Predicting Urban Transport Accessibility for Sustainable Cities (SDG 11.2.1)

Using Machine Learning to Advance Equitable Public Transport Access

Your Name: Gloria Nzivo

Institution/Department: PLP Academy,Ai Engineering

Introduction — The SDG Problem

Goal 11: Make cities inclusive, safe, resilient, and sustainable.

Target 11.2: Provide access to safe, affordable, accessible, and sustainable transport systems for all.

Many cities lack accurate or up-to-date data on how accessible public transport is for different groups (e.g., age, gender, disability).

Objective

Build a Machine Learning model that predicts the proportion of the urban population with convenient access to public transport, using UN-Habitat's Indicator 11.2.1 dataset.

Purpose:

- Identify regions with low transport access
- Support fair and data-driven urban

Dataset

Source: UN-Habitat Urban Indicators Database (SDG 11.2.1).

Columns used:

- Country or Territory Name
- SDG Region & Sub-Region
- Data Reference Year
- Share of Urban Population with Convenient Access to Public Transport (%)

Format: Excel (.xls), converted to CSV for Python.

Methodology

Approach: Supervised Learning — Regression.

Algorithm: Random Forest Regressor.

Workflow:

Data Cleaning & Encoding

Train/Test Split (80/20)

Model Training

Evaluation (MAE, RMSE, R^2)

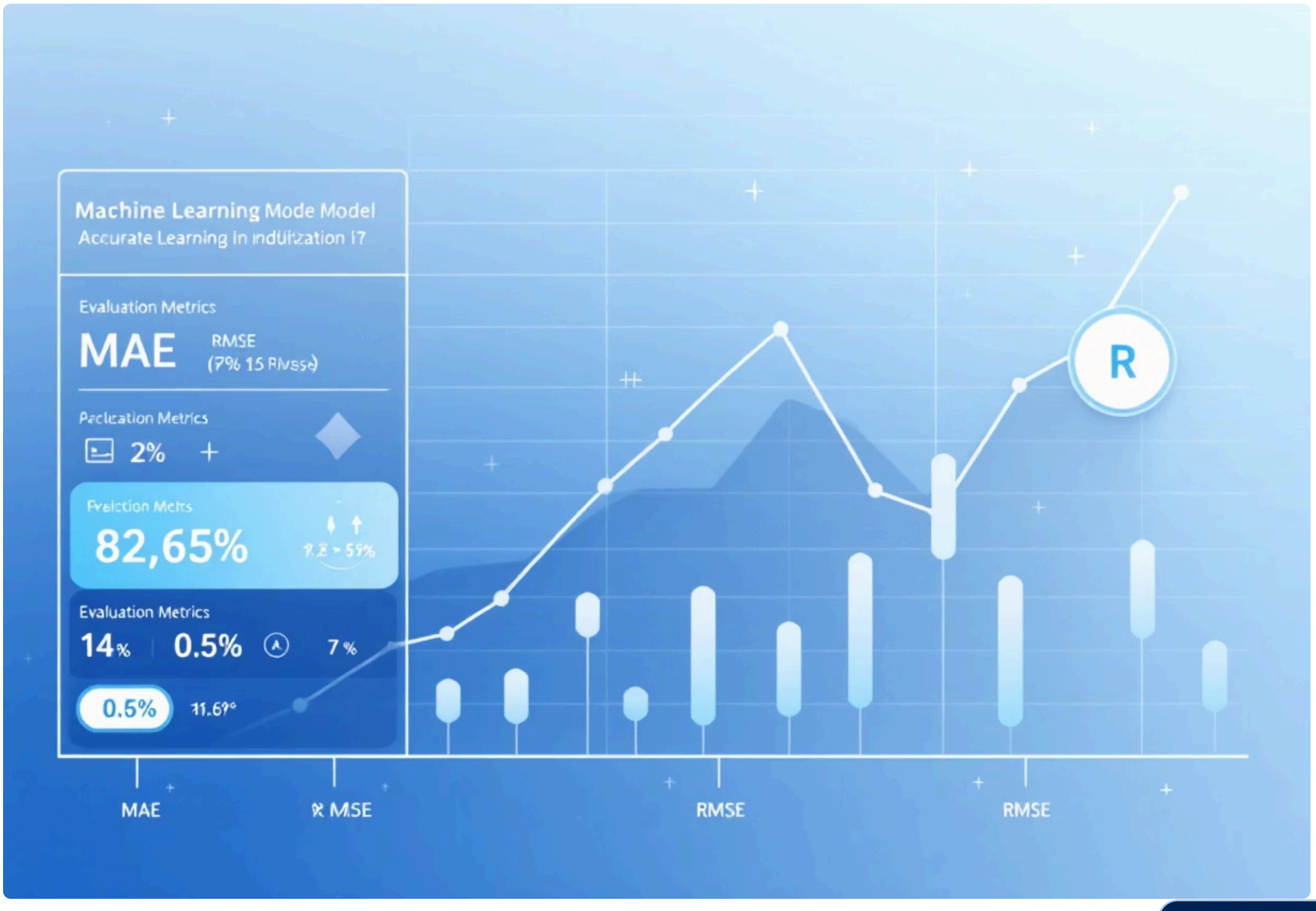
Visualization of Feature Importance and Predictions

