Project Report

9th June 2024

FOR
GUVI TECH CLUB

"JUPADP"
JAIPUR URBAN PLANNING AND DEVELOPMENT PLATFORM

A STREAMLIT APPLICATION

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Introduction

The Jaipur Urban Planning and Development Optimization Portal is a comprehensive tool designed to facilitate urban planning and development in Jaipur. This portal integrates geospatial data, construction material data, and environmental data to provide insightful recommendations for urban infrastructure development. The application uses machine learning models to predict construction costs and recommend Eco-friendly materials, making it a valuable resource for urban planners, architects, and policymakers.

Home Page

Purpose: The home page serves as the introductory screen of the portal, welcoming users and providing an overview of its purpose.

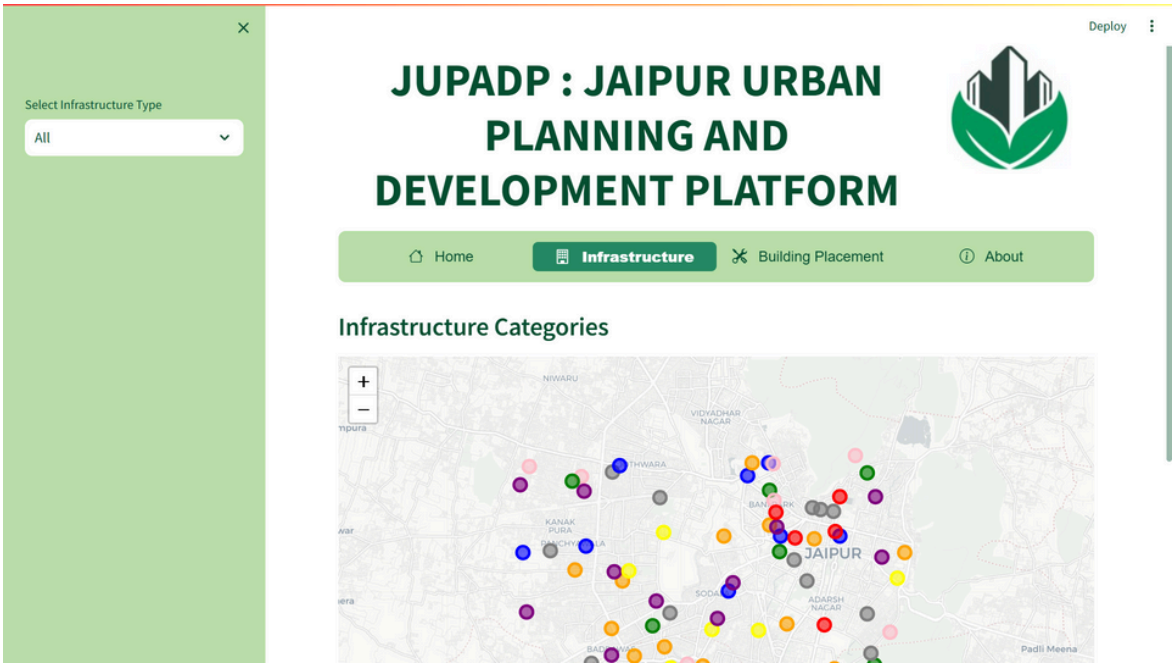
01

Infrastructure Page

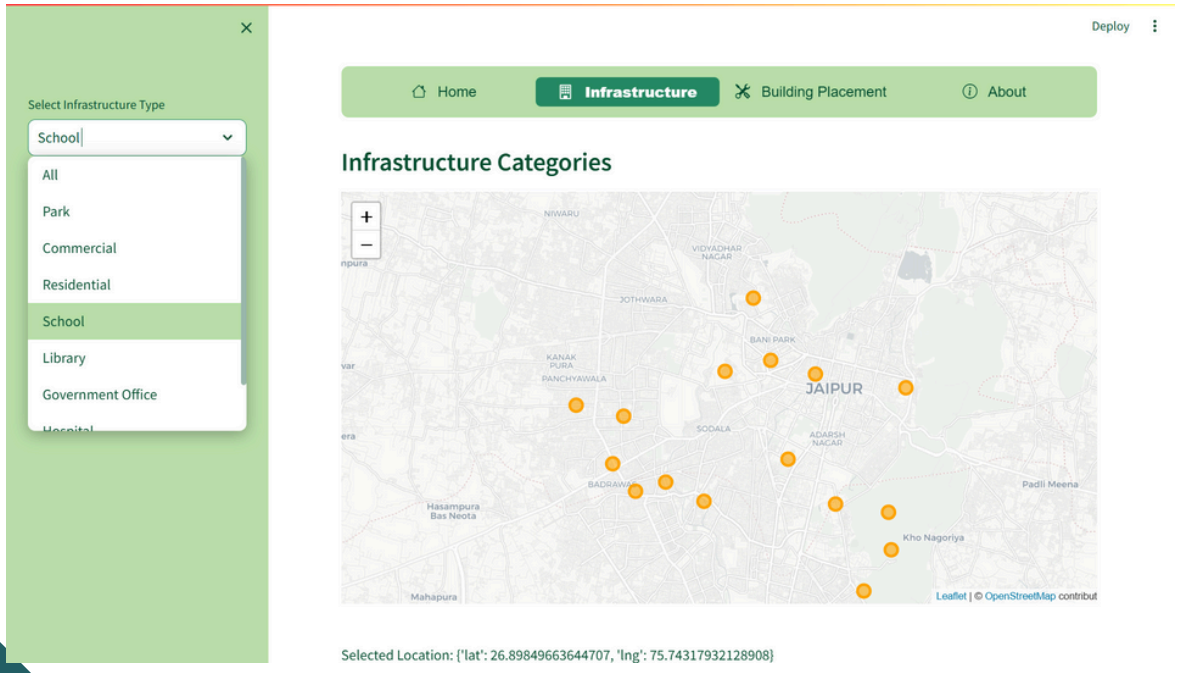
Purpose: To allow users to explore different types of infrastructure within Jaipur.

- Infrastructure Selection: Users can select different types of infrastructure (e.g., parks, commercial areas, residential areas, schools, libraries, government offices, hospitals, utilities) from the sidebar.
- Map Visualization: The selected infrastructure is displayed on an interactive map using Folium. Each type of infrastructure is color-coded for easy identification.
- Location Click: Users can click on locations on the map to view detailed information and potentially move to the building placement page.

