AI for climate change

Machine Learning for UN SDG 13: Climate Action

Presented by: Group no 63

Course: AI for Software Engineering | PLP Academy

The Problem:
Climate Change is Escalating

Rising Emissions

Carbon emissions are increasing yearly, driven by industrial activity, energy usage, and deforestation.

Lack of Forecasting

Without accurate emission predictions, governments and organizations can’t take proactive climate action.

Regional Data Gaps

Many developing regions lack detailed emissions data, limiting their ability to make informed sustainability decisions.

Delayed Policy Response

Climate action is often reactive, not preventive, due to slow or unreliable environmental data insights.

Our AI-Powered Climate Solution:

Forecasting Emissions for a Greener Future

1. Data Collection

Use open datasets from sources like the UN, World Bank, and Kaggle that contain carbon emission records across regions.

2. Model Training

Train a regression model (like Random Forest or Linear Regression) on historical emission trends to forecast future carbon output.

3. Prediction & Visualization

Use real-time or test inputs to predict CO_2 levels. Visualize the results in graphs or maps to show where emissions will spike.

4. Climate Impact Insight

These forecasts help policy makers and organizations take proactive steps—reducing emissions before they peak.

Artificial Intelligence:

Our AI Approach & Ethical Reflection

Supervised Learning

We used a regression-based supervised learning model (Random Forest) to predict carbon emissions using historical data.

Model Evaluation

Performance was evaluated using metrics like MAE (Mean Absolute Error) and R^2 score to ensure reliability and accuracy.

Feature Selection

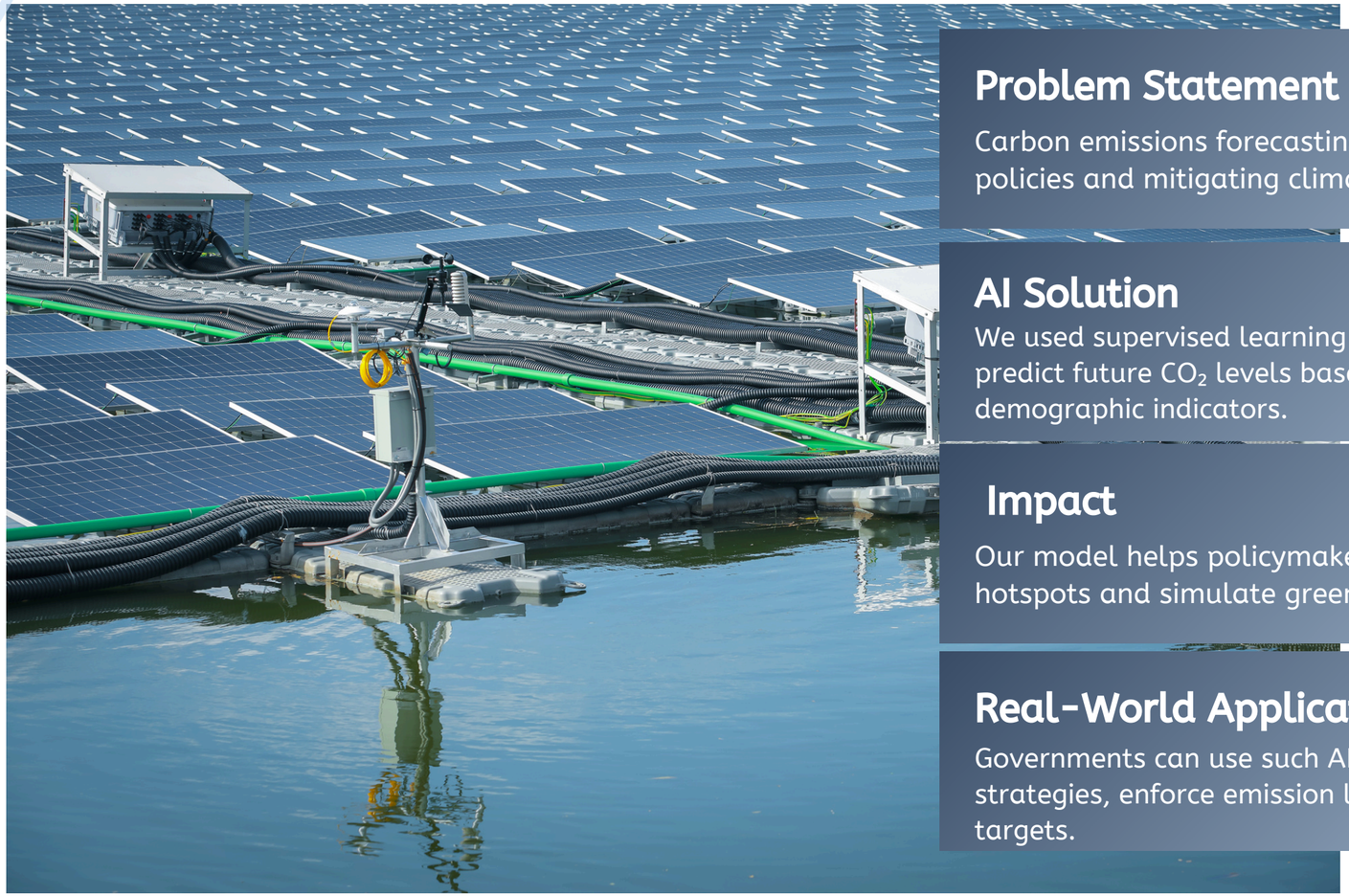
Key features include industrial activity, population, energy use, and regional emission data—sourced from trusted datasets.

