**Project Design Phase**

**Solution Architecture**

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| Date | 14 June 2025 |
| Team ID | LTVIP2025TMID60699 |
| Project Name | Sustainable Smart City Assistant Using IBM Granite LLM |
| Maximum Marks | 4 Marks |

**Solution Architecture – Sustainable Smart City Assistant**

**Our solution architecture bridges real-world sustainability challenges with a practical, tech-based platform. It brings together multiple tools and technologies to create one smooth user experience.**

**Key Goals:**

* **Use the best tech to solve real urban sustainability problems.**
* **Clearly define how each part of the system works together.**
* **Outline what features are needed and how they are delivered in stages.**
* **Ensure the app is reliable, maintainable, and scalable for future use.**

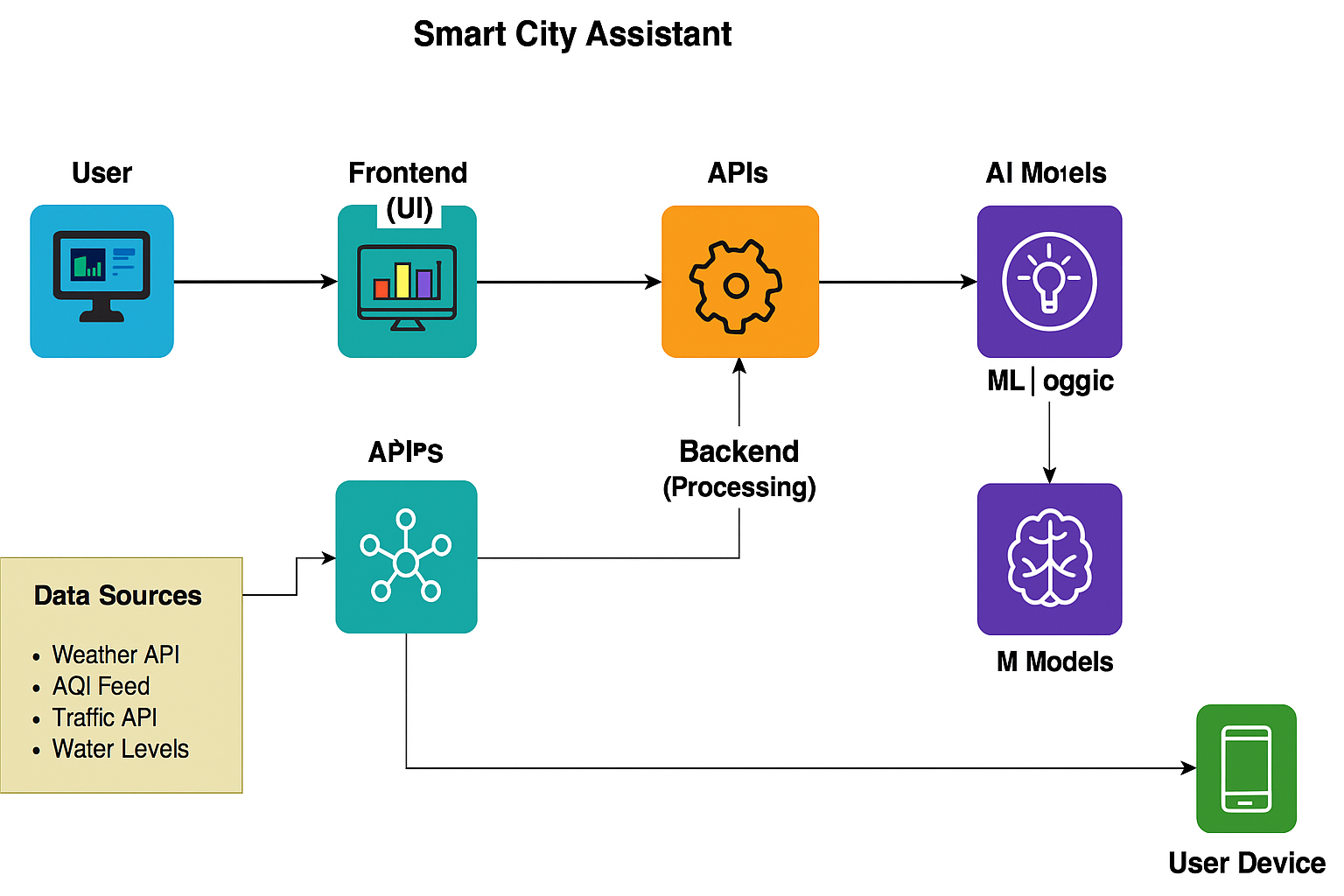
**Architecture Overview:**

1. **Frontend (User Interface)**
   * **Built with React (or any modern web framework)**
   * **Theme-based, responsive UI**
   * **Supports dashboards, charts, chat, eco tips, and summaries**
   * **Offline and multilingual support**
2. **Backend (Processing & Data Handling)**
   * **APIs for real-time environmental data (AQI, water, energy, traffic)**
   * **Forecasting and anomaly detection modules using ML models**
   * **Custom logic for smart alerts, eco tips, and summarization**
   * **Handles user preferences and personalization**
3. **Data Layer**
   * **External APIs for live city/environmental data**
   * **Local JSON or database for storing user preferences, settings, tips**
   * **Data preprocessing for forecasts and summaries**
4. **AI/ML Components**
   * **Forecasting: Predict trends in air quality, water usage, etc.**
   * **Anomaly Detection: Identify sudden spikes or abnormal patterns**
   * **Chat Assistant: Natural language interface to help users**
   * **Summarizer: Converts raw city data into understandable insights**
5. **Smart Features Layer**
   * **Smart alerts based on user behavior, thresholds, and city conditions**
   * **Personalized eco tips based on location, habits, and recent data**
   * **Multilingual interface and theme-switching capability**

**Development Phases:**

* **Phase 1: Dashboard + APIs + UI setup**
* **Phase 2: Forecasting + Anomaly Detection + Eco Tips**
* **Phase 3: Chat Assistant + Summarizer + Smart Alerts**
* **Phase 4: Polishing UX, offline mode.**

**Example - Solution Architecture Diagram:**

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