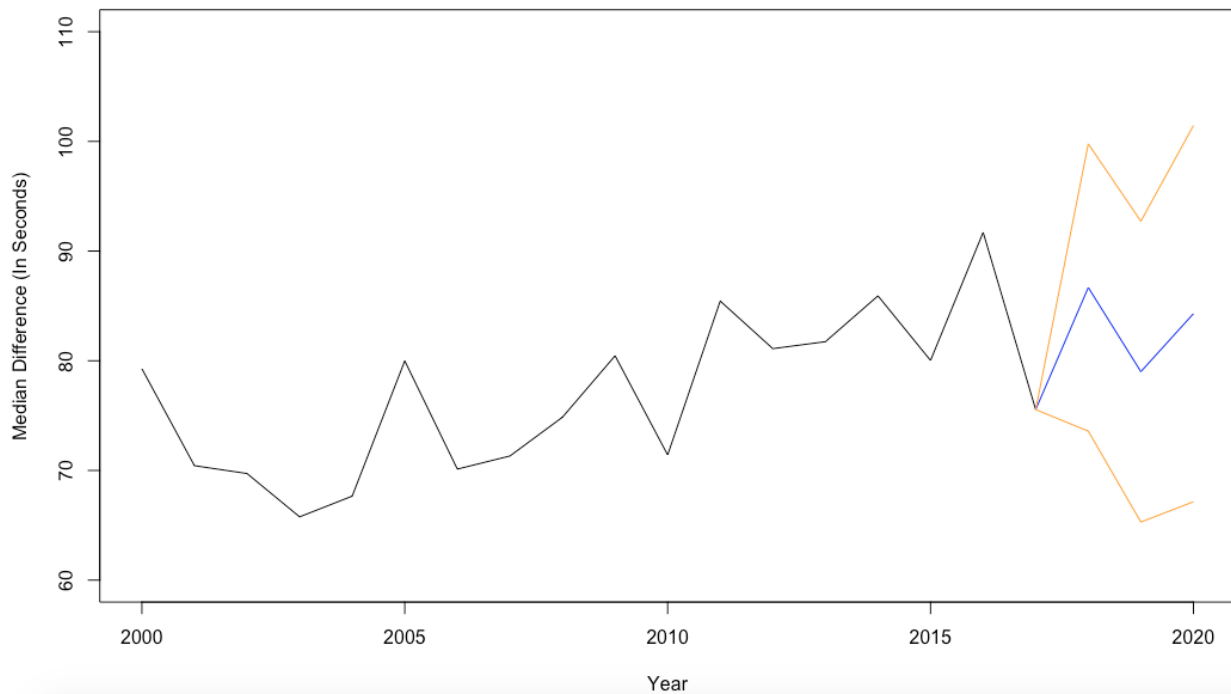


Formula 1 Dataset - Observations

- **Difference in first and last position across all years since 2000**

Median Time Difference with prediction for next 3 years –

Time difference between the first and the last driver



Series: x_all

ARIMA(1,1,0)

Coefficients:

ar1

-0.6891

s.e. 0.2002

sigma^2 estimated as 42.89: log likelihood=-55.88

AIC=115.75 AICc=116.61 BIC=117.42

Training set error measures:

