COMPARISON OF FUEL ECONOMY FOR TOYOTA AND HONDA VEHICLES.

Background

The description of ''fuel economy'' of vehicles driven in the United States (US) is often measured in miles per gallon. This represents the number of miles a vehicle is expected to cover on a single gallon of fuel. The fuel is gasoline and can be purchased at a specific price per gallon from petroleum stations across the country.

A vehicle's fuel economy may be viewed in two distinct ways. One observed on the expected mileage the vehicle can travel on a highway setting and the other representing the expected mileage the vehicle can travel within a city environment. The later is typically less than the forma due to the fact that it is attributed to the increase in stops and the zones of low speeding limits encountered in cities. Highway driving can be expected to have less frequent stops and areas of road in which a driver can travel upon at much higher speeds. This form of drive essentially optimizes the energy obtained from fuel better than driving in a city environment.

Purpose of the Study

Most drivers all over the world and therefore the US usually think of fuel economy of vehicles which influence their decision in purchasing and using vehicles since not all vehicles possess the same fuel economy values. The purpose of this study is to compare two popular Japanese multinational automobile makes; Toyota and Honda in an effort to show potential consumers which of the two makes produce better-performing vehicle in the field of fuel economy. By estimating the total cost expected for both options, this study's conclusion can be used as a means for consumers wanting to make the smartest and economically as possible choice by presenting them with the cheapest available option.

Methodology

Vehicles of various classes belonging to Toyota and Honda will be observed for the analysis. While an original population of possible observations will be designated at the start of this study, it should be considered unrealistic in a real-world setting to measure each member of the population. As a result, a subsection of this population will be chosen and observed as a sample. The goal of taking this sample is to obtain information that is closely representative of the population's true values, while also keeping the use of time and resources to a minimum for parsimony.

While several strategies can be implemented to take samples, some can be proven more efficient than others based on the nature of the population being studied. This study will utilize Simple Random Sampling (SRS) and Stratified Random Sampling method for the analysis. Data from the years 2014 to 2018 will first be gathered from TrueCar.com and United States Environmental Protection Agency (EPA) database through the Kaggle.com. It will then be imported onto R version 3.6.3 and SAS version 9.4 where analysis will begin.

Each vehicle occupies an individual row and only the year, make, model, class, city fuel economy, and highway fuel economy for each vehicle will be considered for this study. Employing the Neyman Allocation (which is a special case of optimal allocation), Kernel Density Estimation (for smoothed density estimates) and the Cost Efficiency Analysis, we will be able provide the analysis which illustrates the expenses a consumer could accrue by purchasing a vehicle from that company. Examining the data, it may be expected that Honda would be a better option over Toyota. All results will be reported along with the code and the dataset.