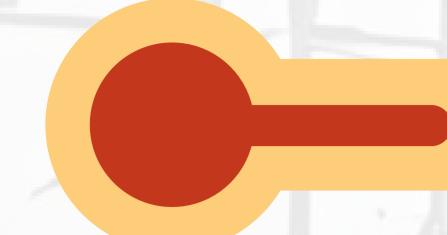
BARANGAY-LEVEL URBAN HEAT ISLAND PREDICTION

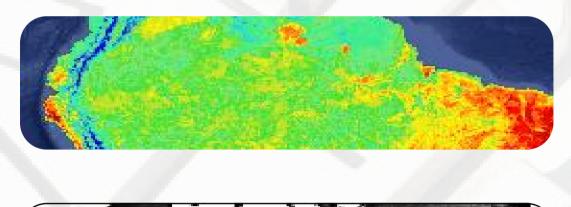


Using Machine Learning in Cagayan de Oro City 🛑

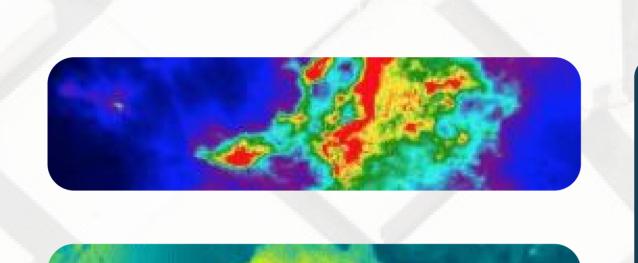
PROBLEM STATEMENT

Despite the growing awareness of UHI effects in urban areas, there is limited research focused on fine-scale prediction and analysis of UHI at the barangay level in Cagayan de Oro City. Existing studies often rely on coarse spatial data or simple modeling approaches that fail to capture local variability in urban form, microclimate, and natural cooling mechanisms. This gap restricts the ability of city planners and policymakers to implement targeted interventions aimed at mitigating heat stress in vulnerable communities.

