**Project Design Phase-II**

**Data Flow Diagram & User Stories**

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| Date | 26 june 2025 |
| Team ID | LTVIP2025TMID32104 |
| Project Name | sustainable smart city assistant using ibm granite llm |
| Maximum Marks | 4 Marks |

**Data Flow Diagrams:**

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

Level 0 DFD

The user interacts with the Sustainable Smart City Assistant via a Streamlit dashboard. Inputs such as policy documents, feedback forms, or KPI files are sent to FastAPI routes. Backend logic invokes IBM Watsonx Granite LLM for summarization, chat replies, eco tips, and reports. ML modules process forecasts and anomaly detection. Outputs are displayed back on the UI. Pinecone handles semantic search on policy documents.

Level 1 DFD

Each module functions independently via FastAPI:

* Policy Summarizer accepts .txt/.csv, sends to Granite LLM → summarized policy shown on UI.
* Eco Tips accepts topic keyword → Granite LLM returns actionable sustainability advice.
* KPI Forecasting accepts .csv KPI → ML model forecasts future usage → outputs to summary card.
* Anomaly Checker scans uploaded utility data → statistical anomaly detection applied.
* Chat Assistant receives questions from user → Granite LLM replies contextually.
* Feedback Form logs citizen complaints with category tagging and stores it for administrators.
* Semantic Search embeds documents with Sentence Transformers → Pinecone retrieves top matches.

**User Stories**

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| --- | --- | --- | --- | --- | --- | --- |
| **User Type** | **Feature** | **User Story ID** | **User Story** | **Acceptance Criteria** | **Priority** | **Release** |
| City Planner | Policy Summarization | USN-1 | As a planner, I can upload policy documents and receive a summarized version. | A clear, readable summary is shown within seconds. | High | Sprint-1 |
| Citizen | Eco Advice | USN-2 | As a user, I can type a keyword and get eco tips. | Relevant and actionable tips appear based on input topic. | High | Sprint-2 |
| Administrator | KPI Forecasting | USN-3 | As an admin, I can upload KPI CSV to get usage forecasts. | Graph and predicted values display on dashboard. | Medium | Sprint-2 |
| Energy Officer | Anomaly Detection | USN-4 | As a user, I can upload KPI data and detect anomalies. | Anomalous values are highlighted or flagged in table/chart. | High | Sprint-3 |
| Citizen | Chat Assistant | USN-5 | As a citizen, I can ask questions and receive sustainability answers. | AI-generated response appears with clarity and relevance. | Medium | Sprint-3 |
| Citizen | Feedback Form | USN-6 | As a user, I can submit complaints with category and message. | Issue is logged, categorized, and confirmation is shown. | High | Sprint-1 |
| Planner/Admin | Semantic Policy Search | USN-7 | As a user, I can search policy documents using keywords semantically. | Top relevant matches are returned with highlighted text snippets. | Medium | Sprint-4 |
| Administrator | Sustainability Report Gen. | USN-8 | As an admin, I can generate a sustainability report from KPI data. | AI-written report displayed in readable format, with optional PDF export. | Medium | Sprint-4 |