

SmartSDLC – AI-Enhanced Software Development Lifecycle

1. Introduction

Project Title: SmartSDLC – AI-Enhanced Software Development Lifecycle

Team Members:

SUBRAMANI P

VIMAL R

VETRIVEL C

VEERAMANI S

2. Project Overview

Purpose

The purpose of SmartSDLC is to enhance the traditional Software Development Lifecycle (SDLC) by integrating AI-driven automation, forecasting, and analytics. The project demonstrates how an AI-augmented system can improve decision-making, optimize resources, and reduce risks in software development.

Features

- Conversational Interface: Natural language interaction for requirements, queries, and assistance.
- Policy / Document Summarization: Converts lengthy docs into concise summaries.
- Resource Forecasting: Predicts effort, time, and resource usage at each phase.
- AI-Assisted Code & Testing: Auto-generates code snippets, test cases, and bug predictions.



- KPI Tracking & Forecasting: Monitors project progress and forecasts KPIs.
- Anomaly Detection: Identifies unusual patterns in project metrics.
- Stakeholder Feedback Loop: Collects feedback to refine requirements.
- Multimodal Input Support: Accepts text, PDFs, and CSVs for document analysis.
- Streamlit/Gradio UI: User-friendly dashboards for project teams.

3. Architecture

- Frontend (Streamlit/Gradio): Interactive web UI with dashboards, chat interface, and KPI visualizations.
- Backend (FastAPI): RESTful API endpoints for docs, reports, and embeddings.
- LLM Integration (IBM Watsonx Granite): Summarization, recommendations, and assistance.
- Vector Search (Pinecone): Semantic search for project knowledge base.
- ML Modules: Forecasting and anomaly detection for project KPIs.

4. Setup Instructions

Prerequisites

- Python 3.9+
- pip & venv tools
- API keys for IBM Watsonx & Pinecone
- Internet access

Installation

1. Clone repository
2. Install dependencies (requirements.txt)
3. Configure .env with credentials
4. Run FastAPI backend server
5. Launch Streamlit frontend



6. Upload docs/CSVs and interact

5. Folder Structure

app/ – FastAPI backend

└─ api/ – API routes (chat, feedback, reports)

ui/ – Streamlit frontend

smart_dashboard.py – Main Streamlit dashboard

granite_llm.py – LLM communication

document_embedder.py – Embeddings + Pinecone

kpi_file_forecaster.py – Forecasting module

anomaly_file_checker.py – Anomaly detection

report_generator.py – AI-generated reports

6. Running the Application

1. Start FastAPI server
2. Run Streamlit dashboard
3. Navigate pages
4. Upload files and interact
5. View outputs: reports, summaries, forecasts, anomaly alerts

7. API Documentation

- POST /chat/ask – Query assistant
- POST /upload-doc – Upload & embed documents
- GET /search-docs – Semantic search
- GET /get-eco-tips – Sustainability/coding tips
- POST /submit-feedback – Store feedback

8. Authentication

Current demo: open access.

Future options:



