Literature review

Abstract

Introduction

The market for the purchase of used vehicles can be difficult to navigate for many persons, but what most persons have in common is that they want the best value for their money this often leads to persons having to do the typical “run around” when it comes to purchasing a used vehicle which may include visits to different dealerships, bargaining and negotiating all while racing against time to acquire their vehicle before another consumer takes it, while on the other hand car dealerships wish to maximize their own profit while also selling at market price for the vehicle.

Various studies and articles have found that in recent years the prices of used cars have risen, “An average three-year-old used car that cost a little over $23,000 in pre-pandemic 2019 now sells for almost $32,500 today, which is a 41% increase. A consumer with about the same car-buying budget in 2023 would have to instead settle for a six-year old vehicle to maintain the same level of affordability” , Gorzelany,J (2023,September, 23), *The Unfortunate Solution To Sky-High Used-Car Prices: Buy An Older Model* , some state that it may be the result of the COVID-19 pandemic,” Used car prices have been high since the early days of the COVID-19 pandemic. The global health crisis and supply chain problems caused a shortage of new cars, which led to limited supply and record-breaking prices”, Delvillar,A,(2023,August,18), *The state of used car prices: why are certain car brands so high?,* while others seem to believe that there could be another underlying reason for this increase in price, “women over the typical vehicle ownership (eight years): Pay $142 per year in total more than men for car ownership, which can pay up to $7,800 more during the length of ownership (typically eight years).Pay $117.12 more than men when buying new cars.”, Tengler, S (2021,October, 27), *New “Pink Tax” Study Shows Women Pay Upwards Of $7,800 More For Car Ownership*.

Although some articles contradict this saying that used car prices have not gone up but instead have decreased “the gap between prices for new and used vehicles, which narrowed during the pandemic, has widened again”, Hyatt, D(2023,November, 13), *Used-Car Shoppers Are Getting a Break As Prices Fall—Unless They Need A Loan.*

Related work

There have been numerous studies discussing this topic. Monburinon et al, (2018), conducted a comparative study on performance of regression based on supervised machine learning models, in which each model is trained using data of used car market collected from German e-commerce website. As a result the gradient boosted regression trees gives the best performance with mean absolute error =0.28. followed by random forest regression with MSE=0.35 and multiple linear regression with MSE=0.55 respectively.

Chen et al (2017), collected over 100,000 used car dealing records throughout China to do empirical analysis on a thorough comparison of two algorithms : linear regression and random forest and determined that random forest has a stable but not ideal effect on price evaluation model for a certain car make, but it shows great advantage in the universal model compared with linear regression.

Ozgur et al (2016), used a representative sample of 470 of all 2005 GM cars with the make of either Chevrolet or Pontiac. The purpose of this paper was to develop a relatively good regression equation for predicting the price of these cars.” It is known that there are many factors that influence the price of a car, but we do not know what factors will influence the price of the cars and how these factors influence the price.”, Ozgur, C et al (2016, August), *Multiple Linear Regression Applications Automobile Pricing*.

Pudaruth (2014), investigated the application of supervised machine learning techniques to predict the price of used cars in Mauritius. The predictions were based on historical data collected from daily newspapers. Different techniques like multiple linear regression analysis, k nearest neighbor, naïve bayes and decision trees were used to make predictions.

Wu et al (2009), proposed a system consisting of three parts: data acquisition system ,price forcasting algorithm and performance analysis

Methodology

Implementation and evaluation

Evaluation and conclusion

As can be seen in the aforementioned paragraphs, price discrepancies in used car sales pose a serious issue to consumers and a solution is needed to help rectify the situation.

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