Advanced Predictive Analytics for Decision Support

Objective

This project's main goal is to create precise predictive models by using the **KNN** and **Random Forest Classifier** algorithms to categorization problems in many fields.

Introduction

The objective of this research is to apply machine learning methods to three different domains of predictive analysis tasks. The following datasets are included in this project:

1. **Social Network Ads:** Predict Whether the product has been purchased or not.
2. **Health Insurance :** This dataset reflects the interconnection between demographic and geographic facts: age, gender, body mass index, family related attributes and smoking habits on one hand and insurance rates on the other hand.
3. **Classifying Ortho patients:** Classifying patients based on Biomechanical features of orthopedic patients.

Machine Learning Techniques

Two main machine learning algorithms will be used in this research.

1. **K-Nearest Neighbors (KNN):** a non-parametric, supervised learning classifier, which uses proximity to make classifications or predictions about the grouping of an individual data point.
2. **RandomForestClassifier :** widely-used machine learning algorithm, which combines the output of multiple decision trees to reach a single result.

Datasets

Dataset	Description	Link
Social Network Ads	Predict product has been purchased	Dataset
Health Insurance	Demographics and their impact on medical insurance charges	Healthcare Insurance
Classifying Ortho patients	Classifying patients based on Biomechanical features	DataSet

Conclusion:

This study is to illustrate the adaptability and efficiency of **KNN** and **Random Forest Classifier** algorithms in predictive analysis tasks through the application of machine learning techniques on various datasets. These models can help with decision-making processes by offering precise forecasts, which can improve results across a range of disciplines.