Multiple Chronic Disease Prediction using Machine Learning Techniques

Chronic diseases are a major concern for humanity nowadays. They are often serious and can even be life-threatening, making them a significant focus in healthcare. Detecting these conditions early is crucial, and that's where advanced automation systems come into play. Machine Learning, as part of Artificial Intelligence, is a powerful tool that can predict outcomes based on provided data. In our study, we're diving into Machine Learning to predict common chronic diseases like diabetes, heart diseases, and Parkinson's the kind of health challenges we all face. This tech-driven approach holds the promise of improving how we spot these issues early, intervene effectively, and manage these health conditions more proactively.

2. Relevance to Sustainable Development Goals (SDGs):

Connecting with the broader mission of Sustainable Development Goals (SDGs), enhancing healthcare systems is a pivotal pursuit for organizations aiming at development. Embracing projects like the implementation of Machine Learning in multiple chronic diseases detection aligns seamlessly with the objectives of the United Nations SDGs. Recognizing healthcare as a cornerstone of sustainable development, it becomes apparent that not all healthcare systems worldwide are equally advanced. Particularly, individuals in regions lacking access to modern medical resources often grapple with challenges in the diagnosis and detection of chronic diseases. In this context, there emerges a compelling opportunity for the United Nations to take proactive measures, facilitating pertinent solutions that empower doctors to predict diseases based on comprehensive medical records, thereby fostering improved global health outcomes.

3. Literature Examples

1- [Kulkarni, K., B, M., Hebbar, T. M., M, M., S, S., & Mathew, T. (2023). Chronic Disease Prediction Using Machine Learning. Retrieved from *https://www.researchgate.net/publication/352980813_Chronic_Disease_Prediction_Using_Machine_Learning]* *This paper explores the application of machine learning techniques, including Logistic Regression, Random Forest, and Decision Tree, to predict chronic diseases such as Diabetes, Heart, Cancer, and Kidney. The proposed conceptual model integrates diverse models and algorithms for the effective prediction and analysis of common chronic diseases, with a particular emphasis on early detection and disease prevention.*

2- ***[Alanazi R. (2022). Identification and Prediction of Chronic Diseases Using Machine Learning Approach. Journal of healthcare engineering, 2022, 2826127. https://doi.org/10.1155/2022/2826127]*** *journal article focuses on using advanced machine learning techniques, including convolutional neural networks (CNN) and K-nearest neighbor (KNN), to identify and predict common chronic diseases.*

4. Describe Data:

The datasets that are going to be used for this project are 3 types of datasets collected from Kaggle in a csv format. These data need to be cleaned and preprocessed in order to build a model for each of these data that will predict Diabetes, heart disease and Parkinson disease based on some features.

5. Machine Learning Approach:

This is a Multiclassification Problem, so Machine Learning Algorithms such as Logistic Regression, Support Vector Machine, Naïve Bayes Classifiers or ensemble techniques such as RandomForestClassifier or XGBoost will be applied to build the models. The choice of these classifications' algorithm will depend on our data analysis and how our data are preprocessed. The best algorithm will be the best one that perform well with our data.