MEDICAL INSURANCE COST PREDICTION

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Introduction

- The healthcare industry is undergoing various Technological adaptations. Amidst these changes, the ability to predict medical insurance costs has emerged as a critical task for insurance providers and healthcare organizations.
- The goal is to understand the factors that contribute to insurance and to build a machine learning model capable of predicting the Medical Insurance Cost.

Problem Statement

- The project focuses on predicting medical insurance using a dataset.
- The problem is framed as a regression task: predicting the insurance charges based on various features such as age, sex, BMI, number of children, smoking status, and region.

Dataset Description

- The Dataset includes information such as patient demographics, region etc.
- Key features include age, gender, BMI, region, smoker or not, number of children.
- The target variable is "Insurance Money," and the Machine Learning model can be trained on historical data to predict this outcome for new individuals.

Model Building

Three classification models have been implemented in the project:

- Linear Regression
- Decision Tree Regression
- Random Forest Regression

Evaluation Metrics

The performance of the models is assessed using common classification metrics:

- Accuracy
- Root Mean Square Error
- Mean Absolute Error

Deployment

- Framework : gradio
- Programming Language: Python
- Version Control : Git hub

Accuracy Results

Table 1: **Models with Accuracy**

Model	**Accuracy**
Linear Regression	0.727
RandmForest Regression	0.936
Decision Tree Regressor	0.916

- Selected Model : Decision Tree Regressor

Random Forest Regression Accuracy

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Files

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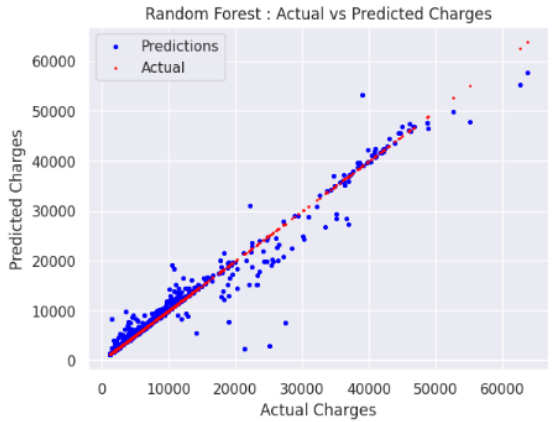
```
plt.show()

# Printing metrics
print('Mean Squared Error (MSE):', rf_mse)
print('Root Mean Squared Error (RMSE):', rf_rmse)
print('Mean Absolute Error (MAE):', rf_mae)
print('R-squared (R2) Score:', rf_r2)
```




```
Mean Squared Error (MSE): 9989558.181061734
Root Mean Squared Error (RMSE): 3160.626232420045 7
Mean Absolute Error (MAE): 1405.4465646732247
R-squared (R2) Score: 0.9365285381175732
```

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Decision Tree Regressor Accuracy

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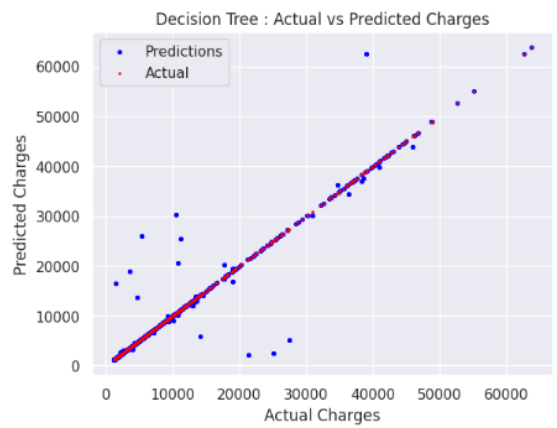
```
# Printing metrics
print('Mean Squared Error (MSE):', dt_mse)
print('Root Mean Squared Error (RMSE):', dt_rmse)
print('Mean Absolute Error (MAE):', dt_mae)
print('R-squared (R2) Score:', dt_r2)
```




```
Mean Squared Error (MSE): 13197894.174199611
Root Mean Squared Error (RMSE): 3632.8906862003
Mean Absolute Error (MAE): 802.4628708228229
R-squared (R2) Score: 0.9161434748341413
```