DATASET OVERVIEW



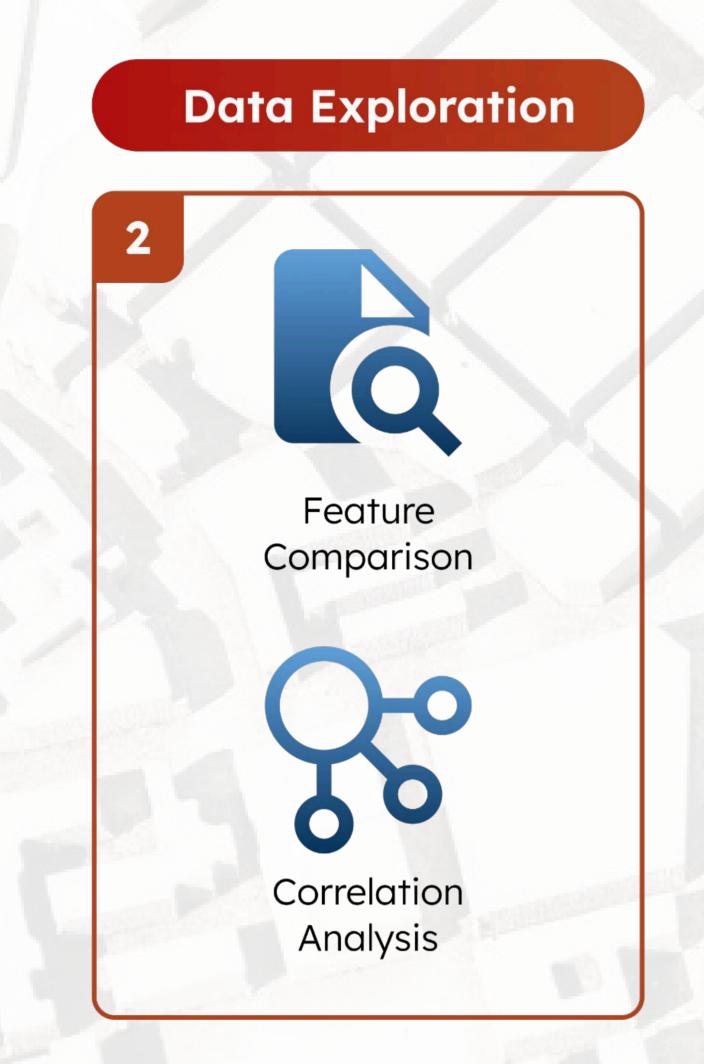




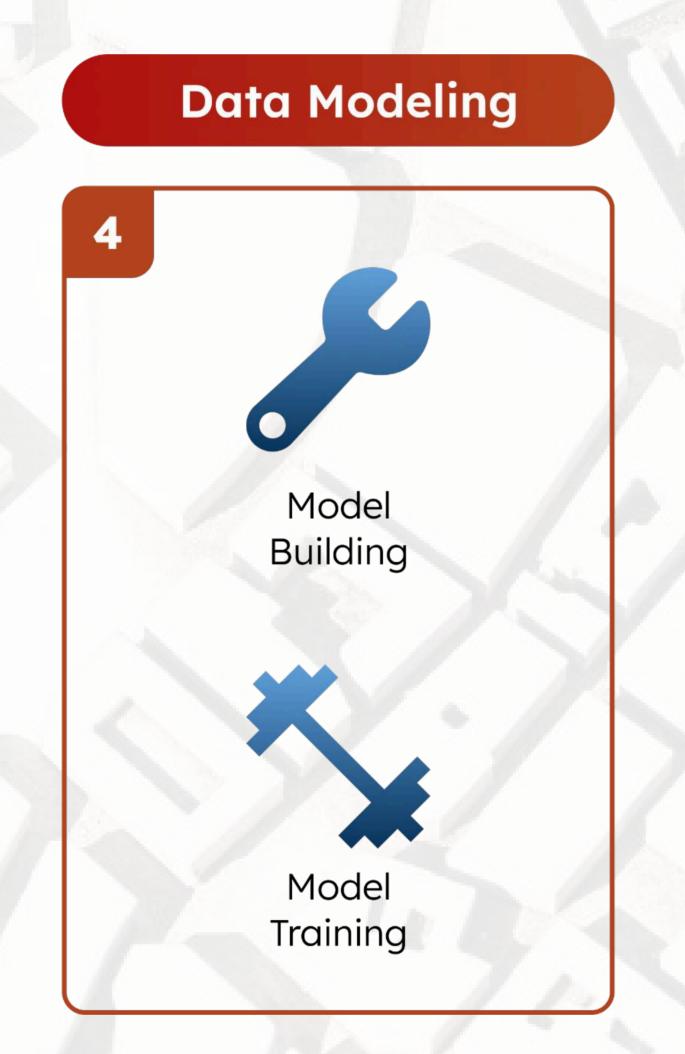
30+ Environmental, Terrain, Meteorological, and Urban Features

