

Project Documentation

Project Title: Civic Lens – A Local Government Transparency Dashboard

23BCS10204 -Mankaran Singh Tandon

1. Introduction

Civic Lens is a web-based platform developed with the objective of improving transparency in local governance by making government data more accessible and understandable for citizens. In most communities, public information such as budget allocations, development projects, and council decisions is either difficult to access or presented in formats that are not citizen-friendly. This creates a disconnect between authorities and the public, which Civic Lens aims to overcome. By offering a centralized dashboard, the platform enables citizens, journalists, researchers, and civic organizations to monitor decision-making processes, track development progress, and evaluate the use of public funds.

The system relies on a modern technology stack to ensure scalability, efficiency, and usability. The frontend is developed using React.js and styled with Tailwind CSS to provide a dynamic and responsive interface. The backend is powered by Spring Boot, a robust Java-based framework, which handles the business logic and communication between the different layers. Data is stored and managed in a relational database such as MySQL or PostgreSQL. The project also incorporates REST APIs for seamless integration between the frontend and backend, and visualization tools like Chart.js or Recharts are used to present information in graphical formats.

2. Module 1: User Interface (UI/Frontend)

The User Interface module acts as the primary entry point for users, providing them with an intuitive and user-friendly experience. Its design prioritizes accessibility so that users with varying levels of technical expertise can easily navigate the system. Through the dashboard, users can view government budgets, filter records based on departments or timeframes, and track the progress of local projects. The interface also includes search and filter functions that simplify the retrieval of specific data. React.js powers the dynamic components of the frontend, enabling real-time updates and smooth interactions. Tailwind CSS ensures a responsive and professional design across different devices, while Recharts and similar visualization libraries are integrated to present government data as interactive charts, graphs, and tables. This module ensures that raw data is transformed into easily digestible and visually appealing formats for the end user.

3. Module 2: Data Management / Database Layer

The Data Management module serves as the backbone of the Civic Lens project, as it is responsible for securely storing and retrieving all government-related data. Information such as departmental budgets, council meeting records, and project progress reports is stored in relational databases such as MySQL or PostgreSQL. This module ensures that the stored data maintains integrity, is consistently updated, and can be efficiently retrieved for queries. Schema design plays a crucial role here, allowing relationships to be defined between entities such as departments, funds, and projects. With these relational mappings in place, the module can handle complex queries and return accurate results. Additionally, the database layer incorporates security mechanisms to ensure that sensitive information is only accessible to authorized users. By acting as a reliable data foundation, this module supports the overall efficiency and credibility of the system.

4. Module 3: Core Processing / Business Logic

The Core Processing module functions as the brain of the Civic Lens system. It processes user requests, applies necessary validations, and ensures that relevant data is delivered to the frontend. When a user queries budget allocations for a particular department in a given year, for example, the core processing layer filters and processes the data retrieved from the database before passing it on to the user interface. This module also handles advanced accountability features, such as monitoring project timelines and evaluating whether allocated funds are being utilized as planned. It is implemented using Spring Boot, which manages controllers and services, ensuring scalability, efficient request handling, and modular development. By centralizing and managing the business logic, this module ensures that the application operates smoothly and delivers accurate insights to the user.

5. Module 4: Integration & APIs

The Integration and API module plays a critical role in connecting the frontend, backend, and database. REST APIs serve as the communication bridge that allows data to flow between different layers in a secure and modular way. This module also manages user authentication and role-based access control. For instance, administrators may be granted privileges to upload or modify datasets, while regular citizens are limited to viewing and downloading reports. The architecture has been designed to ensure scalability, meaning that additional features such as third-party API integration or new government data sources can be incorporated with minimal

disruption. This flexibility allows the Civic Lens platform to adapt to future requirements and expand its functionality without compromising performance.

6. Module 5: Reporting & Analytics

The Reporting and Analytics module transforms raw government data into meaningful insights. One of the primary challenges with civic data is that it is often presented in complex, text-heavy formats that are difficult for citizens to interpret. This module addresses that challenge by generating visualizations, reports, and accountability metrics that are easy to understand. Citizens can view expenditure trends, compare budget allocations across departments, and track the progress of ongoing projects. Reports can also be exported in formats such as PDF or CSV, enabling further analysis by journalists and researchers. In addition, this module introduces advanced features such as transparency scores and accountability indexes, which provide citizens with straightforward indicators of how well their local government is performing. By combining statistical data with interactive charts and reports, this module ensures that information is not only accessible but also actionable.

7. System Flow

The system follows a clear workflow designed to maximize efficiency and ease of use. When a user logs into the dashboard, they are presented with options to search, filter, or request data. Once the request is made, the frontend communicates with the backend through APIs. The backend then interacts with the database to retrieve the requested information, which is processed by the core logic module before being sent back to the user interface. The final output is displayed in tables, graphs, or downloadable reports, ensuring that users receive a complete and user-friendly response to their queries. This streamlined workflow makes the system accessible to non-technical users while maintaining technical robustness.

8. Testing and Evaluation

The system underwent several layers of testing to ensure its reliability and usability. Unit testing was first conducted on individual components such as React elements, API endpoints, and database queries to confirm that each function operated as expected. Integration testing was carried out to verify that the different modules worked together seamlessly, ensuring proper communication between the user interface, backend, and database. User testing involved trial sessions with sample users to evaluate how easily they could navigate the system and interpret the information presented. This feedback was used to refine the interface and improve the

clarity of visualizations. Performance testing was also conducted to assess response times, especially for complex queries involving large datasets. The combined results of these testing phases confirmed that Civic Lens is stable, efficient, and user-friendly.

9. Conclusion and Future Scope

Civic Lens successfully demonstrates how digital platforms can be used to improve transparency in local governance. By providing citizens with direct access to government budgets, project details, and accountability measures, the system reduces information barriers and strengthens civic engagement. The modular design ensures that each function of the system, from database management to analytics, operates effectively and cohesively.

In the future, Civic Lens can be further enhanced with advanced features. Artificial intelligence can be integrated to detect anomalies in budget allocations or to highlight irregularities in project spending. A mobile application could make the platform more accessible to citizens who rely primarily on smartphones. Integration with live open-data feeds from government portals would allow the system to present real-time updates. Finally, the addition of multilingual support would expand inclusivity, allowing a broader demographic of users to benefit from the platform. With these improvements, Civic Lens has the potential to evolve into a comprehensive civic engagement tool with significant societal impact.