



**NMAM INSTITUTE
OF TECHNOLOGY**

(An off-Campus Institution of NITTE (DEEMED TO BE UNIVERSITY), MANGALORE)

Department of Master of Computer Applications

A Task Report On

Car Price Prediction Using Machine Learning

Third Semester Task Project, regards to the subject

Artificial Intelligence And Machine Learning

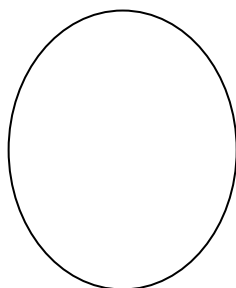
For the Academic year

2024-2025

Submitted by

DARSHAN DINESH MP – NNM23MC028

DELBIN GEORGE – NNM23MC036



Submitted to

Dr. Mamatha Balipa

(Professor and Head, Dept. of MCA)

1. INTRODUCTION

The Car Price Prediction project aims to utilize machine learning techniques to predict the price of a car based on its key specifications and features. The model takes into account various car attributes, such as dimensions, engine specifications, fuel efficiency, and horsepower, to provide an estimated price. By preprocessing the data and optimizing the model, this project demonstrates how machine learning can address real-world challenges in price estimation.

2. OBJECTIVE

The primary goal of this task was to develop a machine learning model to predict the price of a car based on its various features such as wheelbase, car length, width, height, engine size, horsepower, and fuel efficiency.

3. DATASET OVERVIEW

- **Dataset Used:** CarPrice.csv
- **Dataset Features:**
 - **Independent Variables:** wheelbase, carlength, carwidth, carheight, curbweight, enginesize, horsepower, peakrpm, citympg, highwaympg
 - **Target Variable:** price
- **Preprocessing Steps:**
 - Dropped irrelevant columns: car_ID and CarName
 - Handled missing values by imputing the mean
 - Features were standardized using StandardScaler to ensure all variables are on the same scale.

4. MACHINE LEARNING APPROACH

- **Model Used:** Random Forest Regression
 - Number of estimators: 100
 - Random state: 42 (for reproducibility)
- **Data Splitting:**

- Training Set: 80% of the data
- Testing Set: 20% of the data
- **Performance Metrics:**
 - Mean Squared Error (MSE): **3418015.938757601**
 - R^2 Score: **0.9567032955672725**

5. Implementation Details

1. **Training:** The Random Forest Regressor model was trained on scaled features.
2. **Prediction:**
 - Model predictions were evaluated on the test set.
 - A scatter plot was created to visualize actual vs predicted prices.
3. **Custom Predictions:**
 - A custom car with the following features was evaluated for price prediction:
 - **Wheelbase:** 88.6
 - **Car Length:** 168.8
 - **Car Width:** 64.1
 - **Car Height:** 48.8
 - **Curb Weight:** 2548
 - **Engine Size:** 130
 - **Horsepower:** 111
 - **Peak RPM:** 5000
 - **City MPG:** 21
 - **Highway MPG:** 27
 - **Predicted Price:** **14428.545833333335**

6. Results and Insights

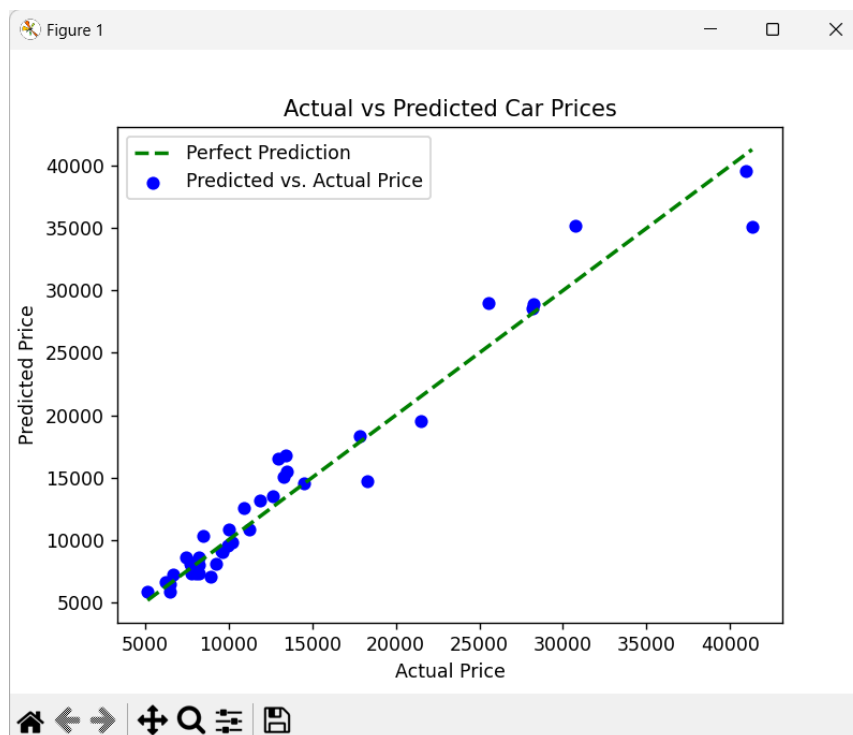
- **Model Performance:**
 - The Random Forest Regression model performed well, achieving a high R^2 score, indicating strong predictive power.

- The scatter plot of actual vs predicted car prices showed a close alignment with the perfect prediction line, further validating the model's accuracy.
- **Custom Car Prediction:**
 - The predicted price for the custom car was reasonable, based on its specifications.

7. Visualization

A scatter plot was created to visualize the relationship between actual and predicted car prices:

- **Green Line:** Represents the ideal perfect prediction line.
- **Blue Points:** Actual vs predicted values.



8. CONCLUSION

The Random Forest Regression model successfully predicted car prices with high accuracy. The preprocessing steps ensured the dataset was clean and ready for model training, and the performance metrics highlighted the effectiveness of the model. This implementation could be extended further by exploring additional features or testing other regression models for comparison.