- JWT / API keys
- OAuth2 (IBM Cloud)
- Role-based access

9. User Interface

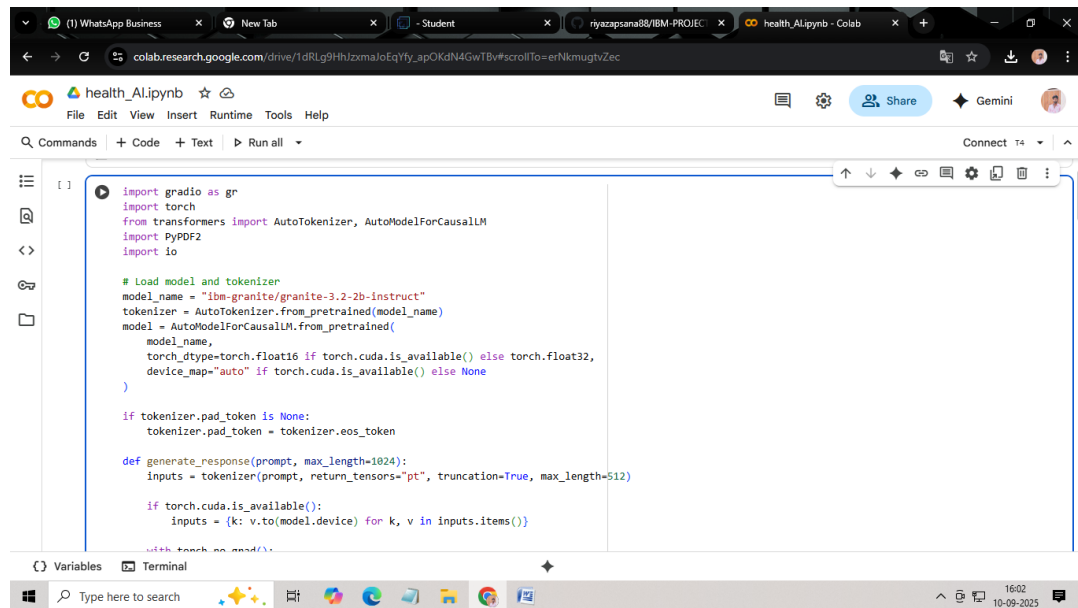
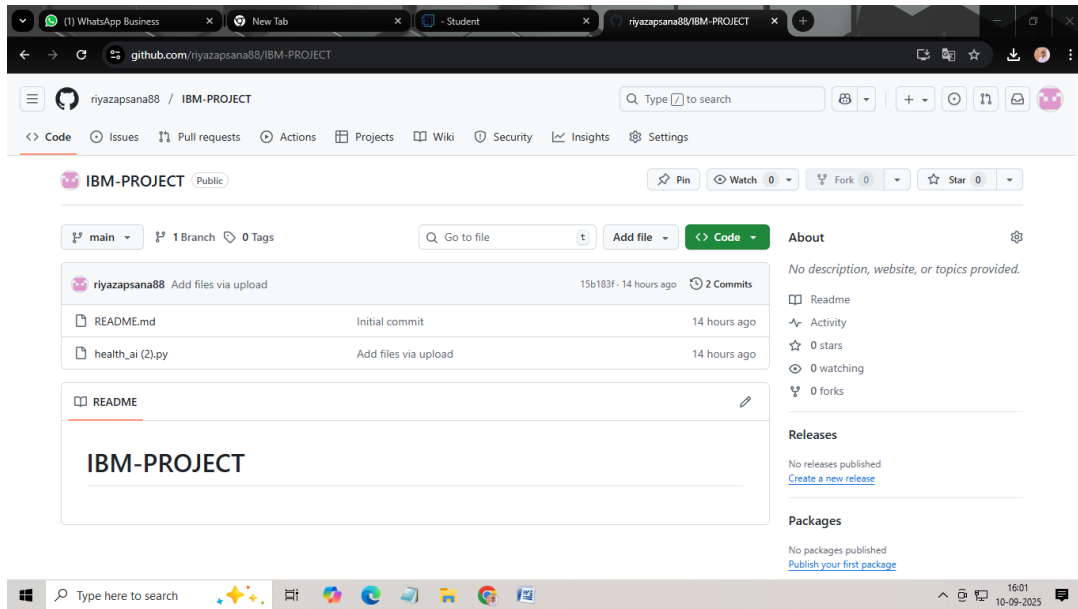
- Sidebar navigation
- KPI visualization cards
- Tabs for chat, forecasts, and reports
- Real-time input forms
- PDF report downloads

10. Testing

- Unit Testing: Utility scripts, ML models
- API Testing: Swagger UI & Postman
- Manual Testing: File uploads, chat responses
- Edge Cases: Invalid keys, large files

11. Screenshots





huggingface.co/ibm-granite/granite-3.2-2b-instruct

Hugging Face Search models, datasets, users...