ME

RMSE

MAE

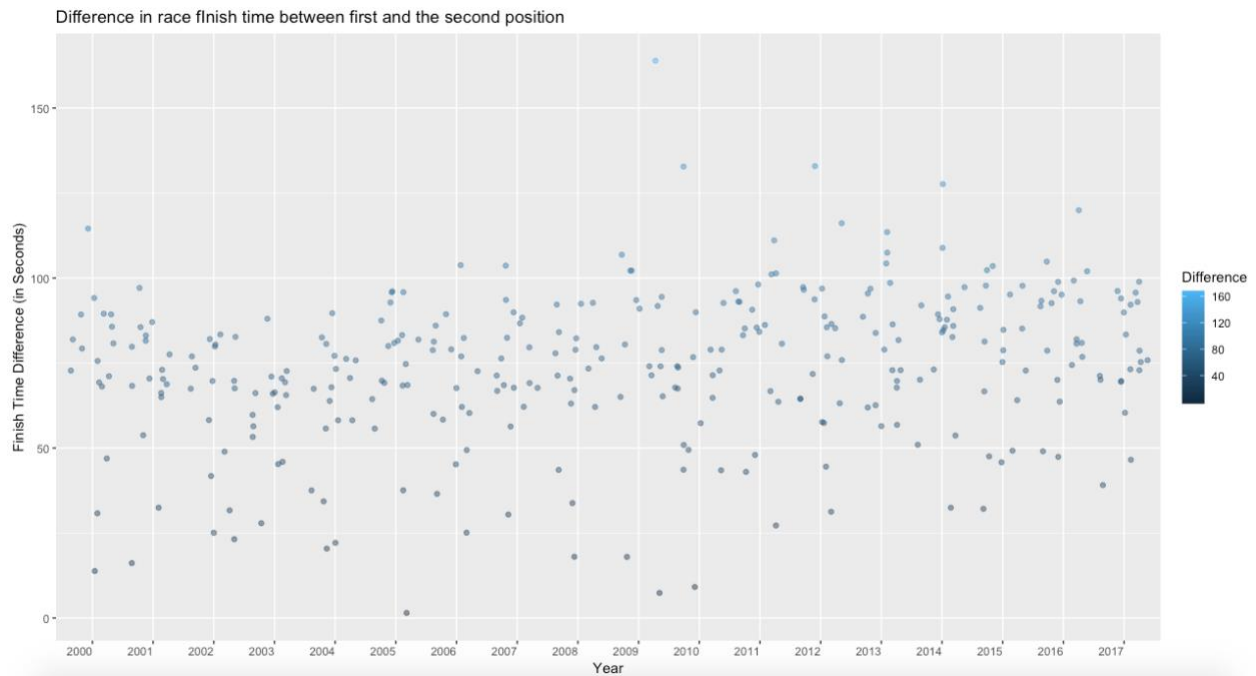
MPE

MAPE

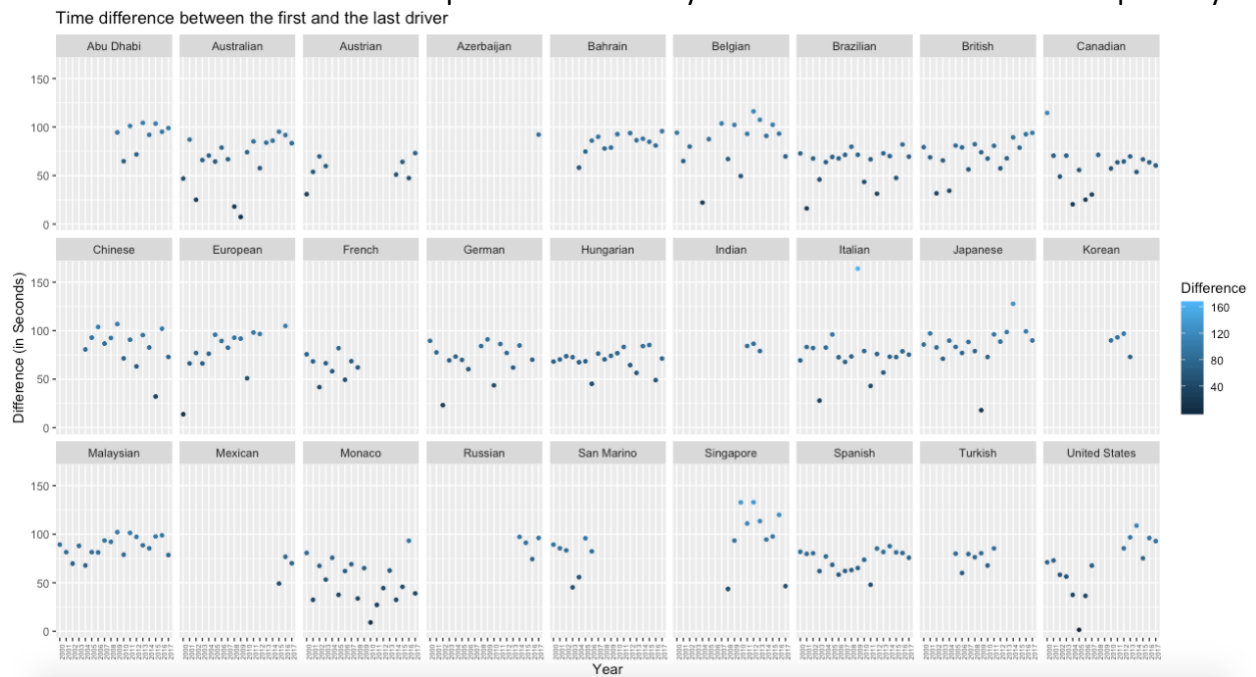
MASE

ACF1

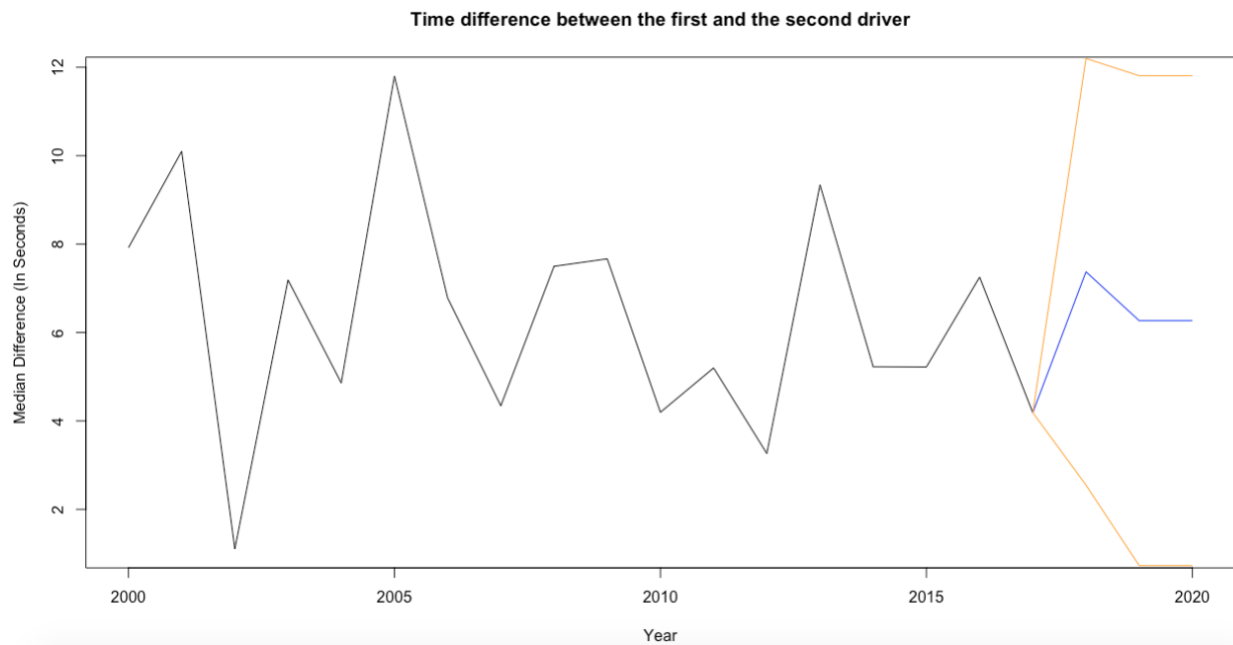
Training set 0.4084176 6.174159 5.309962 0.05826987 6.867321 0.7929354 -
0.1515813