Ethical Considerations

Bias in datasets can impact fairness. Our model was tested across regions to reduce inequity and support global climate justice.

🌍 AI for Climate Action

📈 Predicting Carbon Emissions for a Sustainable Future



Problem Statement

Carbon emissions forecasting is critical for planning sustainable policies and mitigating climate change.

AI Solution

We used supervised learning (Random Forest Regression) to predict future CO_2 levels based on industrial, energy, and demographic indicators.

Impact

Our model helps policymakers and environmentalists assess hotspots and simulate greener energy alternatives.

Real-World Application

Governments can use such AI models to shape climate strategies, enforce emission limits, and align with SDG 13 targets.

Evaluating AI Performance
Accuracy, Insights, and Impact

Model Accuracy

🎯 Achieved R^2 Score of 0.91 and RMSE of 1.7 ppm, indicating strong predictive performance on CO_2 levels.

Visual Insight

📈 Forecast graphs revealed a potential 20% rise in emissions by 2035 under current trends — emphasizing the urgency for intervention.

Policy Relevance

🏛️ Our results support data-driven climate policy, allowing simulations of cleaner energy transitions and regional emission control.

Key Features Identified

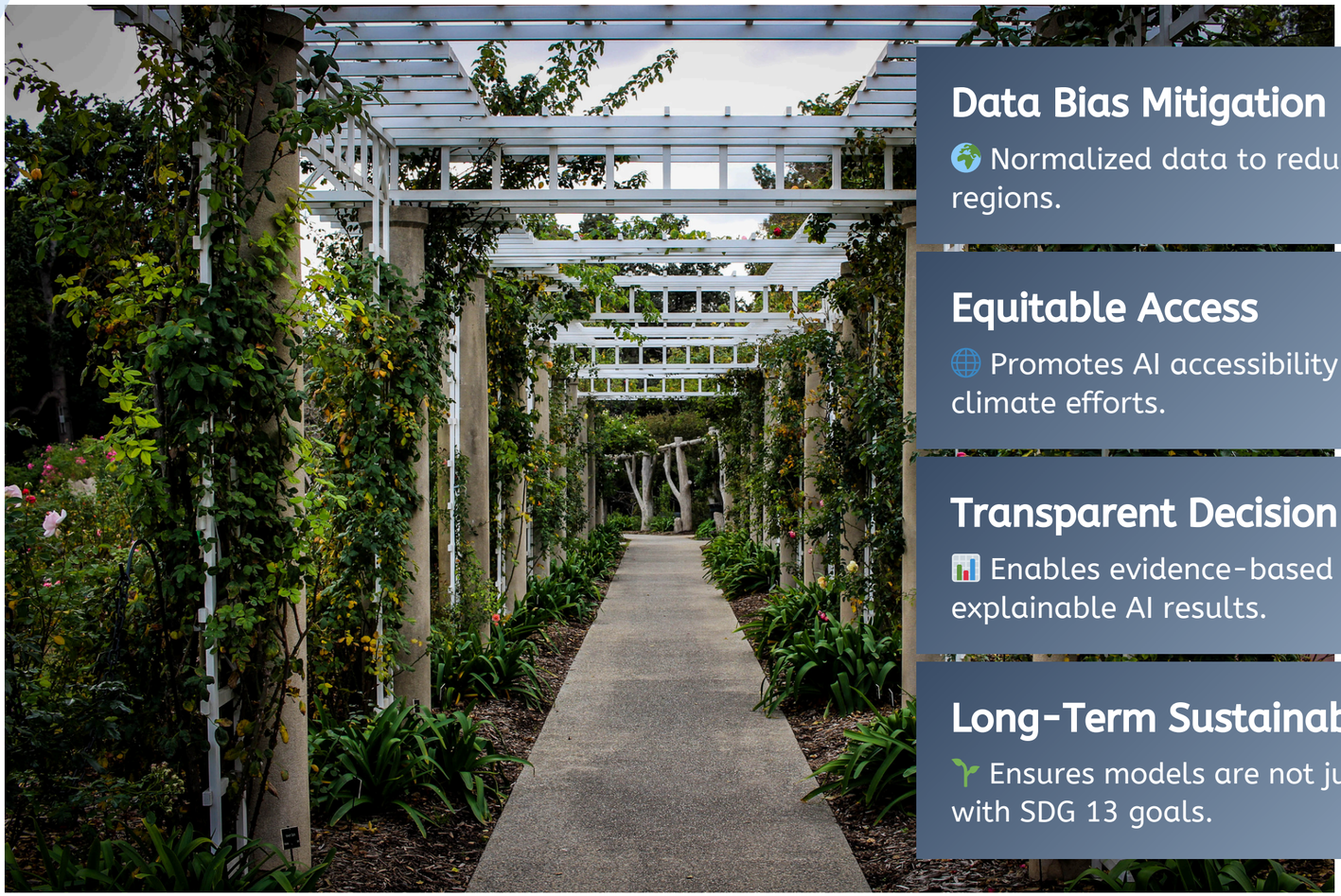
📌 Energy use, industrial output, and urban population emerged as the top predictors of emissions.

User-Friendly Dashboard

🧭 Model output can be integrated into an interactive dashboard for real-time scenario testing by stakeholders.

Responsible AI

for a Greener Future



Data Bias Mitigation

🌍 Normalized data to reduce bias from underrepresented regions.

Equitable Access

🌐 Promotes AI accessibility for developing nations to support climate efforts.

Transparent Decision-Making

📊 Enables evidence-based policymaking grounded in explainable AI results.

Long-Term Sustainability

🌱 Ensures models are not just accurate but ethically aligned with SDG 13 goals.

The Impact of Technology;
Join Us in Climate Innovation

AI for a Better Planet

🤖🌍 AI is a powerful ally in the fight against climate change.

What This Project Proves

📈 Our model shows how machine learning enables proactive climate action.

Collaborate for Impact

💡 Let’s build smarter, cleaner, and more sustainable systems—together.

Thank You! Let's Connect 🤝

"Together, we can build an AI-powered, climate-resilient world.
Let's take data-driven action for a greener tomorrow."