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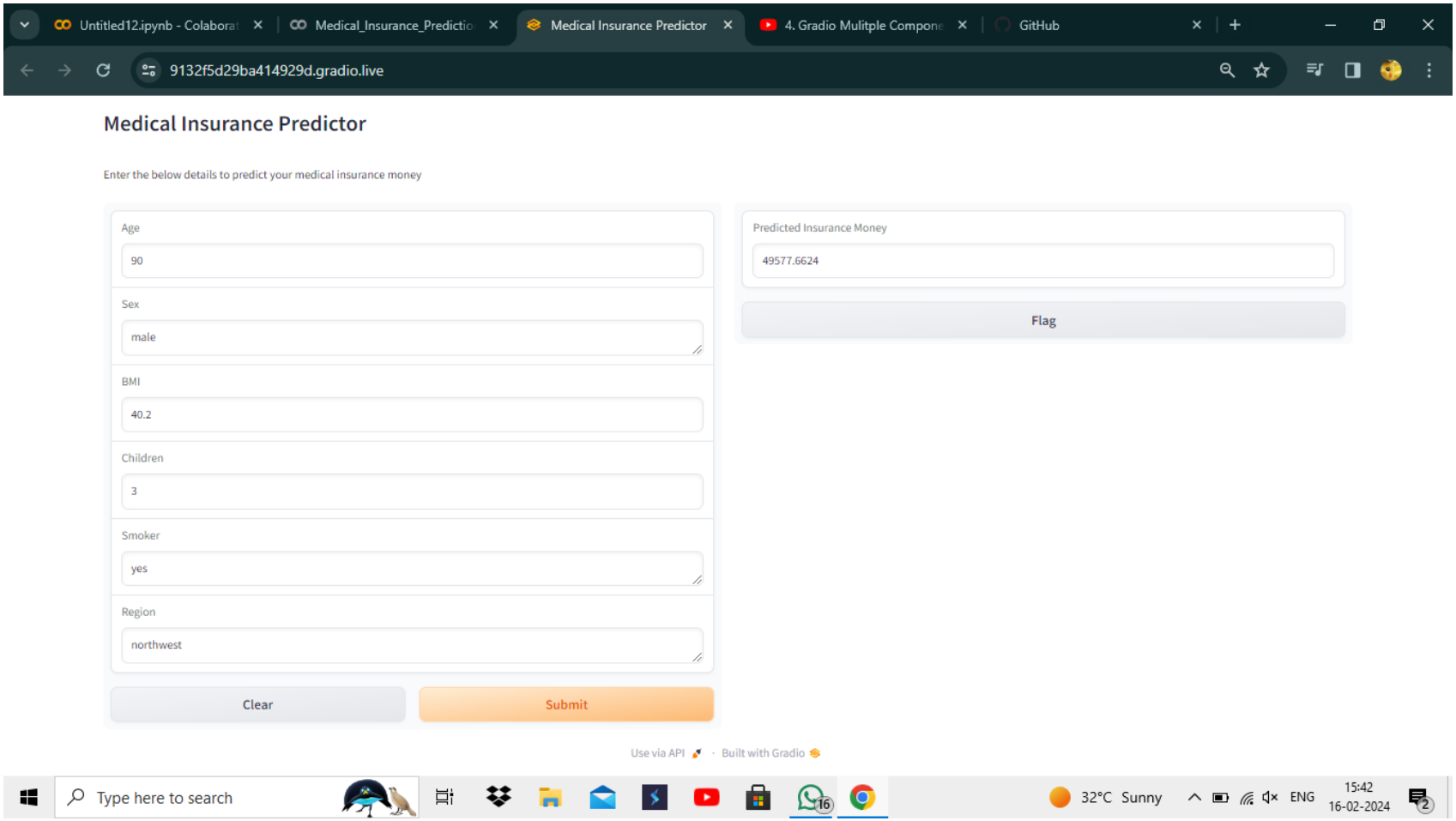
Result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Medical Insurance Predictor
Enter the below details to predict your medical insurance money
Age
90
Sex
male
BMI
40.2
Children
3
Smoker
yes
Region
northwest
Clear
Submit
Predicted Insurance Money
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Thank You