- Difference in first and last position across all years since 2000 – for all races separately



- **Difference in first and second position across all years since 2000**
Median Time Difference with prediction for next 3 years –



Series: x_top2

ARIMA(0,0,1) with non-zero mean

Coefficients:

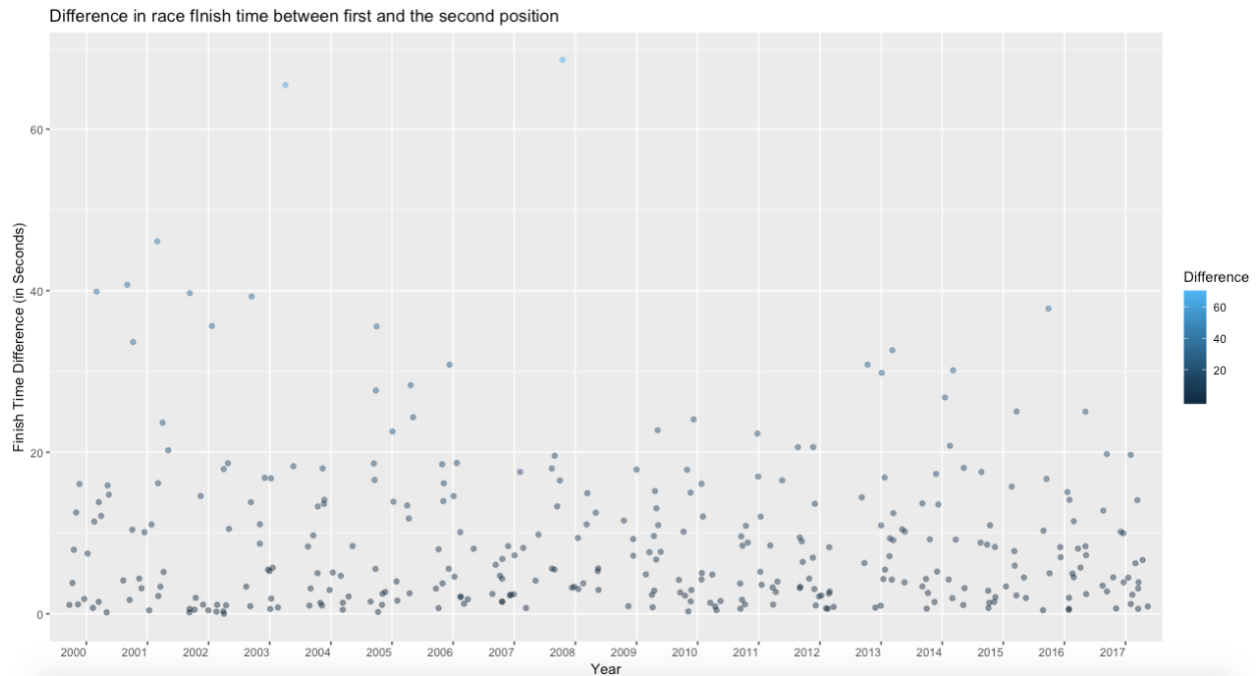
	ma1	mean
	-0.5643	6.2682
s.e.	0.2381	0.2525

sigma^2 estimated as 5.82: log likelihood=-40.52

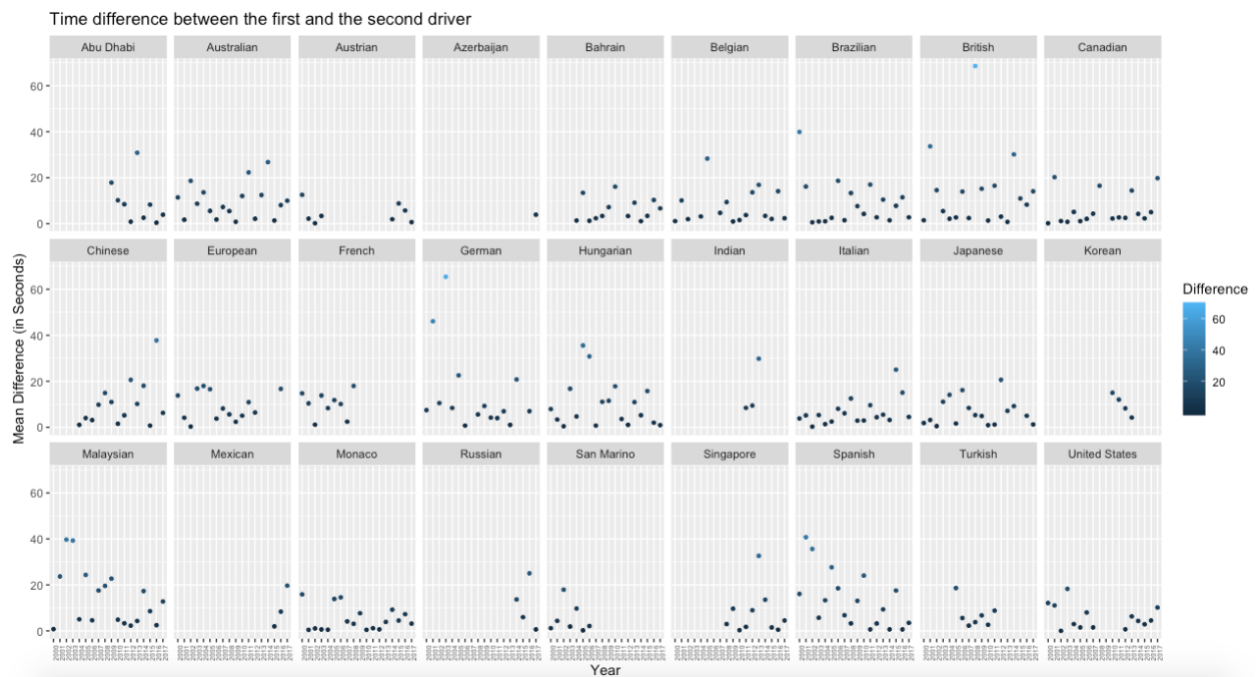
AIC=87.05 AICc=88.76 BIC=89.72

Training set error measures:

