MEDICAL COST PREDICTION USING MACHINE LEARNING MODEL

Submitted By

1.Farhatun Nahar Priya (2023-1-60-202).

2.Afsana Akter Mim (2023-1-60-073).

3. Nuran Farhana Prova (2023-1-60-075).

INTRODUCTION AND PROBLEM

- Our goal is to predict medical insurance costs using personal and health data.
- This helps in understanding what factors affect costs, like age, BMI, or smoking.
- It supports insurance companies and people in making better, fairer decisions.

Data set Overview

TOTAL SAMPLES: 1,338.

FEATURES (6):

- AGE, BMI, CHILDREN (NUMERICAL COLUMNS)

- SEX, SMOKER, REGION (CATEGORICAL COLUMNS)

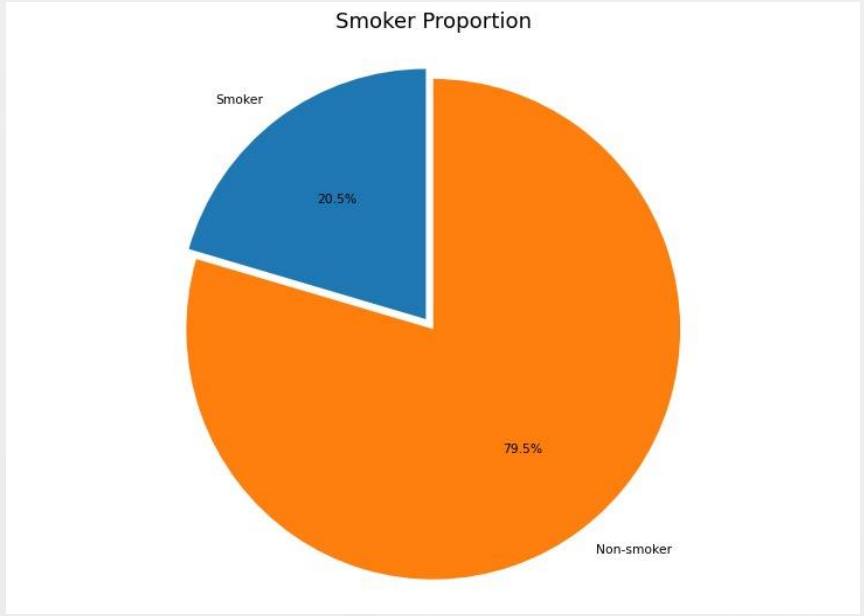
TARGET VARIABLE: CHARGES.

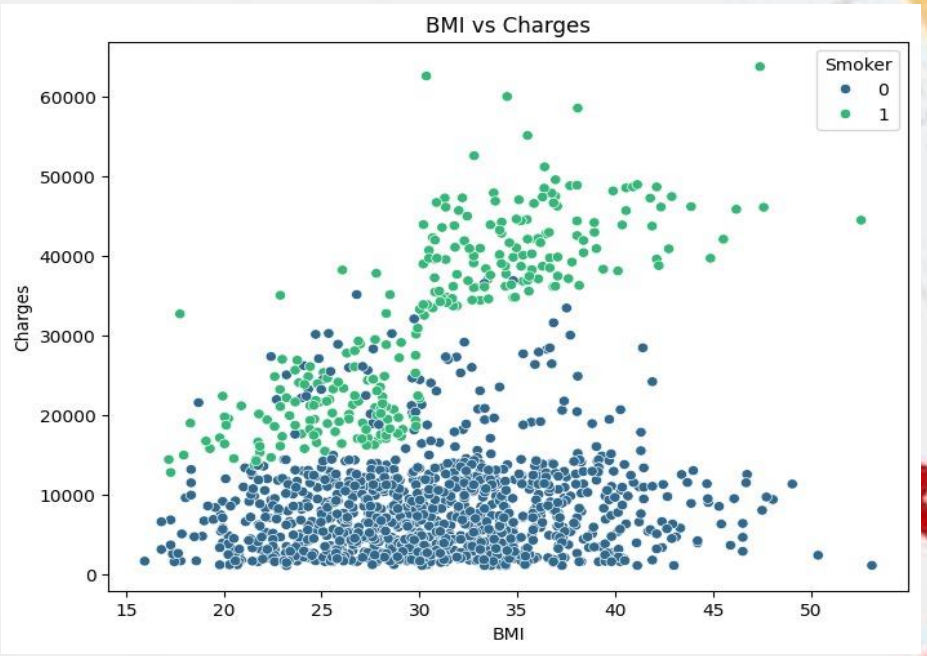
DATA CLEANING & PREPROCESSING

1. **No missing values.**
2. **Removed 1 duplicate row.**
3. **Encoded categorical columns:**

- sex: male = 1, female = 2
- smoker: no = 0, yes = 1
- region: southwest = 1, southeast = 2, northwest = 3, northeast = 4.

