**Technology Stack – SmartSDLC**

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**Team ID**: LTVIP2025TMID31783  
**Project Name**: SmartSDLC  
**Maximum Marks**: 4

**Technical Architecture Overview**

SmartSDLC is an AI-powered tool designed to assist students and developers in classifying software project documents into Software Development Life Cycle (SDLC) phases. The application uses a Streamlit-based interface for interactive usage and integrates NLP models for semantic document classification. The current version simulates AI classification via Gemini API, with plans to integrate IBM Granite-3B/13B for more domain-specific inference. The system also includes phase-wise analytics visualized with Plotly for better document insights.

**Table 1: Components & Technologies**

| **S.No** | **Component** | **Technology Used** |
| --- | --- | --- |
| 1 | User Interface | Streamlit (for document upload, tabbed views, dashboard display) |
| 2 | App Logic - Phase Classification | Python + Google Gemini API (simulated AI text classification) |
| 3 | App Logic - Prompt Handling | Prompt engineering with context-aware formatting |
| 4 | Document Processing | PyMuPDF (for PDF extraction), Pandas |
| 5 | Session Management | Streamlit st.session\_state (to preserve user inputs across tabs) |
| 6 | Data Handling & Storage | CSV/JSON for classification logs; temporary in-memory storage |
| 7 | External AI API | Google Gemini API (current), Hugging Face Transformers (for fine-tuned models) |
| 8 | Target AI Integration | IBM Granite-3B / 13B via Watson Machine Learning (planned) |
| 9 | Data Visualization | Plotly (for SDLC phase graphs, keyword clouds, analytics) |
| 10 | Hosting & Deployment | Localhost (dev), Deployable to Streamlit Cloud / Vercel |
| 11 | Async Operations | aiohttp, asyncio (for asynchronous model requests, future version) |

**Table 2: Application Characteristics**

| **S.No** | **Characteristic** | **Description** |
| --- | --- | --- |
| 1 | Open-Source Frameworks | Streamlit, Plotly, PyMuPDF, Pandas, aiohttp, dotenv |
| 2 | Security Implementations | Token-based API access, .env configuration for model secrets |
| 3 | Scalable Architecture | Decoupled UI + AI inference logic; enables backend swap/integration |
| 4 | Availability | Works offline on local machines; deployable to cloud (Streamlit/Vercel) |
| 5 | Performance | Efficient PDF reading and text chunking; low latency with simulated AI |
| 6 | Data Storage | In-memory session state + CSV/JSON export (DB integration in future) |
| 7 | User Experience | Clean, guided UI for non-technical users; actionable outputs with confidence |

**Summary**

SmartSDLC combines modern open-source frameworks with AI-driven classification to deliver a functional and user-friendly academic project documentation assistant. It’s built for fast prototyping and seamless deployment, while offering scalable architecture for future enhancements. Planned upgrades include persistent cloud storage, real-time collaboration, and advanced document quality scoring using IBM Granite or other enterprise-level LLMs.