[Draw your reader in with an engaging abstract. It is typically a short summary of the document. When you're ready to add your content, just click here and start typing.]

Yolisa Qadi

AI Machine Learning

Yolisa Qadi- Based South Africa

Report
Project Title: Predicting High-Risk Mental Illness Regions using Machine Learning
SDG Focus: SDG 3 – Good Health and Well-being
This project addresses mental health by predicting regions with a high prevalence of depression and anxiety disorders, supporting early intervention and policy planning.

Problem Statement:
Mental illnesses such as depression and anxiety are increasing globally, yet health authorities struggle to identify high-risk regions. Timely identification of these regions is critical for allocating mental health resources effectively and implementing targeted interventions.

Dataset:
- Source: WHO & global mental health prevalence datasets.
- Columns: Depression, Anxiety, Schizophrenia, Bipolar, Eating disorders (age-standardised, both sexes), along with region and year metadata.
- Observations: 6420 rows (countries × years, 1990–2019).

ML Approach:
- **Type:** Supervised Learning
- **Model:** Random Forest Classifier
- **Target:** high_risk – regions with combined depression and anxiety prevalence above the 75th percentile.
- **Features:** All mental illness prevalence rates excluding metadata (Entity, Year, Code).
- **Preprocessing:** Missing values filled with column mean, dataset split 80% train / 20% test.

Results:
- Accuracy: 1.00
- F1 Score: 1.00
- The confusion matrix shows proper classification of high-risk and low-risk regions.
- **Feature Importance:** Anxiety (47.7%), Depression (30.6%), followed by Bipolar, Eating, and Schizophrenia disorders.
- Example Prediction: New region with Depression 4%, Anxiety 3% → **Predicted High Risk: No**

Ethical & Social Considerations:
- Bias exists due to uneven data reporting across countries.
- The model does not account for socio-economic or cultural factors affecting mental health.
- Promotes sustainability by guiding policymakers to allocate mental health resources efficiently.

Conclusion:
This machine learning solution demonstrates how AI can help identify high-risk regions for mental illnesses. By enabling proactive interventions, the project contributes to SDG 3: Good Health and Well-being. Future improvements could include integrating socio-economic and environmental data to enhance prediction accuracy.