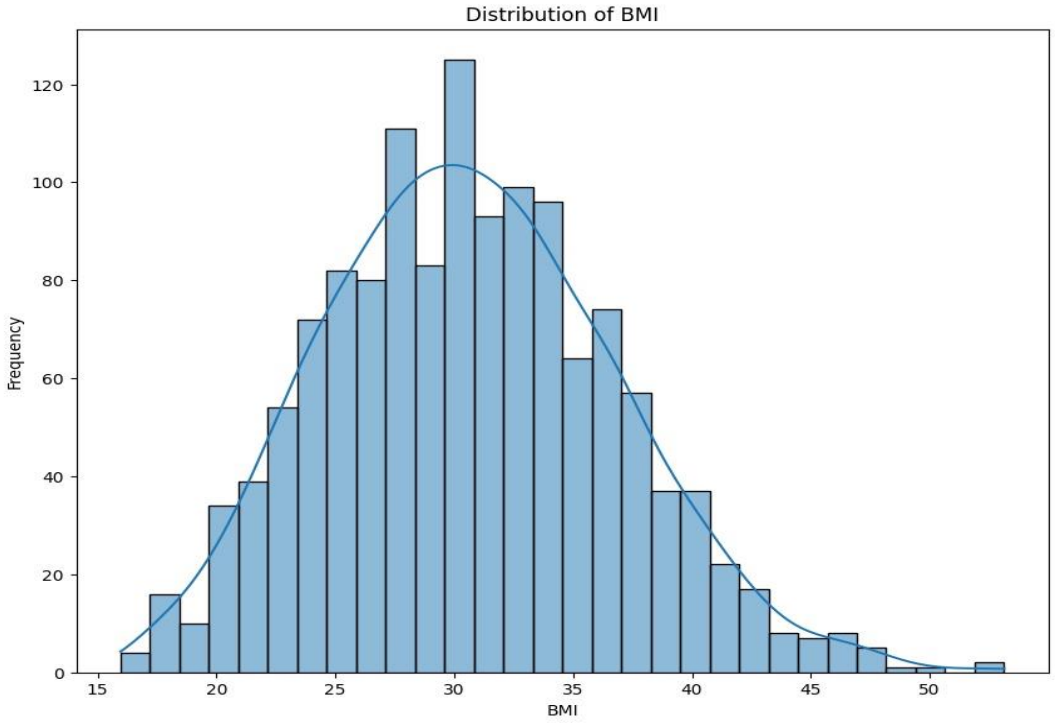
Most individuals in the dataset are non-smokers (79.5%)

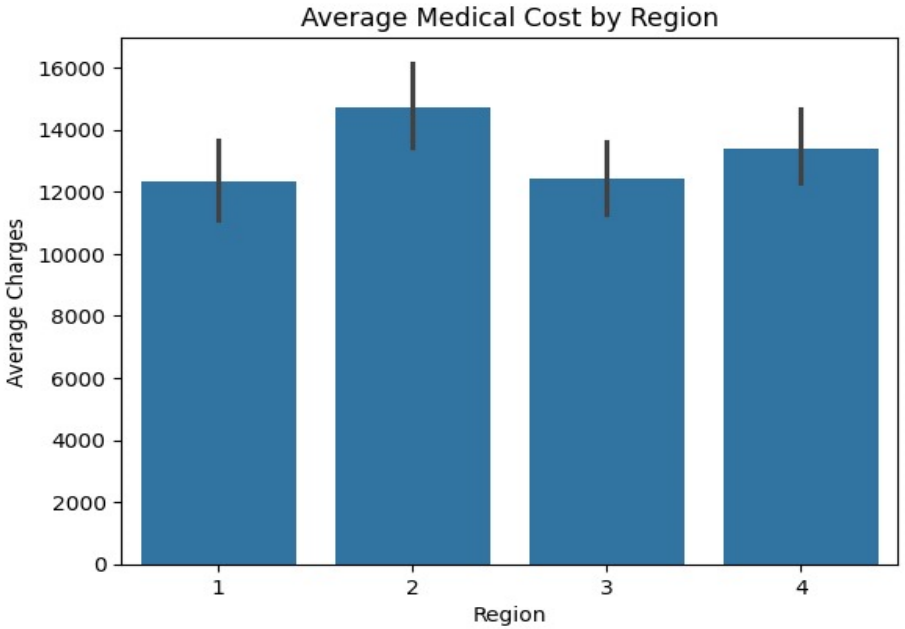




Higher BMI and smoking lead to significantly higher medical costs

BMI is normally distributed, with most people having a BMI around 30





Average medical costs differ by region, with Region 2 (Southeast) having the highest charges.

Machine Learning Model

Model Used: Linear Regression
Library: sklearn. Linear_model. Linear Regression
Model Workflow
Features (X): All columns except charges.
Target (Y): charges (medical cost)
Train-Test Split:
- 80% training, 20% testing
- random_state=2 for reproducibility

Prediction: Model predicts charges on the test set.

Performance Metrics

Mean Absolute Error (MAE): 4,285.22

Mean Squared Error (MSE): 38,364,832.19

Root Mean Squared Error (RMSE): 6,193.94

R-squared (R^2) Score: 0.74 (explains 74% of cost variation)

Errors: MAE and RMSE are reasonable

Limitation: May struggle with very high-cost predictions

conclusion

This project helps to:

- Find people who may need more medical care.
- Set fair insurance prices.
- Plan better for healthcare costs.

We Hope You Enjoy The Presentation

THANK YOU