



Predicting Accessibility in Barcelona Using ML

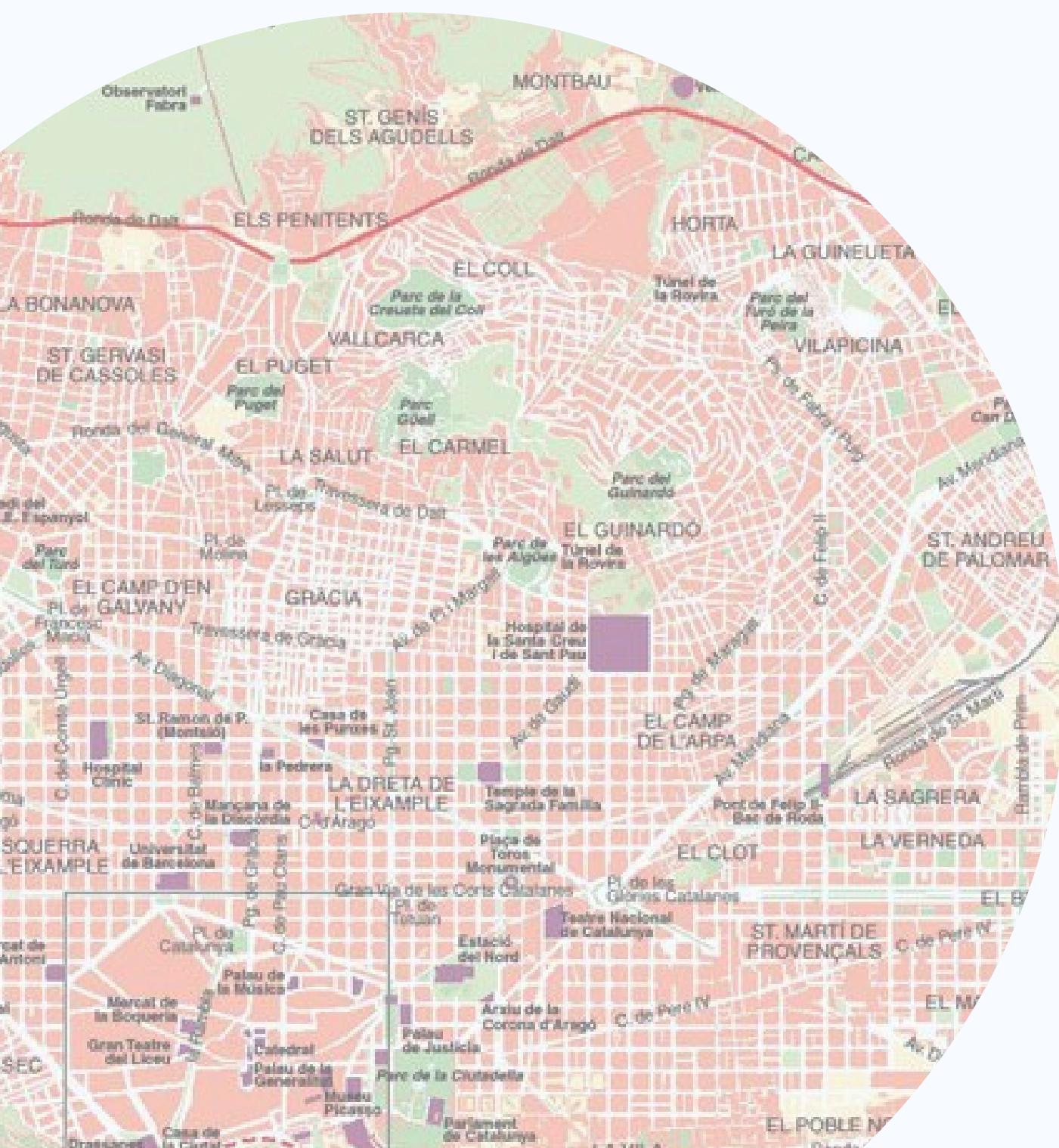
A Comprehensive Analysis and Model Development

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Get Started



Introduction



Urban accessibility is crucial for ensuring that all citizens, including those with disabilities, can navigate cities safely and efficiently.

