**Project Design Phase-II**
**Data Flow Diagram & User Stories**

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|---|---|
| Date | 28 June 2026 |
| Team ID | LTVIP2025TMID60547 |
| Project Name | Sustainable Smart City Assistant Using IBM Granite LLM |
| Maximum Marks | 4 Marks |

**Data Flow Diagrams:**

**🔁 Key Entities:**

- Citizen (External Entity)
- City Administrator (External Entity)
- Streamlit Frontend
- FastAPI Backend
- IBM Granite LLM
- Pinecone Vector Store
- ML Models (Forecasting, Anomaly Detection)
- Database (Feedback, KPI, Policy Docs)

**□ Data Flows:**

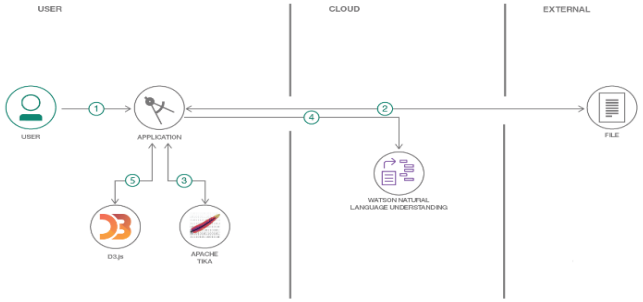
- Citizens submit feedback → Stored in database
- Admin uploads KPI data → Sent to ML Model → Forecasts & anomalies returned
- Policies uploaded → Embedded → Stored in Pinecone → Searchable by LLM
- Eco Tips / Chat prompts → Sent to Granite LLM → Natural language response returned

- Dashboard retrieves processed KPI metrics → Streamlit displays data to user

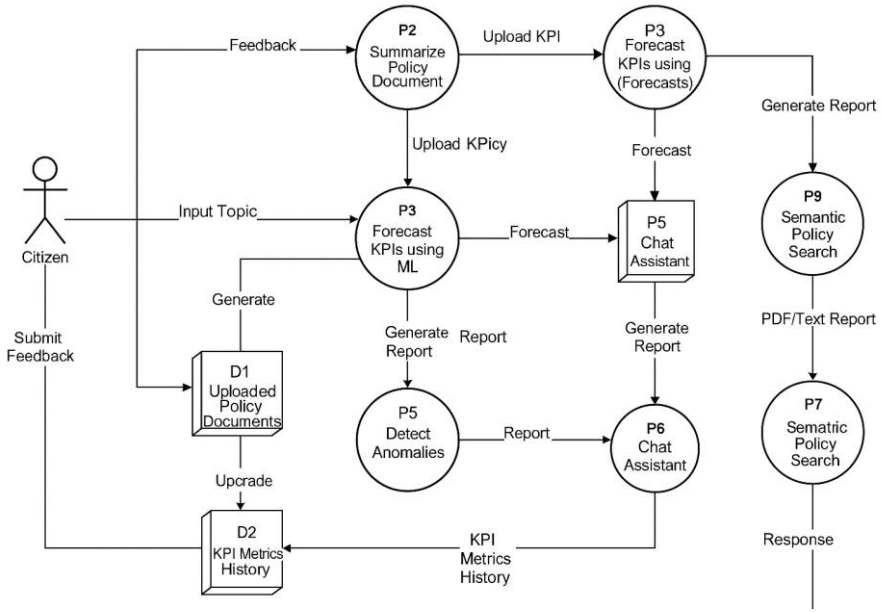
.

**Example: (Simplified)**

# Flow




1. User configures credentials for the Watson Natural Language Understanding service and starts the app.
2. User selects data file to process and load.
3. Apache Tika extracts text from the data file.
4. Extracted text is passed to Watson NLU for enrichment.
5. Enriched data is visualized in the UI using the D3.js library.



## User Stories

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|---|---|---|---|---|---|---|
| Citizen | Feedback Submission | USN-1 | As a citizen, I want to submit a complaint with a category so that I can report issues like water leaks or garbage. | Complaint is stored and tagged with category. | High | Sprint-1 |
| Citizen | AI Chat Assistant | USN-2 | As a citizen, I want to ask sustainability questions and get helpful replies using AI. | Granite LLM provides relevant AI responses instantly. | High | Sprint-1 |
| Citizen | Eco Tips | USN-3 | As a user, I want to receive eco-friendly tips based on keywords like plastic or solar. | AI returns relevant environmental tips in real time. | Medium | Sprint-2 |
| Admin | KPI Upload & Forecasting | USN-4 | As an admin, I want to upload water/energy data to get future KPI predictions. | Forecasted results are visualized on dashboard. | High | Sprint-1 |
| Admin | Anomaly Detection | USN-5 | As an admin, I want to detect abnormal spikes in city energy/water usage. | Outliers are detected and flagged clearly. | Medium | Sprint-2 |
| Admin | Policy Summarization | USN-6 | As an admin, I want to upload large policy files and get short summaries using AI. | LLM-generated summary appears below upload section. | High | Sprint-1 |
| Admin & Citizen | Semantic Document Search | USN-7 | As a user, I want to search through policies and find relevant sections easily. | Results are returned based on semantic similarity using Pinecone and LLM. | Medium | Sprint-2 |
| Admin | Report Generator | USN-8 | As an admin, I want to auto-generate city sustainability reports based on collected data. | Report content is created using LLM and downloadable. | Low | Sprint-1 |
| School Teacher / Educator | AI Eco Awareness Tips | USN-9 | As a teacher, I want to generate eco tips using keywords to educate students about sustainability. | AI returns clear and student-friendly eco tips based on topic input. | Medium | Sprint-2 |
| Policy Analyst | Document Summarization | USN-10 | As a policy analyst, I want to summarize lengthy policy files to focus on actionable insights. | IBM Granite LLM produces concise and structured summaries for long text documents. | High | Sprint-1 |
| NGO Volunteer | Real-time KPI Monitoring | USN-11 | As an NGO volunteer, I want to view real-time KPIs like air quality to plan awareness campaigns. | The dashboard shows accurate, updated sustainability metrics per zone/city | Medium | Sprint-2 |

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|---|---|---|---|---|---|---|
| Smart City Project Manager | Anomaly Notifications | USN-12 | As a project manager, I want to be alerted when abnormal resource usage occurs to take preventive action. | The system flags anomalies and provides quick alerts on dashboard or via email | High | Sprint-1 |