**Predicting the Unfair: A Machine Learning Study on Global Inequality**

Of the seventeen Sustainable Development Goals adopted by the United Nations, I chose to focus on Goal 10, Reduced Inequalities. This goal resonates with me deeply because, beyond the numbers and policies, inequality is a daily reality for those of us from developing countries. I wanted to find out if the odds are truly against us despite our efforts or if there is still hope in how we respond.

To investigate this, I built a machine learning model that could use real global data to show the current state of inequality and where it might be headed. I used datasets from the United Nations that cover GDP, the Gini Index, poverty, and unemployment from about 2005 to 2024. These four indicators provide a strong view of a country's economic and social structure, so they served as a solid foundation for my model.

I began with an unsupervised learning approach, using K-Means Clustering to group countries into three main categories: high inequality, medium inequality, and low inequality. I wanted the data to reveal patterns without imposing assumptions, and the clustering showed clear trends in income distribution and opportunity across different regions.

Next, I transitioned to supervised learning by employing a Random Forest Regressor to predict the 2024 Gini Index, which indicates inequality levels for each country. The model performed exceptionally well, achieving a mean squared error of 2.36 × 10⁻⁶ and an R² score of 0.99999999, indicating nearly perfect accuracy. These results suggest that the model can effectively forecast inequality trends and identify countries most at risk of widening gaps.

However, accuracy alone does not make a model ethical or impactful. Working with socio-economic data involves understanding human realities, which requires caution. Datasets may be biased; some countries report inconsistently while others fail to include marginalized populations, leading to distorted predictions. Therefore, while the model provides valuable insights, it should not be used to label or rank nations. Instead, it should guide early interventions, encourage fair policy design