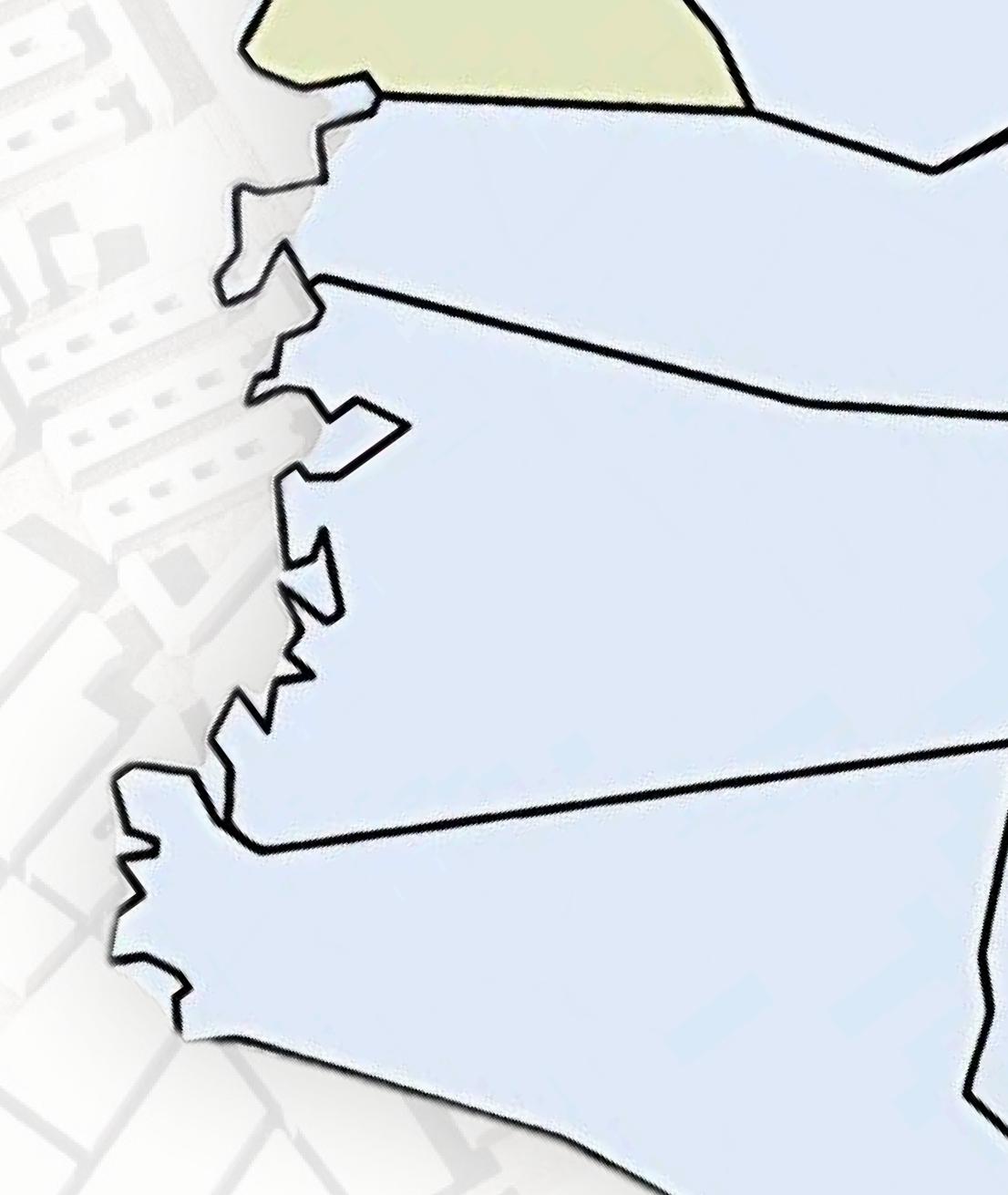
METHODOLOGY











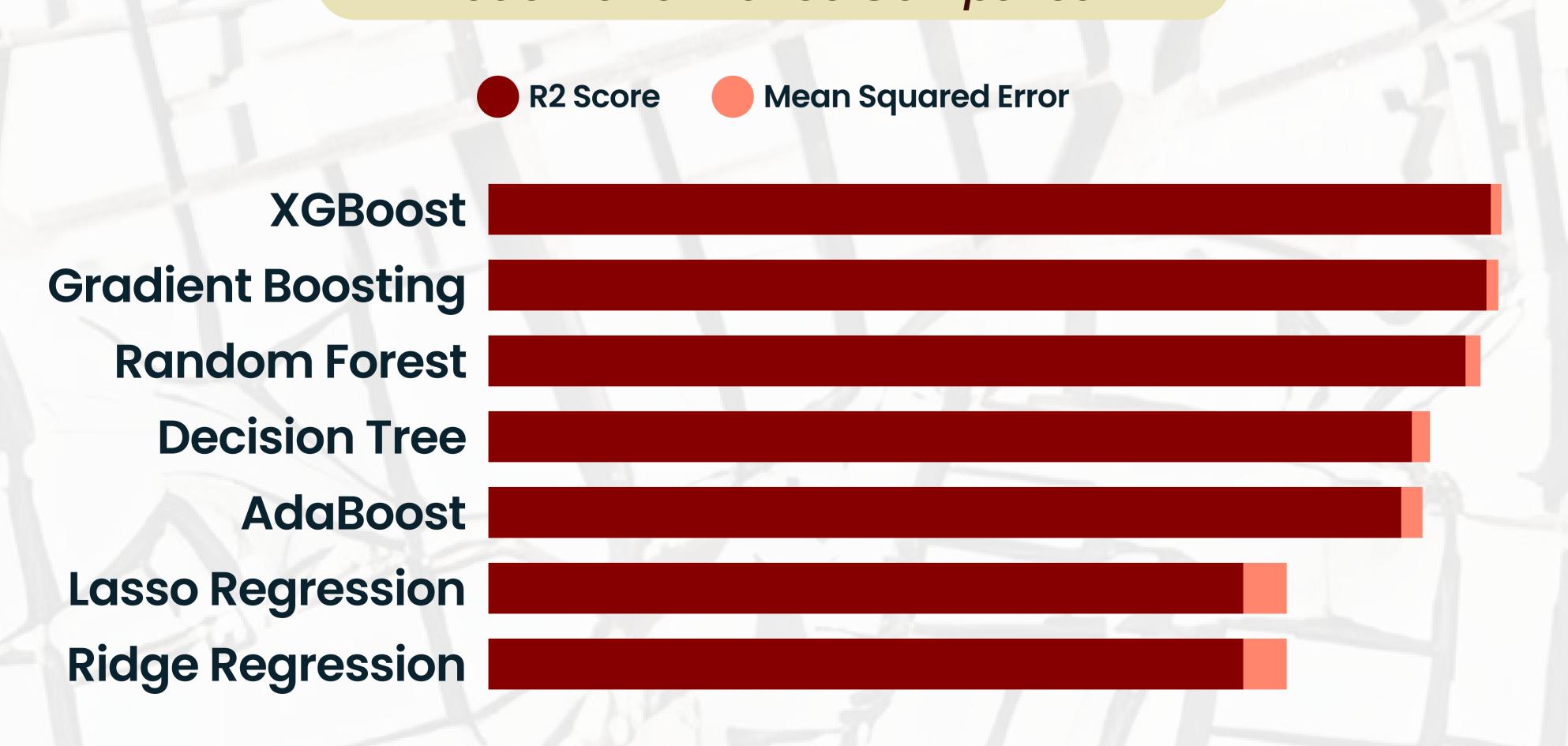
RESULTS & DISCUSSION

BEST MODEL:

XGBoost

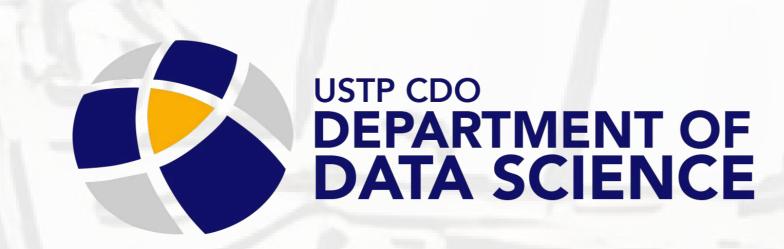
 $R^2 = 0.955$ MSE = 0.594

Model Performance Comparison



We tested different models, and XGBoost delivered the most accurate predictions. It gave us over 95% accuracy in explaining UHI patterns, confirming that our data and features were highly informative.