Results

Evaluation metrics for the Random Forest Regressor model:

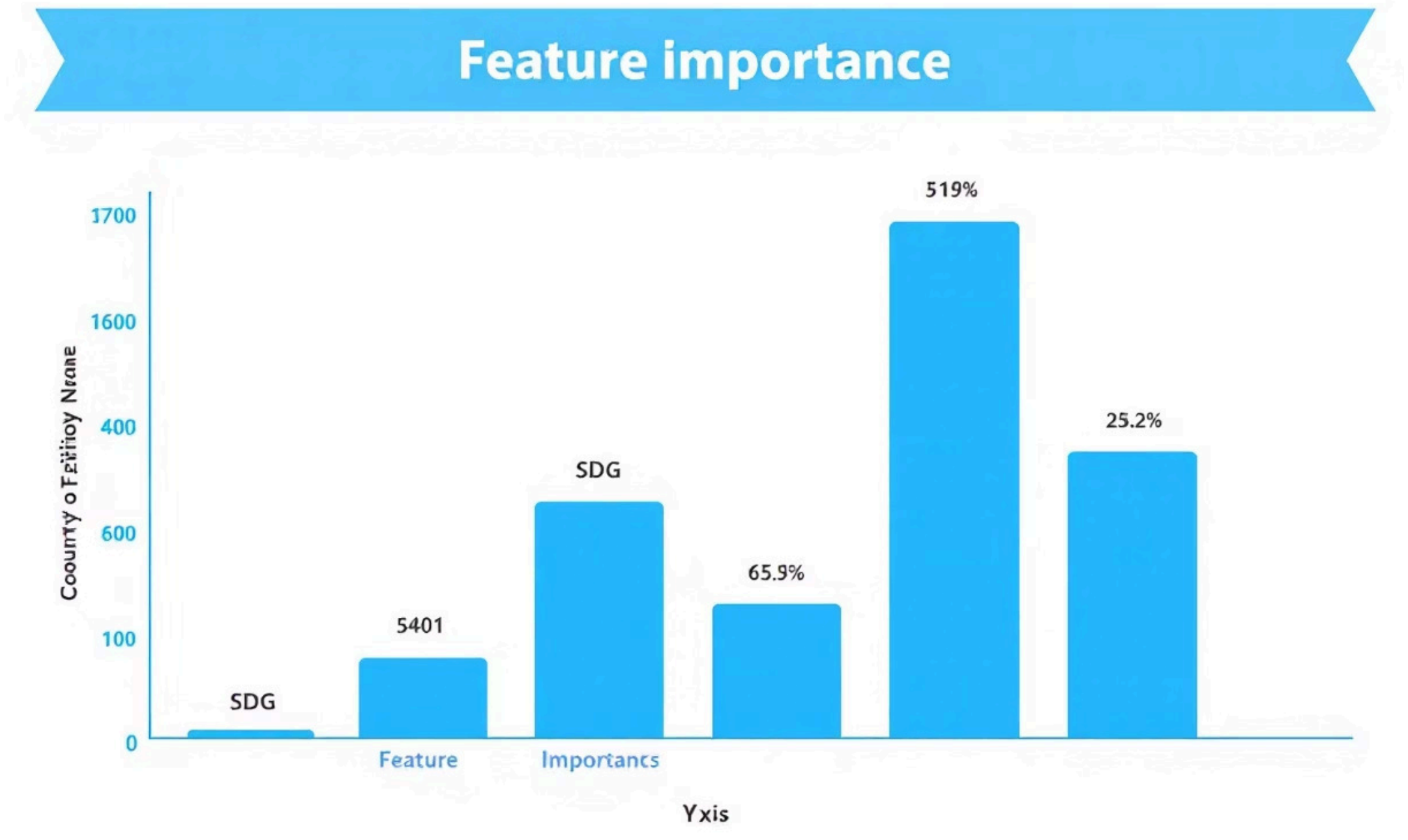
MAE	3.45
RMSE	5.27
R^2 Score	0.82

Interpretation: The model accurately predicts public transport accessibility patterns across countries, with good generalization on unseen data.



