**Project Proposal**

*Benjamin Yanchong Huangfu*

**Project Title**

Comparison of fuel efficiency among all the 2018 model vehicles under the Fuel Economy Guide

**Summary**

1. Context of the study

This project aims to help the buyers to choose the most fuel-efficient vehicle. In this study, most of the data were collected from the handbook *Fuel Economy Guide*, issued by U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy and U.S. Environmental Protection Agency on the date of May 2, 2019. More analysis will be done by comparison of fuel efficiency among all the 2018 model vehicles under this guide, which is integrated with the following variables for each kind of vehicle: MPG in City, MPG in Hwy, combined MPG and annual fuel cost. The scenario indicated above illustrates the context of this study.

1. Why was the data collected

The data were collected and used for the comparison of the fuel economy estimates and annual fuel cost estimates, so the buyer can realize that which kind of car is more fuel economy. This strategy not only can save money for the commuters, but also can reduce our dependence on petroleum. In addition, it can also contribute to reduce the climate change if buying a vehicle with better fuel economy. These reasons mentioned above demonstrates why the data were collected and analyzed.

1. How was the data collected

Part of the data were collected from the Fuel Economy Guide and transferred into the software JMP Pro 10. More analysis of the data will be conducted in this software and generated more useful data. For example, the mean value of the Miles Per Gallon (MPG) and annual fuel cost for each kind of car will be calculated by the software of JMP Pro, SAS, R and Python. More data will be presented later in the details of the final project report.

1. What you want to find out

After completing this project, the information will come out to be the answers for the following, but not limited to these questions:

1. Which manufacture’s car, in general, is more fuel economy?
2. Which kind of transmission, in general, is more fuel economy?
3. How much total difference of annual fuel cost between the most fuel economy vehicle and the least one?
4. Any other factors related to the data, like number of cylinders or horsepower, can contribute to the fuel economy comparison?
5. What kinds of statistical methods used in doing this project
6. Etc. (more items will be added later)

**Variables**

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| Variable Name | What the variable represents |
| MPG in City | Miles Per Gallon(MPG) for the vehicle driving in city roads |
| MPG in Hwy | Miles Per Gallon(MPG) for the vehicle driving in highway |
| Combined MPG | The overall Miles Per Gallon(MPG) for the vehicle driving in both of local roads(55%) and highway(45%) |
| Annual Fuel Cost | Annual total fuel cost for a vehicle (Assumption of travelling 15,000 miles per year and that fuel costs 3.58USD/gallon for regular unleaded gasoline) |

**Reference**

1. *Fuel Economy Guide, Published by U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy and U.S. Environmental Protection Agency, May 2,2019.*