**Housing Data Analysis Report**

**Introduction**

The purpose of this analysis is to predict whether a housing unit has a high median value (HIGH\_MEDV) based on other features of the housing unit (HousingData.csv). To do this, we will use logistic regression to build a binary classification model that predicts whether the median value of a housing unit is above or below the median value of all housing units in the dataset.

**Methodology**

To build the model, I performed the following steps:

1. Load the dataset into a Pandas DataFrame using the read\_csv function.
2. Remove rows with missing data using the dropna function.
3. Create a binary target variable HIGH\_MEDV based on the median value of MEDV using the np.where function.
4. Split the dataset into training and test sets using the train\_test\_split function from the sklearn.model\_selection module.
5. Train a logistic regression model using the LogisticRegression class from the sklearn.linear\_model module.
6. Use the trained model to predict on the test set and calculate accuracy and confusion matrix using the accuracy\_score and confusion\_matrix functions from the sklearn.metrics module.

**Results**

The logistic regression model achieved an accuracy of 0.85 on the test set. The confusion matrix for the test set is shown below:

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Confusion Matrix:

[[22 7]

[ 2 27]]

The confusion matrix shows that the model correctly predicted 22 housing units as having a high median value (true positives) and 27 housing units as not having a high median value (true negatives). It incorrectly predicted 7 housing units as having a high median value (false positives) and 2 housing units as not having a high median value (false negatives).

**Conclusion**

In conclusion, the logistic regression model I built achieved a good accuracy of 0.85 on the test set, indicating that it is a useful tool for predicting whether a housing unit has a high median value based on other features of the housing unit. The model could be further improved by using more advanced machine learning techniques and incorporating additional features of the housing unit, such as the number of rooms, the age of the building, and the location of the housing unit.

import pandas as pd

import numpy as np

from sklearn.model\_selection import train\_test\_split

from sklearn.linear\_model import LogisticRegression

from sklearn.metrics import accuracy\_score, confusion\_matrix

# Load the dataset

data = pd.read\_csv('HousingData.csv')

# Drop rows with missing values since there are N/A values

data.dropna(inplace=True)

# Create a binary target variable HIGH\_MEDV

median\_MEDV = data['MEDV'].median()

data['HIGH\_MEDV'] = np.where(data['MEDV'] > median\_MEDV, 1, 0)

# Split the dataset into training and test sets

X = data.drop(['MEDV', 'HIGH\_MEDV'], axis=1)

y = data['HIGH\_MEDV']

X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)

# Train a logistic regression model

logreg = LogisticRegression(max\_iter=10000) # increase max\_iter to 10000

logreg.fit(X\_train, y\_train)

# Predict on the test set and compute accuracy and confusion matrix

y\_pred = logreg.predict(X\_test)

accuracy = accuracy\_score(y\_test, y\_pred)

cm = confusion\_matrix(y\_test, y\_pred)

print("Accuracy:", accuracy)

print("Confusion Matrix:\n", cm)