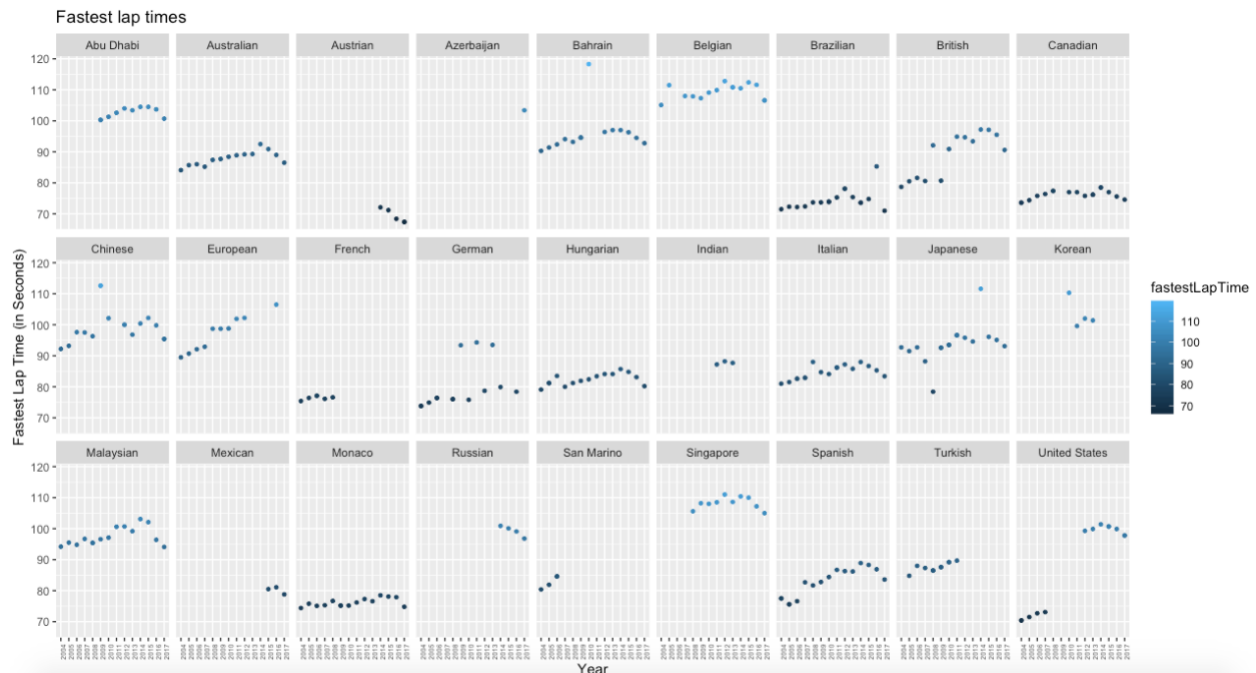
	ME	RMSE	MAE	MPE	MAPE	MASE
ACF1						
Training set	0.1132595	2.274586	1.848336	-19.75684	41.8592	0.5325397
	0.06625792					



- Difference in first and second position across all years since 2000 – for all races separately



