# **Week 8 Report – Dashboard Development and Visualization Phase**

During the 8th week of the InsightNation project, the primary objective was to transition the insights derived from the analytics modeling phase into a user-friendly and visually engaging dashboard. This phase aimed to ensure that the analytical results are effectively communicated to stakeholders through clear and interactive visualizations. It marks a crucial step in making the data accessible and actionable for decision-makers.

**1. Defining Dashboard Requirements**

The week began with a team discussion to finalize the functional and visual requirements of the dashboard. Key questions addressed included:

* What are the most relevant insights from the analytics phase that need to be displayed?
* Who are the primary users of the dashboard (e.g., government officials, policy analysts, or citizens)?
* What types of visualizations (charts, heatmaps, filters) would best suit these users?

The team decided to prioritize clarity, interactivity, and performance, ensuring that insights are immediately understandable and actionable.

**2. Tool Selection and Environment Setup**

Based on earlier architectural planning, **Streamlit** was chosen as the primary tool for building the dashboard, due to its simplicity, flexibility, and compatibility with Python-based analytics pipelines. The development environment was set up locally, and necessary dependencies (e.g., pandas, plotly, matplotlib, seaborn, streamlit) were installed. A modular folder structure was maintained to integrate the backend ML components with the frontend visual layer.

**3. Designing Dashboard Layout and Interface**

The layout was sketched out using initial wireframes and mockups created during the design phase (Week 4). Key sections included:

* **Overview Page**: High-level summary metrics like average citizen satisfaction, total responses, and engagement by service category.
* **Service-specific Insights**: Interactive tabs to view feedback on parks, libraries, transport, and public toilets.
* **Sentiment Analysis Section**: Bar charts and pie charts representing positive, neutral, and negative feedback distribution.
* **Demographic Filters**: Dropdowns and sliders for age, gender, and city, allowing users to customize their view.
* **Feedback Trends**: Time-series graphs showing how satisfaction levels changed over different periods.

**4. Visualization Implementation**

Using Plotly, Altair, and Seaborn, several types of visualizations were developed:

* **Bar Charts** to compare service satisfaction levels across cities.
* **Heatmaps** to identify areas with the highest complaints or service gaps.
* **Pie Charts** for visualizing sentiment proportions.
* **Line Graphs** for trend analysis over time.
* **Word Clouds** for qualitative feedback (from NLP sentiment analysis).

All visualizations were embedded within Streamlit containers and updated dynamically based on user inputs.

**5. Testing Interactivity and User Experience**

Once the initial version was implemented, it was tested thoroughly to ensure that all dropdown filters, tabs, and visualizations responded accurately. Minor bugs related to data filtering and visual overlaps were fixed. Emphasis was placed on loading speed, ensuring that even with the full dataset, the dashboard remained responsive.

**6. Feedback and Iteration**

Preliminary feedback was gathered from team members and academic mentors. Based on their suggestions:

* Tooltip explanations were added to complex graphs.
* Visual colors were refined for accessibility.
* Redundant graphs were removed to avoid clutter.

**7. Documentation and Preparation for Final Review**

Detailed notes were taken on the visualization logic, data used in each chart, and design decisions. This documentation will be included in the final project report and technical appendix.

**Conclusion**

Week 8 marked a significant milestone as the InsightNation platform evolved from raw data and analytics into a powerful visualization tool. By creating an interactive and informative dashboard, the project now moves closer to its mission of enabling data-driven public service improvement. The visual layer built this week will be instrumental in communicating citizen sentiments to stakeholders in an intuitive manner.