a scalable cloud infrastructure.

Detailed Design

1. **User Interface:**
   Users interact with the system through a web-based UI, which provides access to document upload for summarization and code submission for analysis**.**
2. **Text Summarization System:**
   The NLP/LLM model processes the document data submitted via the web interface. The summarization results are stored in the Document Database.
3. **Code Analysis System:**
   The Code Analysis Tool analyses submitted code and generates a complexity report, which is stored in the Code Analysis Database.
4. **Cloud Infrastructure:**
   All components (UI, databases, and models) are deployed and scaled through AWS Cloud Services. The web-based user interface, models, and data storage are hosted in the cloud, ensuring access for users.

Design Components

Component one
Text Summarization
Purpose
Summarizes text documents using LLM.
Pseudocode
For the Text-Summarization Component :

```
def summarize_text(input_text):
    model = load_summarization_model()
    summary = model.summarize(input_text)
    return summary
```

Component two
Code-Based Analysis
Purpose
Analyzes the code for complexity, errors, and optimization.
Pseudocode
For the Code-Based Analysis Component :

```
def analyze_code():
    results = run_static_analysis_tool(code_base)
    return results
```

Component three
Cloud Infrastructure
Purpose
Hosts the summarization and analysis components on the cloud for scalability.
Pseudocode
For the Cloud Infrastructure Component:

```
def deploy_to_cloud():
    cloud_service = connect_to_cloud(platform="AWS")
    deploy_model(cloud_service)
```

Test-Plan (TP)

No.	Testcase Title	Description	Expected Outcome	The requirement in RS that is being tested	Result
1	Successful Cloud Deployment	Verify that the cloud services are correctly configured.	Cloud services should run without errors.	RS3	Passed
2	Code Analysis for Complexity	Run the analysis tool to check for code	Complexity warnings	RS2	Passed

		complexity issues.	should be generated.		
3	Text Summarization Accuracy	Test the LLM model for summarization output.	Generated summary should reflect core content.	RS1	Passed
4	Web Interface Accessibility Test	Test if the web-based user interface is easily accessible.	The web interface should load correctly on desktop and mobile devices.	RS4	Passed