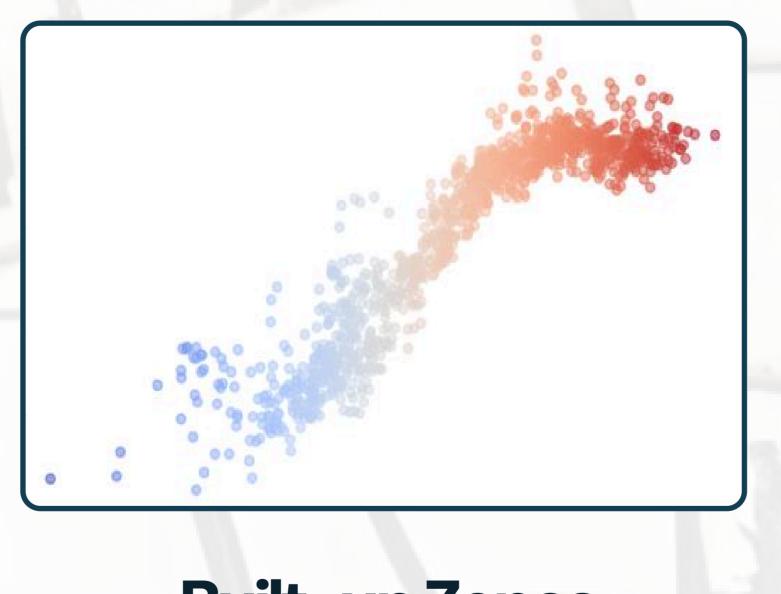
HeatScape UHI ANALYTICS



Top 3 Contributors

- NDBI (Normalized Difference Built-up Index)
- Cooling Capacity
- Microclimate Modifier (Terrain + Moisture)

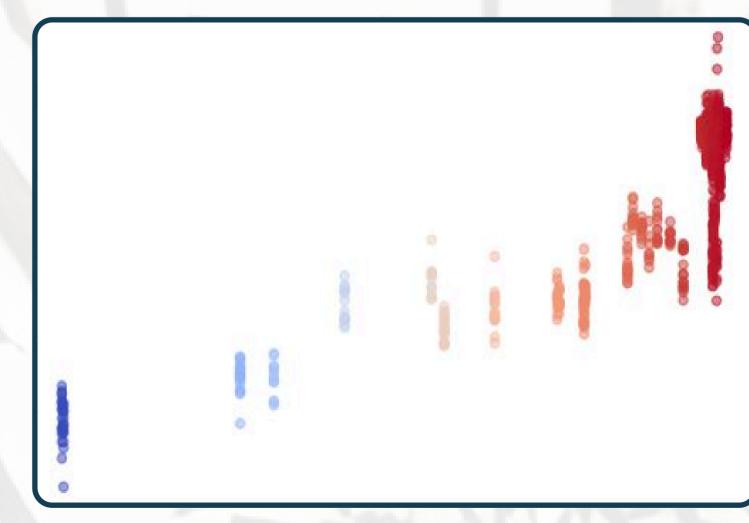
What SHAP Tells Us:





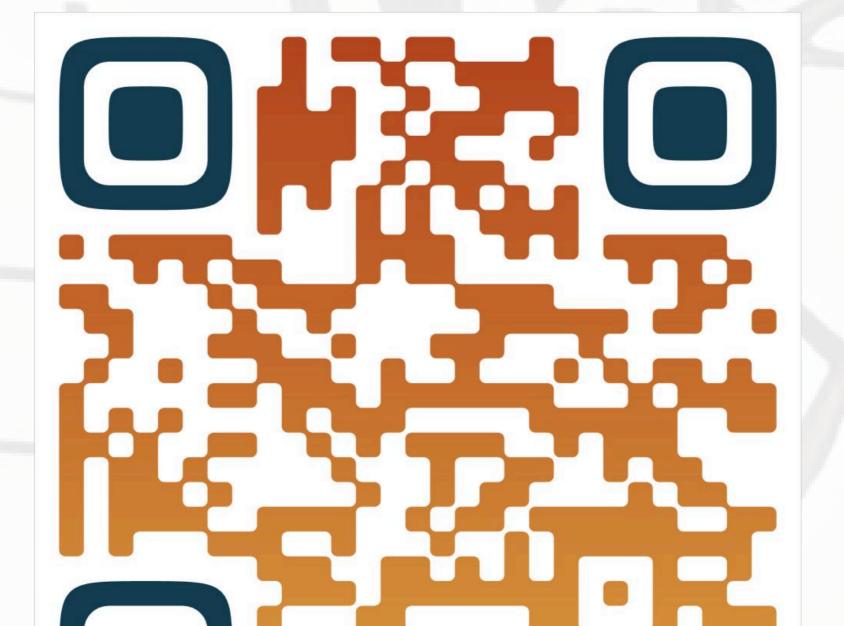


Vegetation + Moisture = Cooler



Terrain + Atmosphere

= Significant Modifiers



Dashboard for Decision Making

https://heatscape.streamlit.app/