This project aims to predict and visualize accessible areas in Barcelona using machine learning, helping to improve urban mobility and planning



Problem

Many urban areas lack proper accessibility, creating significant challenges for people with disabilities.



By predicting accessibility, we can provide valuable insights for urban planners and policymakers to create more inclusive cities



Data Overview



The screenshot shows the Open Data BCN website interface. At the top left is the URL www.barcelona.cat. Next to it are icons for a grid, a globe, and the city of Barcelona. Below the URL is the **Open Data BCN** logo, which includes a small icon of a person with crutches. The main content area displays the dataset [2022_Accessibilitat_barris.csv](#), which is described as a "Territory / Town planning and ... / Streets' accessibility in ... / 2022_Accessibilitat_barris.csv". Below the file name is a brief description: "Accessibility parameters geolocated list in the city of Barcelona". At the bottom right of the content area are two buttons: "Download" and "Data API". A yellow border highlights the entire screenshot.

The dataset comprises 173,144 records and 40 features, obtained from [Open Data BCN](#).

The target variable, **Accesibilitat**, indicates the accessibility status of areas



Data Overview

A comprehensive dataset includes geographical coordinates, street features, and accessibility indicators.

Key features include GIS coordinates, street width, pavement conditions, and accessibility features like ramps and tactile paving



Solution Approach



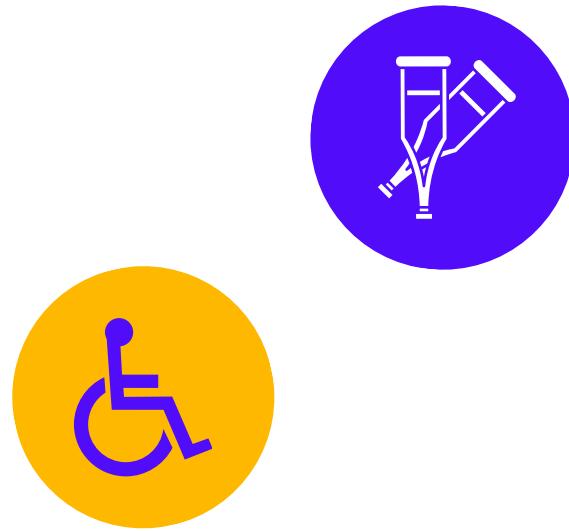
- Data preprocessing steps included handling missing values, scaling features, and using SMOTE to address class imbalance. Feature selection helped identify the most relevant predictors.
- After performing a set of tests to define the best model and hyperparameters for Logistic Regression, Gradient Boost and Random Forest, a Random Forest classifier was chosen as the best model to predict accessibility in Barcelona.