- **Fastest Laps – year over year – for each races**

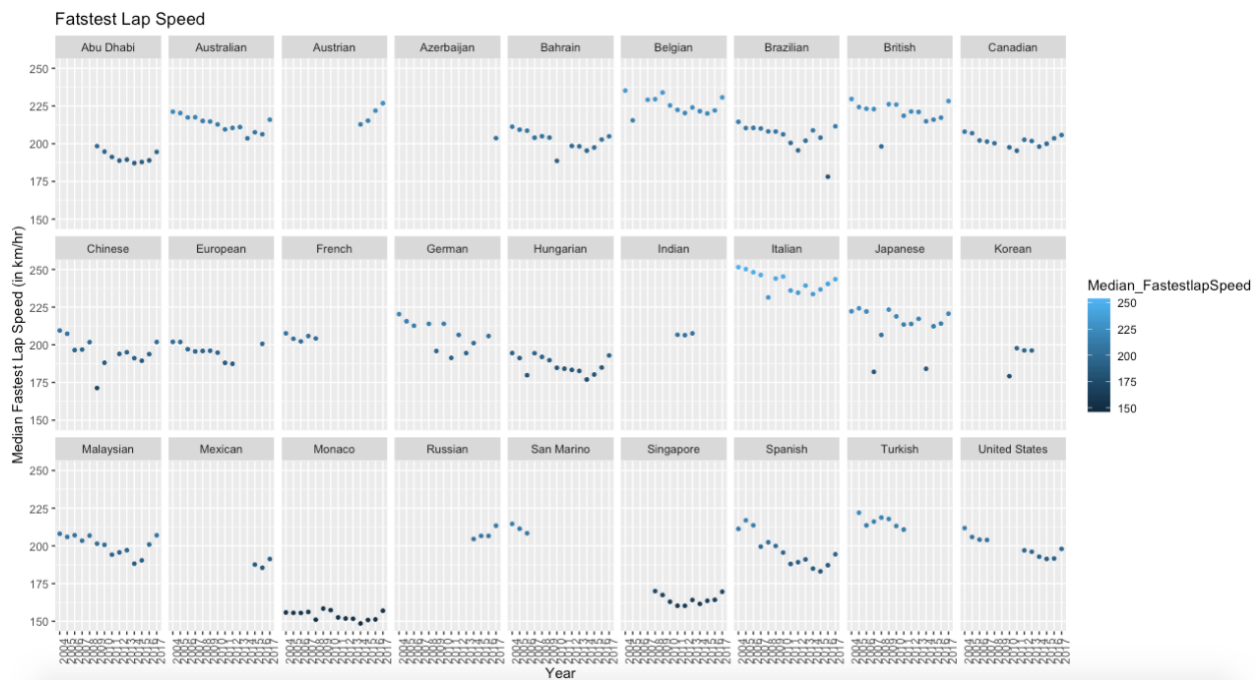


- Bahrain Grand Prix 2010 –
<https://www.autosport.com/f1/news/81055/bahrain-unveils-new-layout-for-f1-race>
 The 2010 race saw a new circuit configuration being used for the Grand Prix. It used the "Endurance Circuit" layout, extending the lap length to 6.299 km (3.914 mi).
- German Grand Prix – 2008 through 2014
https://en.wikipedia.org/wiki/German_Grand_Prix
 Hockenheimring and the Nürburgring alternated hosting the German Grand Prix between 2008 and 2014, at which point Nürburgring pulled out of hosting the event in 2015, leaving Hockenheim the sole host of the race but only in alternating years until 2018. Thus no race results for 2015 and 2017. A further one-year deal places the German Grand Prix on the 2019 calendar
- Japanese Grand Prix 2014 –
https://en.wikipedia.org/wiki/2014_Japanese_Grand_Prix
 Heavy rain from Typhoon Phanfone made the track surface wet and reduced visibility. Starting from behind the safety car, the race was stopped after two laps and resumed 20 minutes later.
 The race was scheduled to run for 53 laps, but was brought to an end on the 46th lap (with the result counted back two laps) after an accident involving Jules Bianchi. Bianchi lost control of his Marussia at Dunlop Curve on the 43rd lap and collided with a tractor crane that was tending to Adrian Sutil's Sauber, which had spun off on the previous lap. Bianchi sustained severe head injuries in the accident, from which he died in his native

France on 17 July 2015, thus becoming the first driver to die as a result of injuries sustained in a Formula One race since Ayrton Senna in 1994. The accident prompted Formula One's governing body, the Fédération Internationale de l'Automobile (FIA), to investigate the incident with a ten-person panel in which it was determined there was no single cause that prompted the crash.

- United States Grand Prix –
https://en.wikipedia.org/wiki/United_States_Grand_Prix
 Held at -
 Indianapolis - 2000 through 2007
 Austin – 2012 through till date

- **Maximum speed – year over year**



- Monaco and Singapore Grand Prix
https://en.wikipedia.org/wiki/Monaco_Grand_Prix
https://en.wikipedia.org/wiki/Singapore_Grand_Prix#Track_description
 These are held on the city streets. That explains the lower maximum speeds compared to the other races
- Japanese Grand Prix 2007 and 2014 –
https://en.wikipedia.org/wiki/2014_Japanese_Grand_Prix
https://en.wikipedia.org/wiki/2007_Japanese_Grand_Prix
 Due to the Heavy rain in both 2007 and 2014 the driving conditions were difficult, resulting in reduced maximum speeds

- Formula 1 Engines –

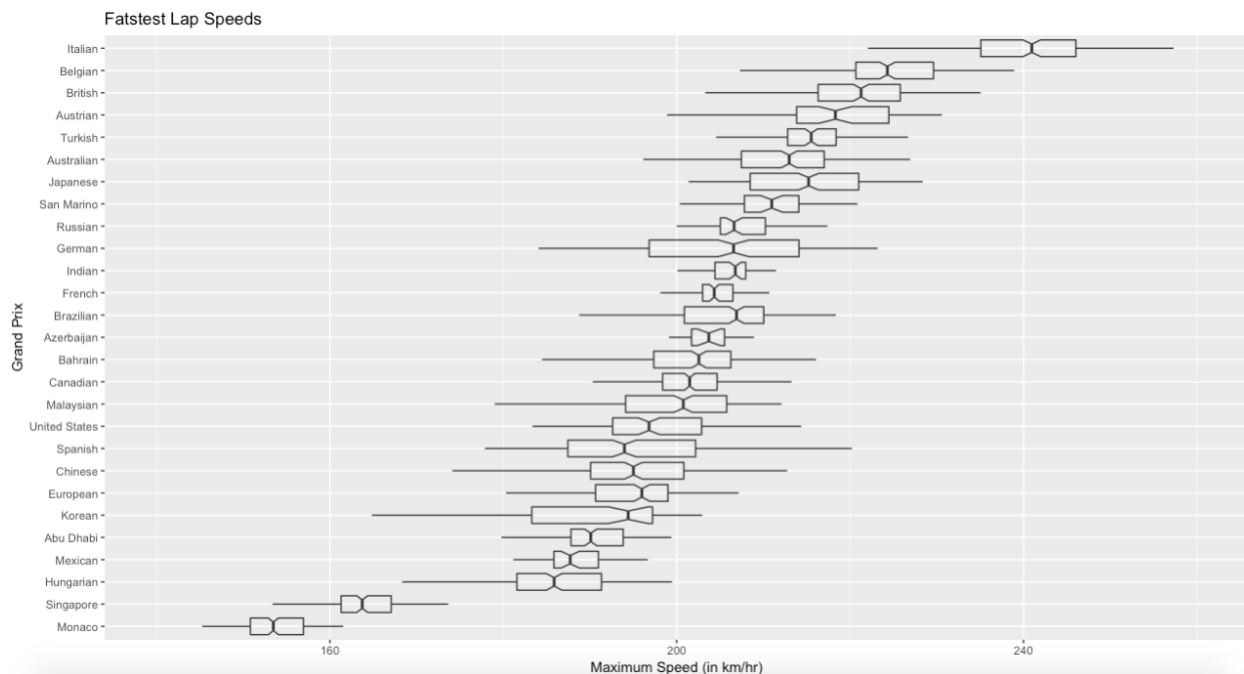
https://en.wikipedia.org/wiki/Formula_One_engines#2006–2013

