**Project Title:**

**Predictive Analysis of Global Happiness Scores using Machine Learning**

**Problem Statement**  
Global happiness and well-being are influenced by a variety of socio-economic and cultural factors. While countries differ widely in these domains, understanding the primary drivers of happiness can help policymakers implement more effective social policies. The challenge is to model and predict a country's happiness score based on measurable indicators using machine learning techniques, thereby gaining insights into what factors most significantly impact well-being.

**Objectives**

* To analyze and visualize global happiness trends using the 2019 World Happiness Report dataset.
* To identify key features (GDP, social support, freedom etc.) influencing happiness scores.
* To build predictive machine learning models to estimate happiness scores for countries.
* To rank feature importance to understand the most influential drivers of happiness.
* To develop a policy-recommendation framework based on insights from the model.

**Proposed Methodology**

1. **Data Preprocessing:**
   * Cleaning the dataset: handling missing values, normalizing scales.
   * Encoding categorical data if any.
2. **Exploratory Data Analysis (EDA):**
   * Visualization of global happiness distribution.
   * Correlation matrix and feature selection.
3. **Model Development:**
   * Regression-based models (Linear Regression, Random Forest, Gradient Boosting).
   * Evaluation using metrics like RMSE, MAE, and R² Score.
   * Feature importance analysis and model interpretation.
4. **Model Optimization:**
   * Hyperparameter tuning (GridSearchCV or RandomizedSearchCV).
   * Cross-validation to ensure model generalizability.
5. **Deployment:**
   * A simple Streamlit-based web interface for inputting indicators and predicting happiness score.

**Dataset Description**  
The project uses the **2019 World Happiness Report** dataset, containing data from 156 countries.

The features reflect each country's socio-economic environment and perceived well-being.

**Expected Outcomes**

* A well-performing machine learning model capable of predicting happiness scores.
* Insights into which factors most strongly influence global happiness.
* Visual and statistical outputs highlighting global and regional happiness patterns.
* A Streamlit dashboard to allow interactive exploration of happiness predictors.