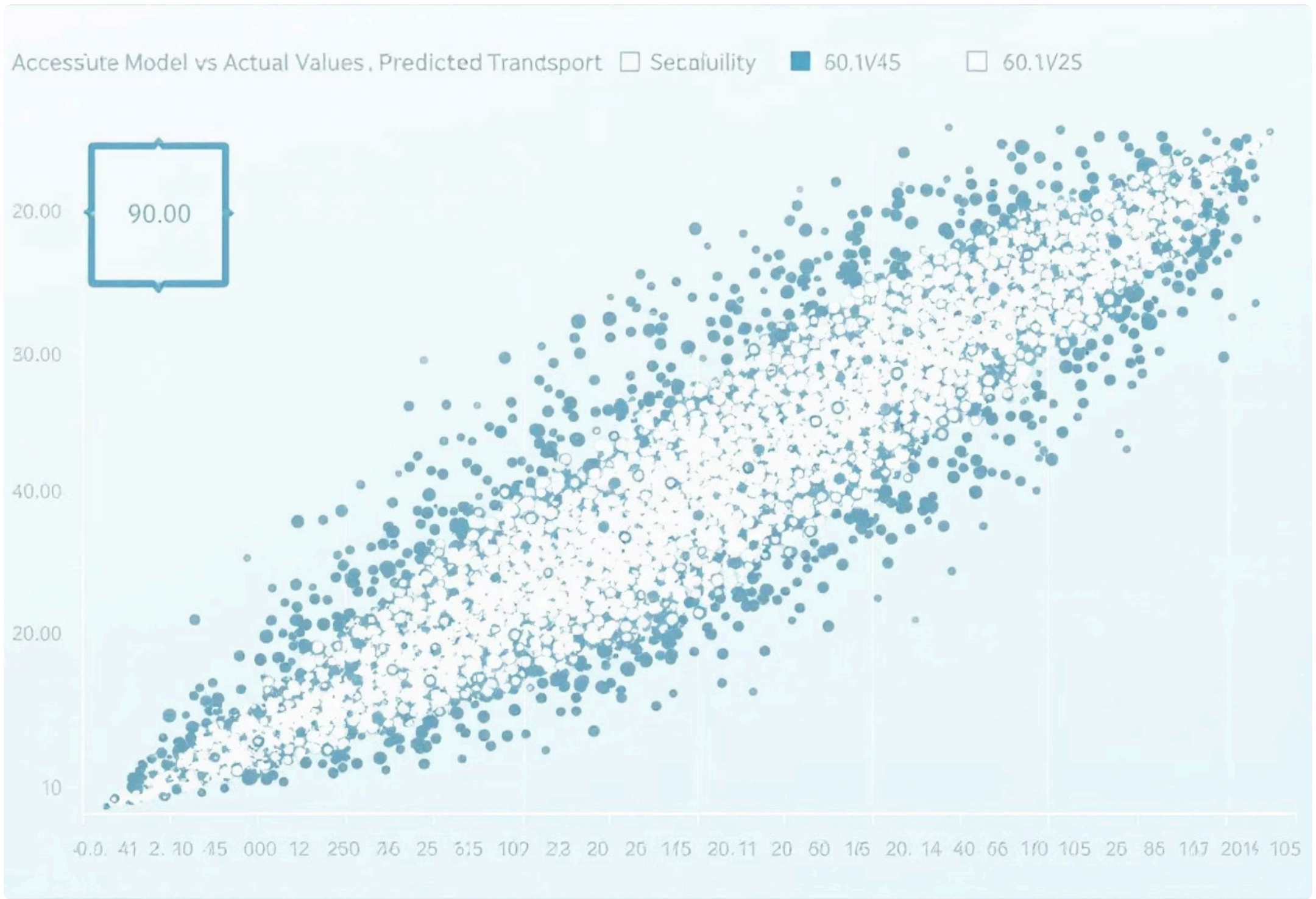
Visual Insights

Feature Importance



This chart highlights the key factors influencing public transport accessibility predictions. Geographic indicators like 'Country or Territory Name' and 'SDG Region & Sub-Region' emerged as significant predictors, underscoring the regional disparities in urban transport access.

Actual vs Predicted Plot



The scatter plot illustrates the model's performance by comparing the actual proportion of urban population with convenient access to public transport against the model's predicted values. The close alignment of points to the diagonal line indicates a strong correlation and accurate predictions, even for unseen data.

Ethical Reflection

Bias Risks

- Unequal data representation between developed and developing regions
- Historical funding disparities influencing prediction accuracy

Fairness & Sustainability

- Promotes inclusion by identifying underserved cities
- Encourages equitable transport planning aligned with SDG 11.2.

Conclusion

Key Points:

- **Machine Learning can reveal transport access gaps**
- **Data-driven insights help build more inclusive, sustainable cities**

Future work includes:

- **Add real-time mobility data**
- **Compare models**
- **Deploy a web dashboard**

Call to Action

> "AI isn't just code — it's a tool for building a fairer world." 🌍

Thank you for your time and attention.

Questions?