Model Training and Evaluation



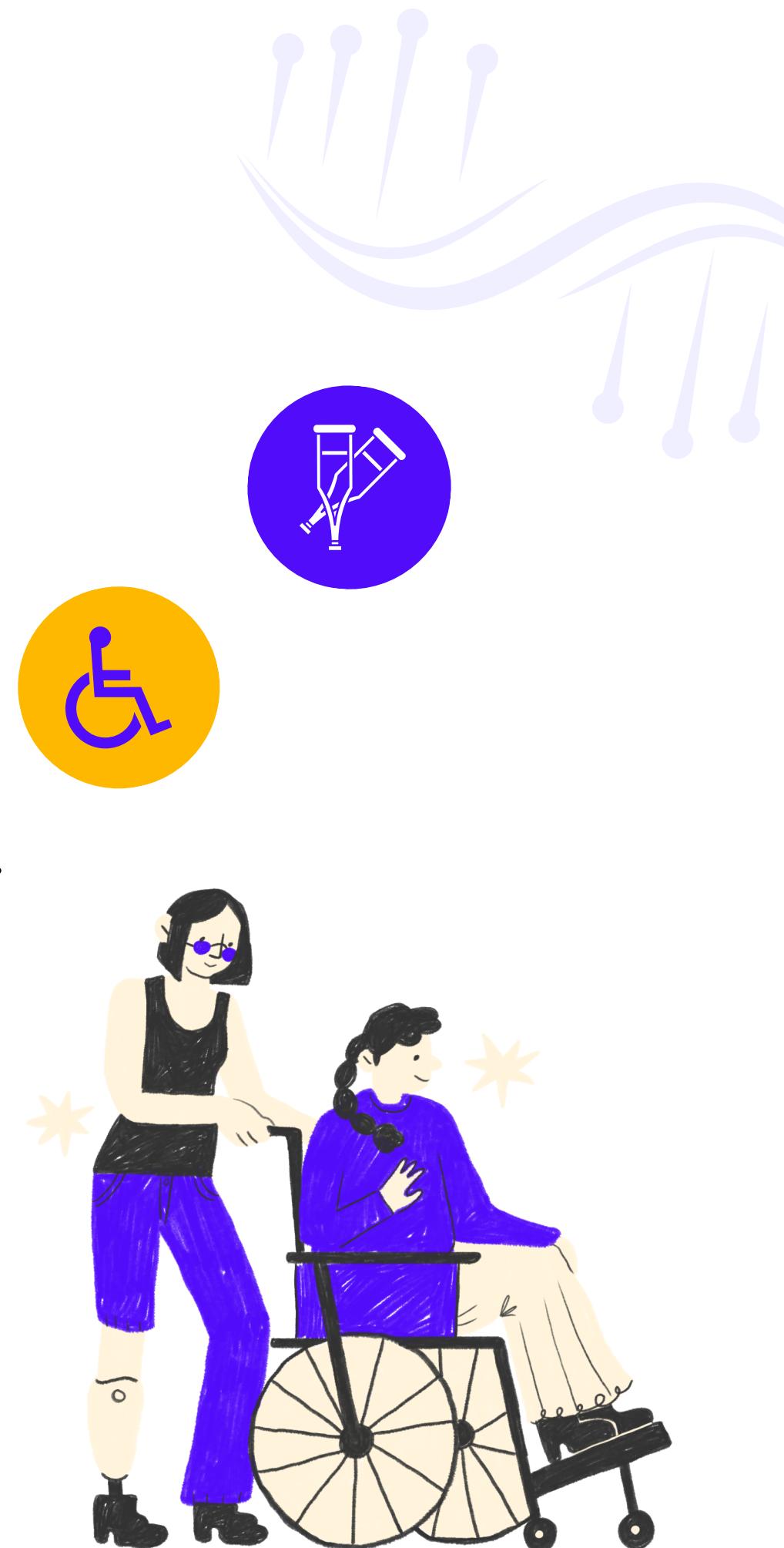
- The model was evaluated using accuracy, precision, recall, and F1-score. The Random Forest model achieved high accuracy, demonstrating its reliability in predicting accessibility.
- To check for overfitting, a 3-fold cross-validation was performed, and the mean cross-validation score showed a 99.6% accuracy.



Results and Impact

Confusion Matrix showed that model predicted **51 780 true positives** and **51 700 true falses** against 32 false positives and 101 false negatives. The model's predictions provide a precise classification of accessible and non-accessible areas in Barcelona.

This information can guide urban planners in making data-driven decisions to enhance accessibility, benefiting people with disabilities and improving overall urban mobility.