Models Datasets Spaces Community Docs Pricing Log In Sign Up

ibm-granite/granite-3.2-2b-instruct Like 48 Follow IBM Granite 2.34k

Text Generation Transformers Safetensors granite language granite-3.2 conversational arxiv:0000.00000 License: apache-2.0

Model card Files and versions xet Community Train Deploy Use this model

A newer version of this model is available: ibm-granite/granite-3.3-2b-instruct

Granite-3.2-2B-Instruct

Model Summary: Granite-3.2-2B-Instruct is an 2-billion-parameter, long-context AI model fine-tuned for thinking capabilities. Built on top of [Granite-3.1-2B-Instruct](#), it has been trained using a mix of permissively licensed open-source datasets and internally generated synthetic data designed for reasoning tasks. The model allows controllability of its thinking capability, ensuring it is applied only when required.

- Developers: Granite Team, IBM
- Website: [Granite Docs](#)

Downloads last month: 12,137

Safetensors

Model size: 2.53B params Tensor type: BF16 Chat template Files info

Inference Providers

Text Generation

This model isn't deployed by any Inference Provider. Ask for provider support

naanmudhalvan.smartinternz.com/Student/guided_project_workspace/514

Smart Internz

Home Projects Support

Guided Project Project Workspace

Project Title : SmartSDLC - AI-Enhanced Software Development Lifecycle Project Progress

NM Id : 86B372F8F90E9C5A4CD48C8A5C47C649

Industry Mentor(s) Name : No Mentor has been assigned

90.00%

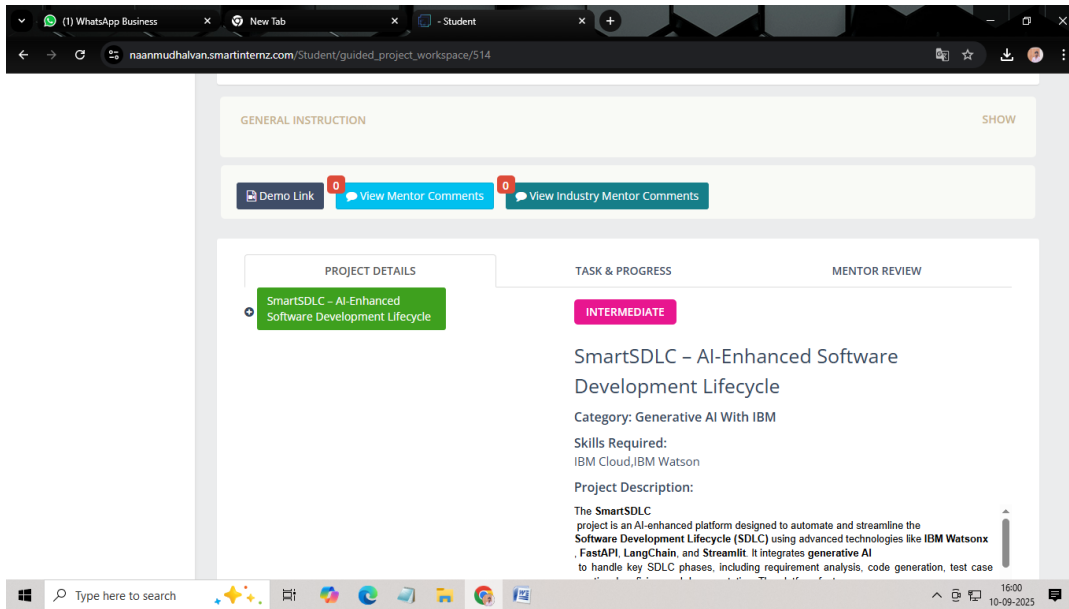
GENERAL INSTRUCTION SHOW

Demo Link View Mentor Comments View Industry Mentor Comments

PROJECT DETAILS TASK & PROGRESS MENTOR REVIEW

SmartSDLC - AI-Enhanced Software Development Lifecycle INTERMEDIATE





12. Known Issues

- Limited offline functionality
- Dependency on external APIs
- Scalability challenges

13. Future Enhancements

- CI/CD pipeline integration
- Multi-language support
- Advanced role-based dashboards
- Expanded anomaly detection
- Auto-document generation

