

# Formula 1 Regulation Changes and their Effect on Competitiveness



# F1 World Championship

Consists of 2 championships:

- Drivers
- Constructors

Upcoming season includes:

- 10 teams, 20 drivers and 21 Grands Prix
- It includes races at some of the most iconic tracks, like Spa-Francorchamps, Monza, and Silverstone



# Rules And Regulations

- Every year new rules are made by F1's governing body.
- Sometimes the rules have little affect on the car and sometimes there is major impact to the car's performance.
- Major KERS (kinetic energy recovery system) requirements for 2014 caused many teams standings to be reshuffled.



# Rules And Regulations

- Bodywork and Dimensions
- Stiffness
- Engines and KERS
- Impact and Roll Structure Testing
- Suspension and Steering system
- Weight



# This Project

- Red Bull (Constructor) and Sebastian Vettel (Driver) lost their domination in the sport from one year to the next. The same year that had significant rule changes by F1's governing body for the 2014 season.
- Decided to investigate if there was a historical correlation between rule changes and constructor/driver success.



# F1 Data

- Ergast Developer API website <https://ergast.com/>
- This site offers F1 historical data from 1951 to today in a database download (MySQL) or an API that can be accessed directly.
- For this project, I chose the API, in order to practice using an API and accessing JSON data in Python.
- The race results were relatively easy to access, but the driver and constructor details were in a nested dictionary that required some logic to get to.
- The data was relatively clean.



# F1 Data

- I traversed through the JSON output to retrieve the data I needed.
- Then created a function to loop through the API data and export it to a CSV file.
- The function can be modified to retrieve data for different date ranges (years) and different race positions.
- For this project, I will be using data from 1980 to 2018 and for the top 3 finishes in each race.





# Panda Results

- This is sample of a Panda data frame after retrieving the data from the CSV file that was created using the API, then exporting the manipulated JSON results, to a CSV file.

	Posittion	RaceName	SeasonYear	RaceNumber	RaceDate	DriverFirstName	DriverLastName	DriverID	StartingGridNumb	ConstructorName
0	1	Australian Grand Prix	2015	1	2015-03-15	Lewis	Hamilton	hamilton	1	Mercedes
1	1	Malaysian Grand Prix	2015	2	2015-03-29	Sebastian	Vettel	vettel	2	Ferrari
2	1	Chinese Grand Prix	2015	3	2015-04-12	Lewis	Hamilton	hamilton	1	Mercedes
3	1	Bahrain Grand Prix	2015	4	2015-04-19	Lewis	Hamilton	hamilton	1	Mercedes
4	1	Spanish Grand Prix	2015	5	2015-05-10	Nico	Rosberg	rosberg	1	Mercedes





# Analysis

- In the book 'Wrangling F1 with R' by Tony Hurst, Mr. Hurst introduces the concept of churn to test competitiveness.
- This was first used in baseball and then Nascar.
- I am looking into using the Churn formula to see if periods of significant change appear to have influence on competitiveness as measured by churn.
- Scatter plot of frequency (of wins)
- Maybe plot race wins and race times over time to see if any patterns appear.
- Plot race time by race track by year to see changes in performance by year.



# Analysis

- Also need to decide the criteria for 'significant' rule changes.
- I will be using the information in the following Wikipedia page to compose the list of years/dates that had significant rule changes:  
[http://en.wikipedia.org/wiki/History\\_of\\_Formula\\_One\\_regulations](http://en.wikipedia.org/wiki/History_of_Formula_One_regulations)



# Project Progress

- Please check-in in at the following websites for progress:
  - <https://github.com/siracos/Springboard/tree/master/F1%20Project>
  - <https://public.tableau.com/profile/sirahots#!/>



# Thank You

Top 3 Placements from 2010-2018

