

Project Report

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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

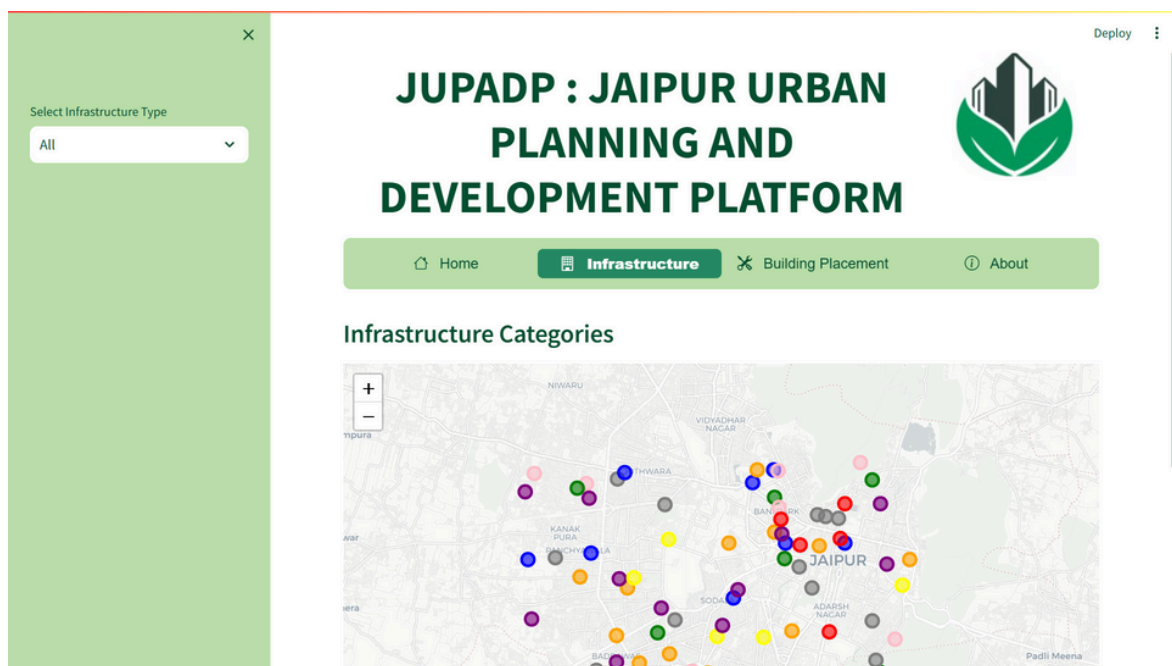


Infrastructure Page

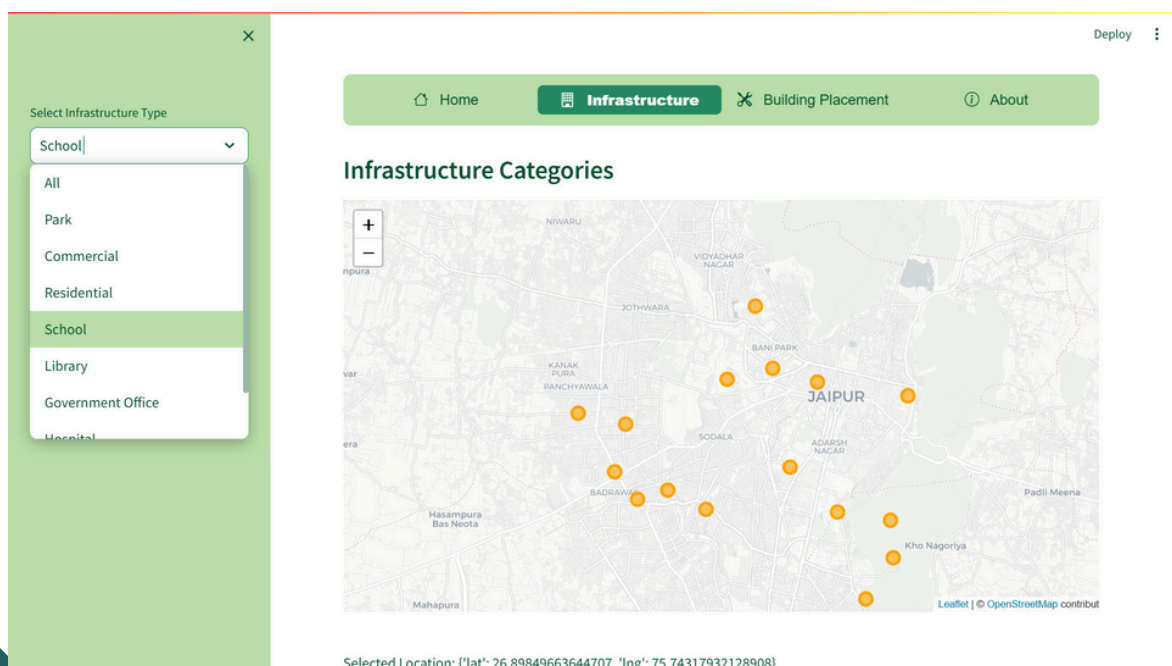
Purpose: To allow users to explore different types of infrastructure within Jaipur.

- **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



Selected Location: {'lat': 26.89849663644707, 'lng': 75.74317932128908}

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



Environmental Data for Selected Location

CO2 Emissions

 High

Traffic Congestion

 Bad

Water Availability

 Average

Waste Management

 Average

Population Estimates

 Low

Get Recommendations

[Recommend Eco-Friendly Materials](#)[Predict Construction Cost](#)

Recommended Eco-Friendly Materials (Top 5 with Lowest Cost in Lacs):

	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

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Environmental Data for Selected Location

CO2 Emissions

 High

Traffic Congestion

 Bad

Water Availability

 Average

Waste Management

 Average

Population Estimates

 Low

Get Recommendations

[Recommend Eco-Friendly Materials](#)[Predict Construction Cost](#)Predicted Construction
Cost: Rs. 47.31 Lacs

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

Purpose: To provide information about the portal, its objectives

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Infrastructure

✂ Building Placement

 About

Infrastructure Mapping: Visualize various types of infrastructure, such as parks, residential areas, commercial zones, schools, libraries, hospitals, and more. Easily navigate through different categories and explore their geographic distribution within the city.

Environmental Impact Assessment: Get detailed environmental data for specific locations within Jaipur. Understand the CO2 emissions, energy efficiency, recyclability, and other environmental factors impacting different areas.

Building Placement Recommendations: Select a location on the map and receive tailored recommendations for construction materials based on environmental data. Predict construction costs and evaluate the eco-friendliness of materials to make informed, sustainable choices.

Material Cost and Sustainability Analysis: Utilize our predictive models to estimate construction costs and assess the sustainability of various construction materials. Identify cost-effective and eco-friendly options to optimize your building projects.

How to Use

Explore Infrastructure: Navigate to the "Infrastructure" page to explore different types of infrastructure across Jaipur. Use the sidebar to filter by category and click on map points to get more details. Building Placement: On the "Building Placement" page, select a location to view detailed environmental data and receive

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How to Use

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Our Mission

Our mission is to support sustainable urban development in Jaipur by providing advanced tools and insights that facilitate data-driven decision-making. We believe that integrating environmental considerations into urban planning is essential for creating livable, resilient, and sustainable cities.

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Good

Low

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Average

Good

Average

Moderate

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Predict Construction Cost

Predicted Construction Cost: Rs. 43.75 Lacs

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High

Good

Good

Good

High

Get Recommendations

Recommend Eco-Friendly Materials

Predict Construction Cost

Predicted Construction Cost: Rs. 57.68 Lacs

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.