We do see a steady drop in maximum speeds from 2006 though 2013. Whereas, starting 2014 there seems a steady improvement.

Starting 2006, the Formula 1 engines had to be 2.4 liter V8 as compared to 3 liter V10 in previous years. The reduction in capacity was designed to give a power reduction of around 20% from the 3 liter engines, to reduce the increasing speeds of Formula One cars.

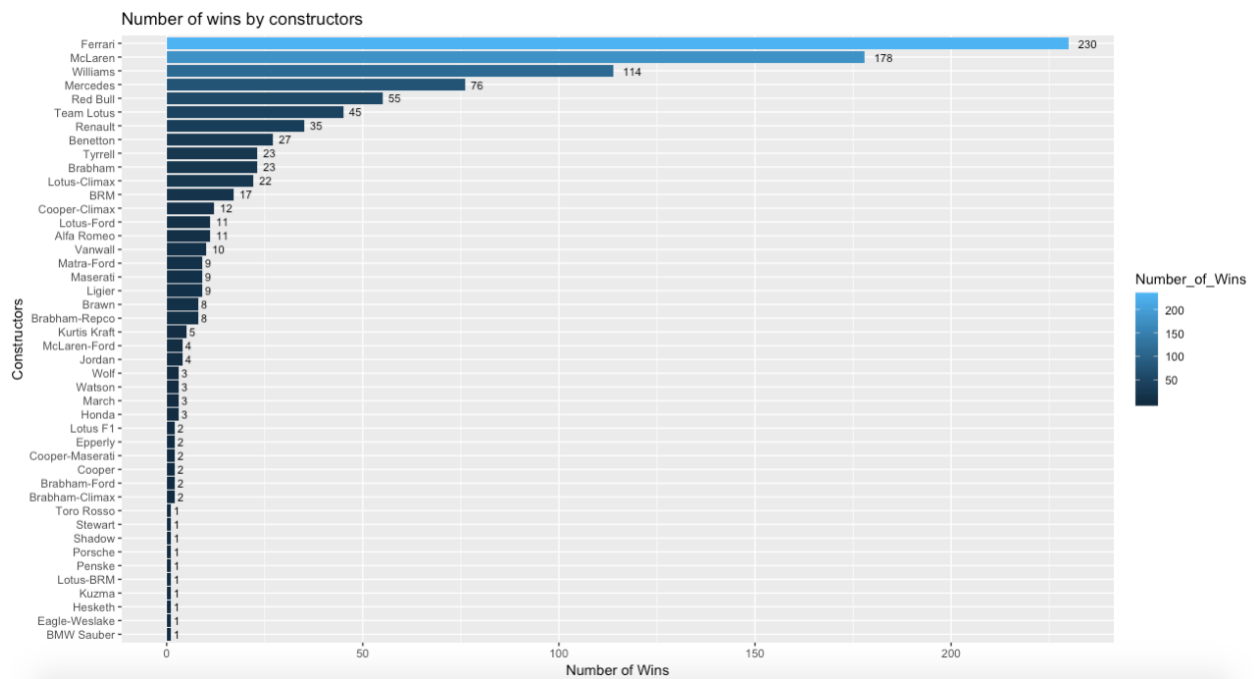
Formula One entered its second turbocharged era in 2014 with 1.6 liter turbocharged V6 hybrid engines. In-season engine development returned; the previous V8's development was frozen. The new turbo engines produce 600 bhp (the previous V8s produce approximately 750 hp); but the new Energy Recovery System (ERS) are twice as powerful as the KERS system; this new ERS system gave the drivers up to the equivalent of 160 hp when activated; the KERS gave cars an extra 80 hp when activated.

- **Maximum Speed – For each race**



- Italian Grand Prix has the fastest speed while Monaco Grand Prix has the lowest speed

