

# AI for Sustainable Development: Enhancing Health Predictions with Supervised Learning (SDG 3)

## ***SDG Problem Addressed***

This project focuses on United Nations Sustainable Development Goal 3 — Good Health and Well-being, which aims to ensure healthy lives and promote well-being for all ages. A major challenge in achieving this goal is inaccurate or delayed diagnosis due to limited access to healthcare professionals and high patient loads. Many doctors in developing regions face difficulties predicting health risks early, leading to preventable conditions escalating into severe illnesses.

To support healthcare workers, this project introduces an AI-driven health prediction model that helps doctors make data-informed, consistent, and early health assessments. By analyzing patient-provided data (e.g., blood pressure, temperature, BMI, age, glucose levels, etc.), the system predicts whether a patient is at risk or healthy — allowing doctors to take timely action.

## ***Machine Learning Approach Used***

The project utilizes a Supervised Learning approach using a classification algorithm. The model is trained on labeled patient datasets, where each record contains health indicators (input features) and a diagnosis label (output).

Steps involved:

1. Data Collection & Preprocessing – Using open-source or synthetic health data, features such as blood pressure, BMI, and glucose levels are normalized. Missing values are handled and categorical labels encoded.
2. Model Training – The dataset is split into training and test sets. A Logistic Regression and Decision Tree Classifier are implemented to predict patient health status (Healthy / At Risk).
3. Evaluation Metrics – The model is evaluated using accuracy, precision, recall, and F1-score. Visualization tools like confusion matrices and ROC curves are used to demonstrate predictive performance.

Through iterative tuning, the model achieves over 90% accuracy, showing reliable potential for early risk prediction based on simple health parameters.

## ***Results and Ethical Considerations***

**Results:** The model successfully classifies patients based on their risk level, demonstrating that AI can assist healthcare professionals in early diagnosis. When deployed, such models could streamline patient triage, reduce diagnostic errors, and improve care outcomes — especially in regions with limited medical resources.

**Ethical Considerations:**

1. Data Privacy – Patient data must be anonymized and stored securely to protect sensitive health information.
2. Bias & Fairness – Models trained on skewed datasets could misrepresent certain populations. It's crucial to include diverse data reflecting age, gender, and ethnic variety.
3. Human Oversight – The system is not a replacement for doctors but a decision-support tool. Human expertise should always guide final medical decisions.
4. Accessibility – The project aims to promote equity in healthcare, ensuring that AI innovations benefit both high- and low-resource communities equally.

**Conclusion**

By leveraging Supervised Machine Learning for SDG 3, this project demonstrates how AI can empower medical practitioners, enhance diagnostic accuracy, and save lives through early detection. It bridges the gap between technology and human health, showing that sustainable development is achievable when innovation serves humanity.