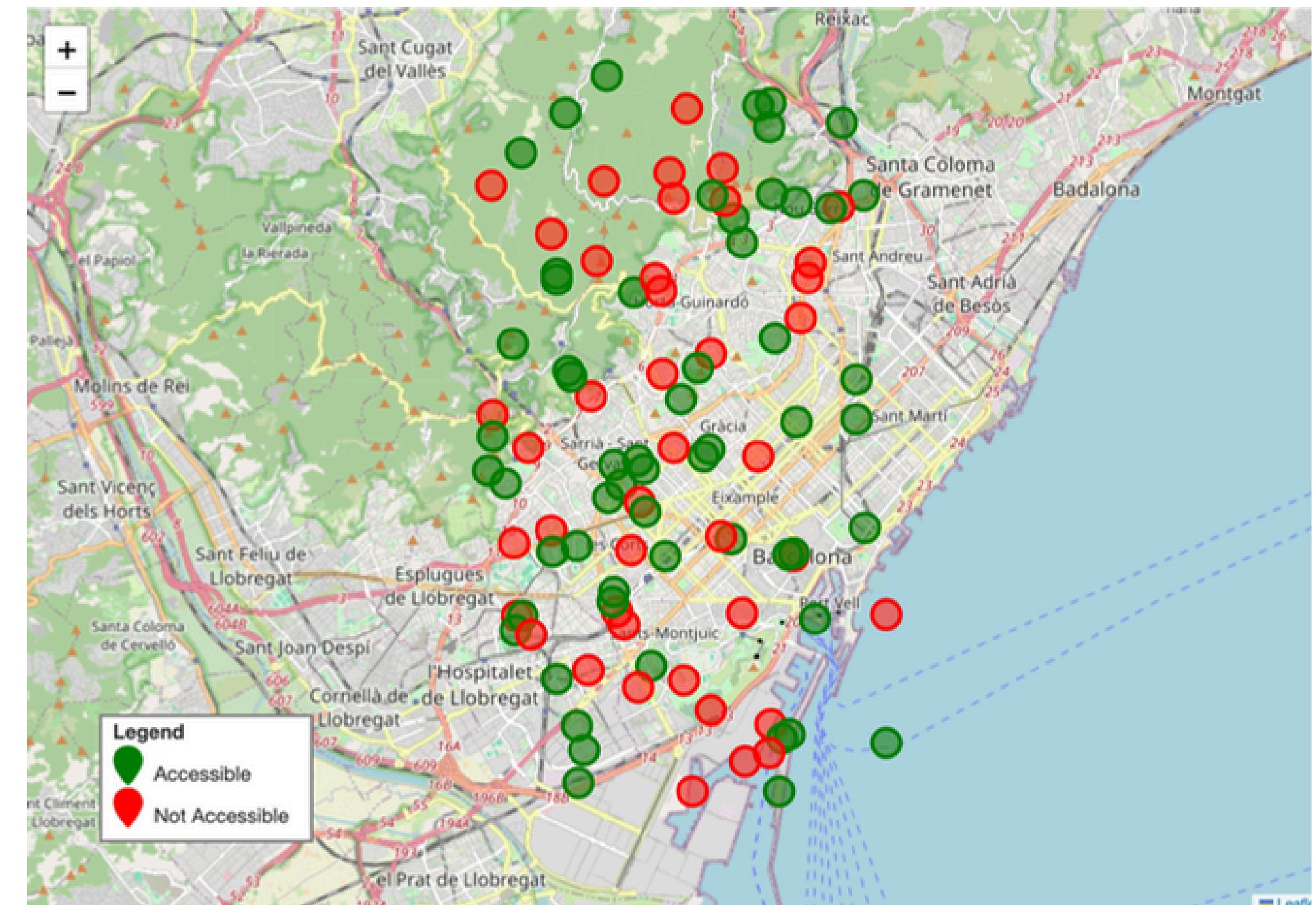


Example Visualization

Here is a visual representation of the model's predictions.

Accessible areas are marked in green, while non-accessible areas are in red.

This map can be a valuable tool for identifying accessibility gaps and planning improvements.





Conclusion

In summary, the developed model effectively predicts urban accessibility, offering valuable insights for improving city planning. By addressing accessibility challenges, we can create more inclusive and navigable urban environments.

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Thank you!