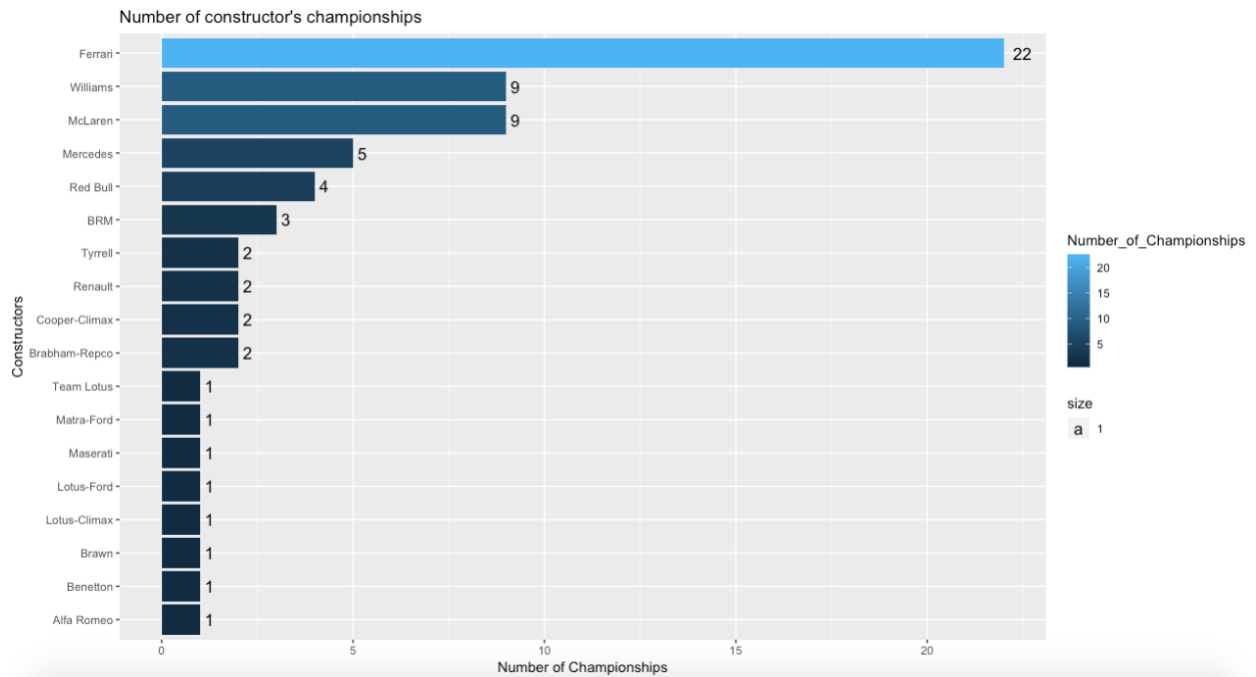
- Constructors –
 - Maximum wins



Top 3 Constructors to win Formula 1 races

1. Ferrari - 230
2. McLaren - 178
3. Williams - 114

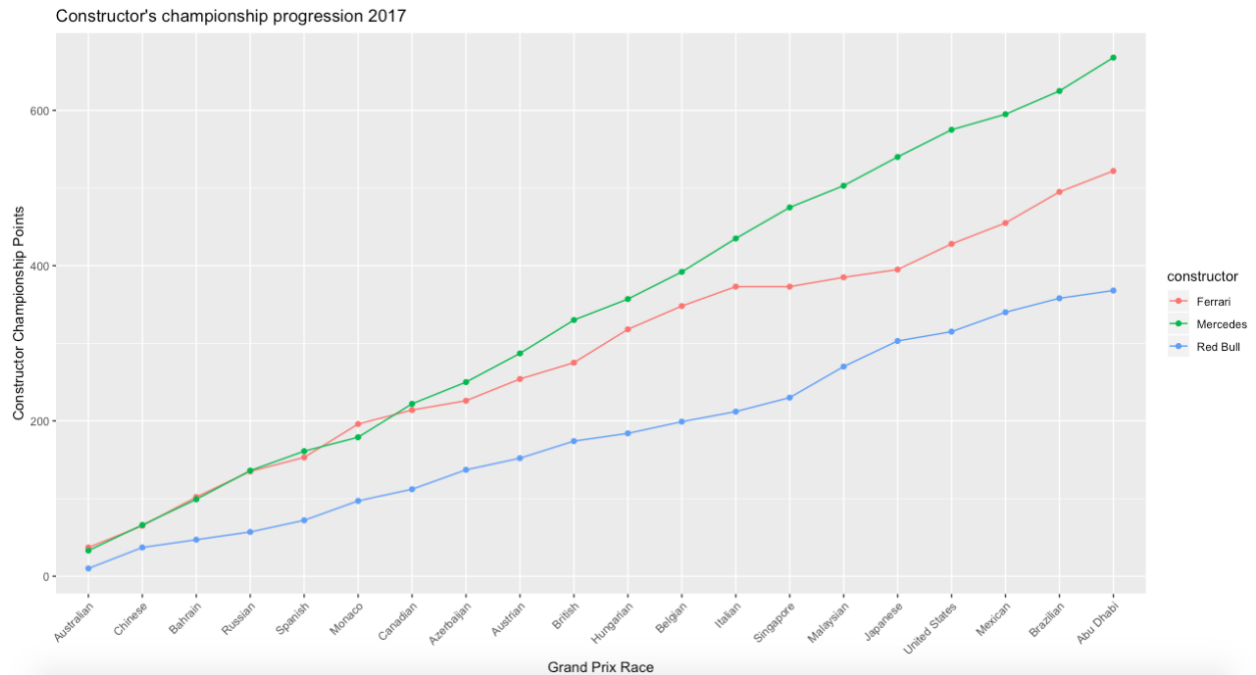
○ Number of Constructors championships



Top 3 constructors to win Championships

1. Ferrari – 22
2. Williams – 9
3. McLaren – 9

○ 2017 Points chart for top 3

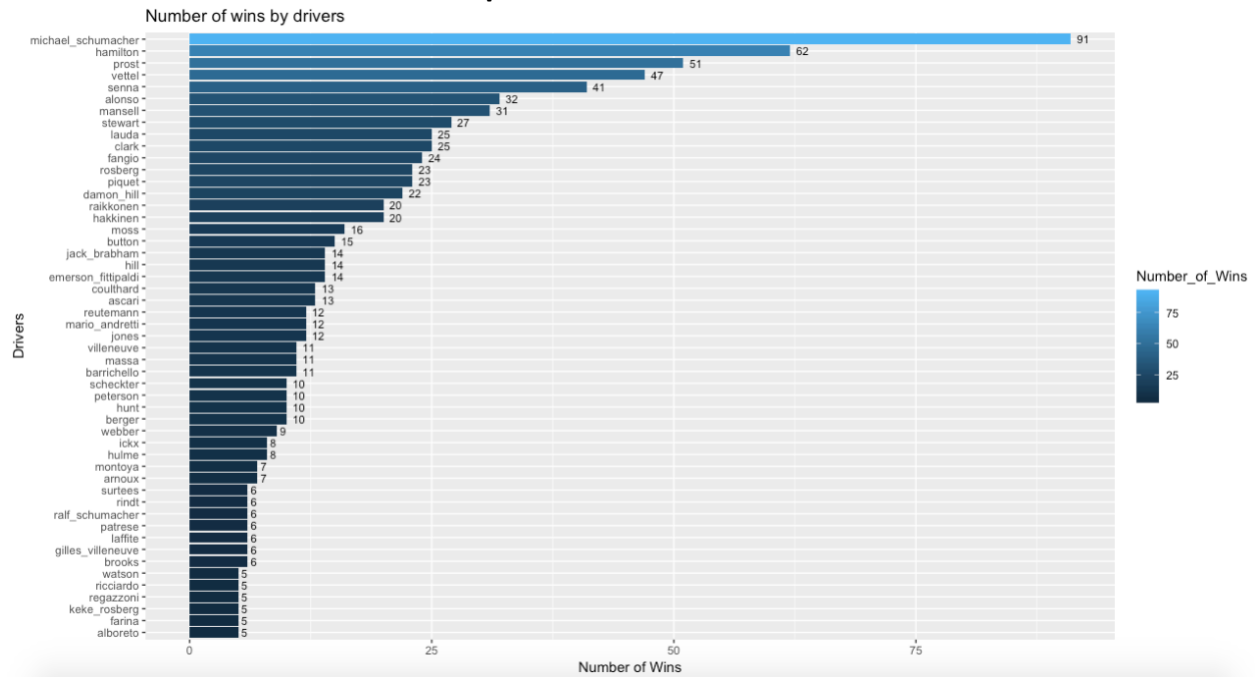


[https://en.wikipedia.org/wiki/2017_Formula_One_World_Championship#World_Constructors' Championship standings](https://en.wikipedia.org/wiki/2017_Formula_One_World_Championship#World_Constructors'_Championship_standings)

