# Machine Learning Tasks with Different Datasets

## 1. Introduction

**Overview of the tasks:**

This document details the application of various machine learning algorithms to three different datasets. The tasks include classification, clustering, and regression.

**Datasets used:**

- Iris Dataset (for classification)

- Wine Dataset (for clustering)

- California Housing Dataset (for regression)

## 2. Supervised Learning: Classification with Iris Dataset

**Description of the dataset**:

The Iris dataset consists of 150 samples of iris flowers, each with four features: sepal length, sepal width, petal length, and petal width. The dataset includes three classes of iris flowers: Setosa, Versicolour, and Virginica.

Logistic Regression implementation:

We used Logistic Regression for classifying the Iris dataset. The dataset was split into training and testing sets. The model was trained on the training set and evaluated on the test set.

Evaluation metrics:

-Accuracy: 1.0

- Precision, Recall, F1-Score: 1.0 for all classes

## 3. Unsupervised Learning: Clustering with Wine Dataset

Description of the dataset:

The Wine dataset contains the results of a chemical analysis of wines grown in the same region in Italy. It includes 13 features for each wine sample and has three classes.

K-Means Clustering implementation:

K-Means clustering was applied to the Wine dataset. The predicted labels were adjusted to match the true labels as closely as possible.

Evaluation metrics:

- Clustering Accuracy: Calculated by adjusting predicted labels to match true labels.

## 4. Regression with California Housing Dataset

Description of the dataset:

The California Housing dataset contains information about housing in California, including features like median income, house age, and total rooms, along with the target variable: median house value.

Linear Regression implementation:

Linear Regression was used to predict the median house value based on the features. The dataset was split into training and testing sets. The model was trained on the training set and evaluated on the test set.

## 5. Conclusion

In this document, we applied machine learning algorithms to three different datasets for classification, clustering, and regression tasks. The models were evaluated using appropriate metrics and visualizations, providing insights into their performance and effectiveness.