02



CHOOSING A LOCATION

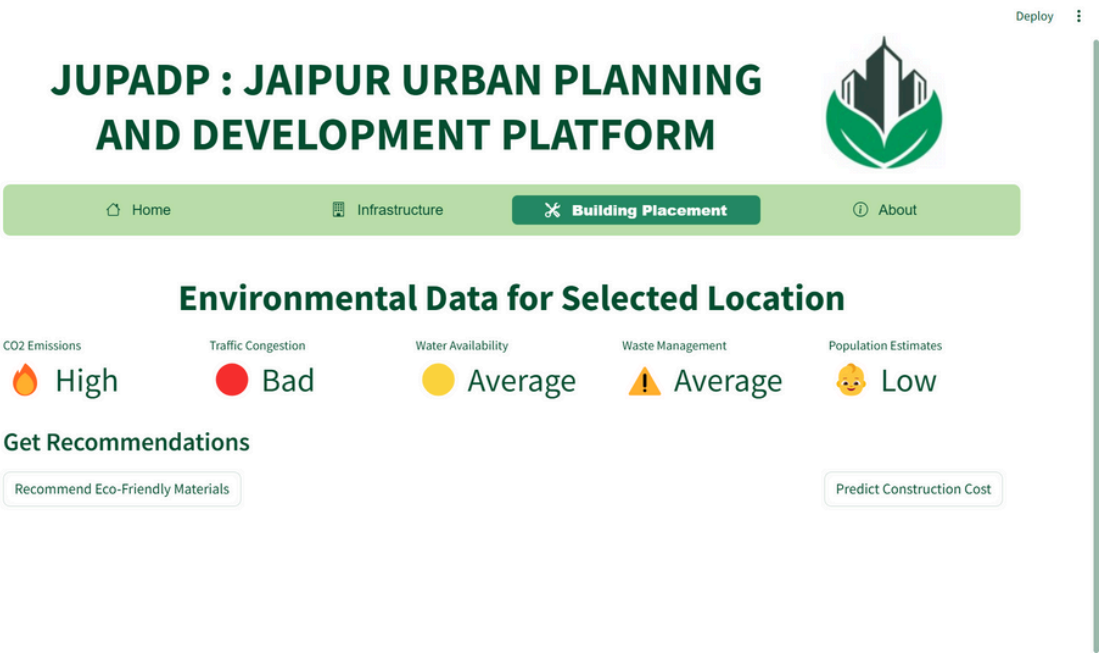


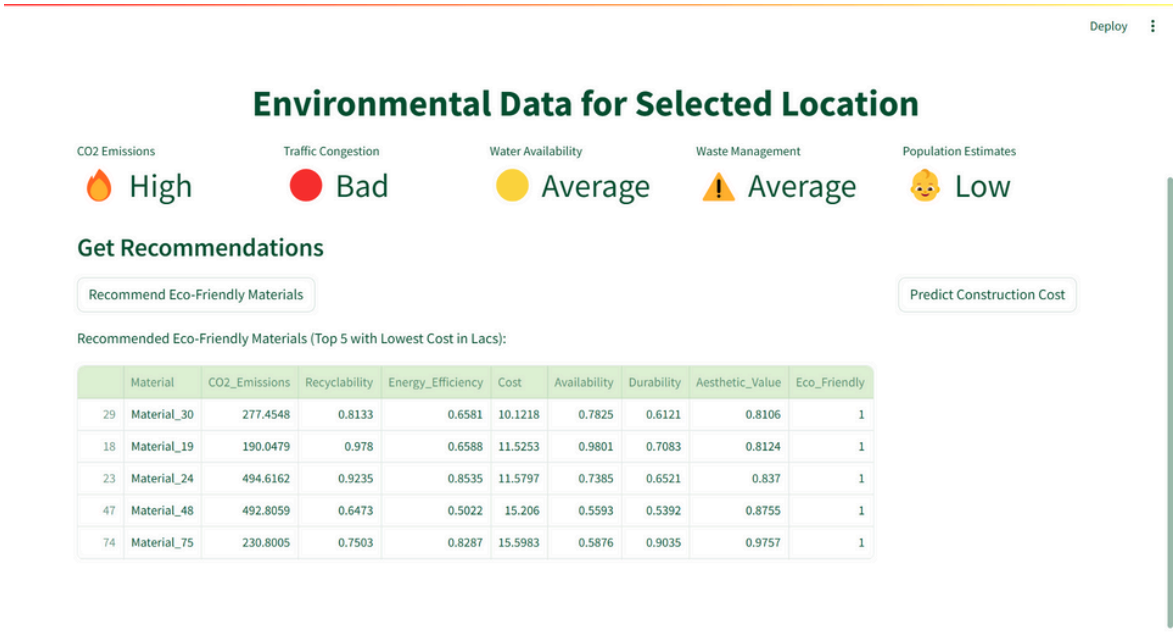
Building Placement Page

Purpose: To provide detailed environmental data for selected locations and offer construction-related recommendations.

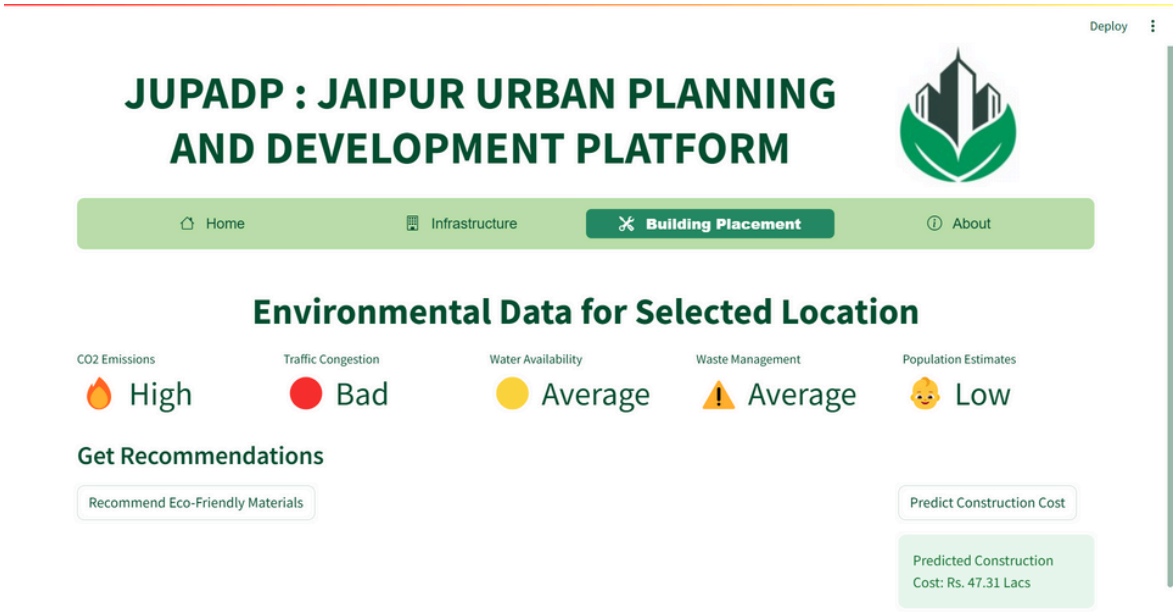
- **Environmental Data Display:**
  - CO2 Emissions: Displays the CO2 emission level with an icon indicating the status (High, Moderate, Low).
  - Traffic Congestion: Displays traffic congestion status (Good, Average, Bad) with respective icons.
  - Water Availability: Displays water availability status (Good, Average, Bad) with respective icons.
  - Waste Management: Displays waste management status (Good, Average, Bad) with respective icons.
  - Population Estimates: Displays population density with respective icons indicating levels (Low, Moderate, High).
- **Machine Learning Predictions:**
  - Predict Construction Cost: Uses a linear regression model to predict the cost of construction based on selected environmental factors.
  - Recommend Eco-Friendly Materials: Uses a random forest classifier to recommend eco-friendly construction materials.

03





	Material	CO2_Emissions	Recyclability	Energy_Efficiency	Cost	Availability	Durability	Aesthetic_Value	Eco_Friendly
29	Material_30	277.4548	0.8133	0.6581	10.1218	0.7825	0.6121	0.8106	1
18	Material_19	190.0479	0.978	0.6588	11.5253	0.9801	0.7083	0.8124	1
23	Material_24	494.6162	0.9235	0.8535	11.5797	0.7385	0.6521	0.837	1
47	Material_48	492.8059	0.6473	0.5022	15.206	0.5593	0.5392	0.8755	1
74	Material_75	230.8005	0.7503	0.8287	15.5983	0.5876	0.9035	0.9757	1



CHECK FOR PARAMETERS AND PREDICTIVE VALUES FOR COST AND RECOMMENDATIONS FOR MATERIALS

About Page

Purpose: To provide information about the portal, its objectives

04

GLIMPSE OF OTHER PARAMETERS

Utility

This portal is designed to streamline the urban planning process by integrating various data sources and providing actionable insights. Key benefits include:

- Informed Decision-Making: Provides detailed environmental data to inform planning decisions.
- Cost Estimation: Predicts construction costs based on material attributes, helping budget planning.
- Sustainability Recommendations: Recommends eco-friendly materials to promote sustainable construction practices.
- User-Friendly Interface: Interactive map and intuitive design make it easy for users to navigate and utilize the portal.

Technical Implementation

- Programming Language: Python
- Web Framework: Streamlit
- Data Handling:
  - Pandas
  - Geopandas
- Geospatial Visualization: Folium
- Interactive Widgets: Streamlit Option Menu
- Machine Learning:
  - Linear Regression: scikit-learn
  - Random Forest Classifier: scikit-learn
- Session Management: Streamlit Session State
- Data Visualization: Streamlit Metrics
- File Handling: Python Built-in Functions
- Custom Icons: Unicode Emojis

Conclusion

The Jaipur Urban Planning and Development Optimization Portal is a robust tool that combines data visualization, machine learning, and interactive features to support urban development initiatives. By leveraging this portal, urban planners can make data-driven decisions that promote efficient and sustainable growth in Jaipur.