2017 season started well for both Ferrari and Mercedes. It was a tight race until after round 7 at Canadian Grand Prix. Mercedes dominated round 8 and onwards, leaving Ferrari behind to clinch their 4th consecutive constructor's championship title, taking their total to 5 championships overall.

- Drivers –

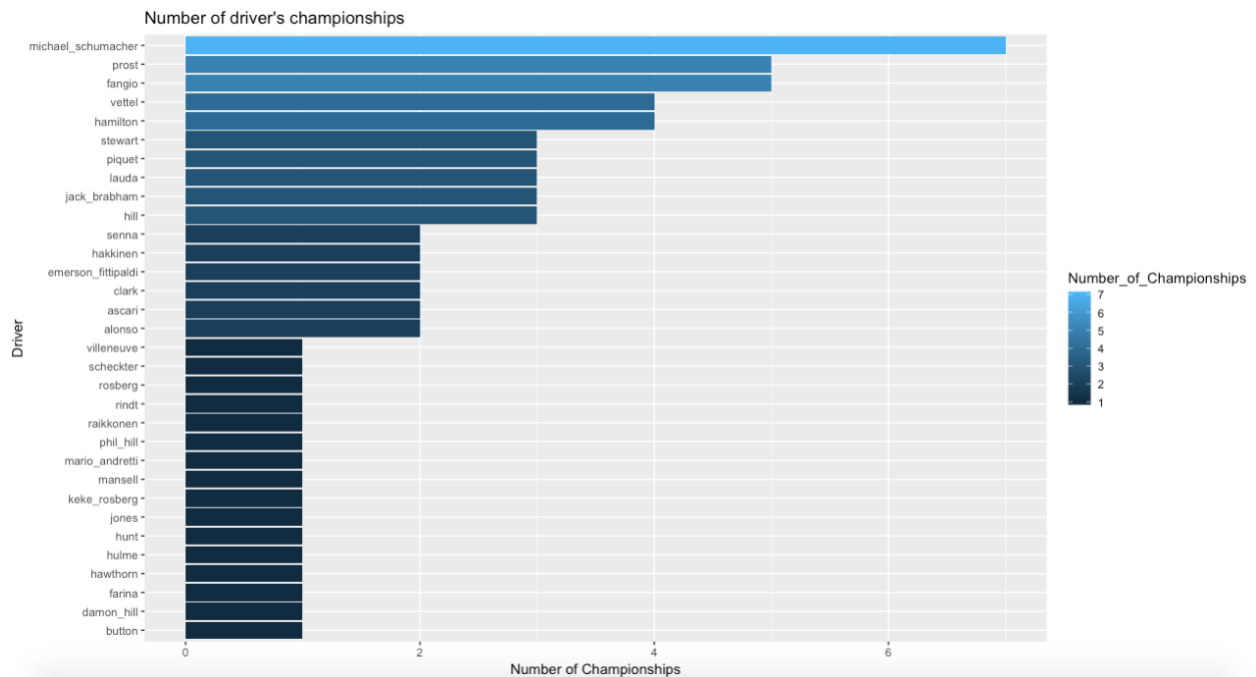
- Maximum wins – top 50 drivers



Top 3 drivers with most wins

1. Michael Schumacher – 91
2. Lewis Hamilton - 62
3. Alain Prost - 51

○ Number of championships –

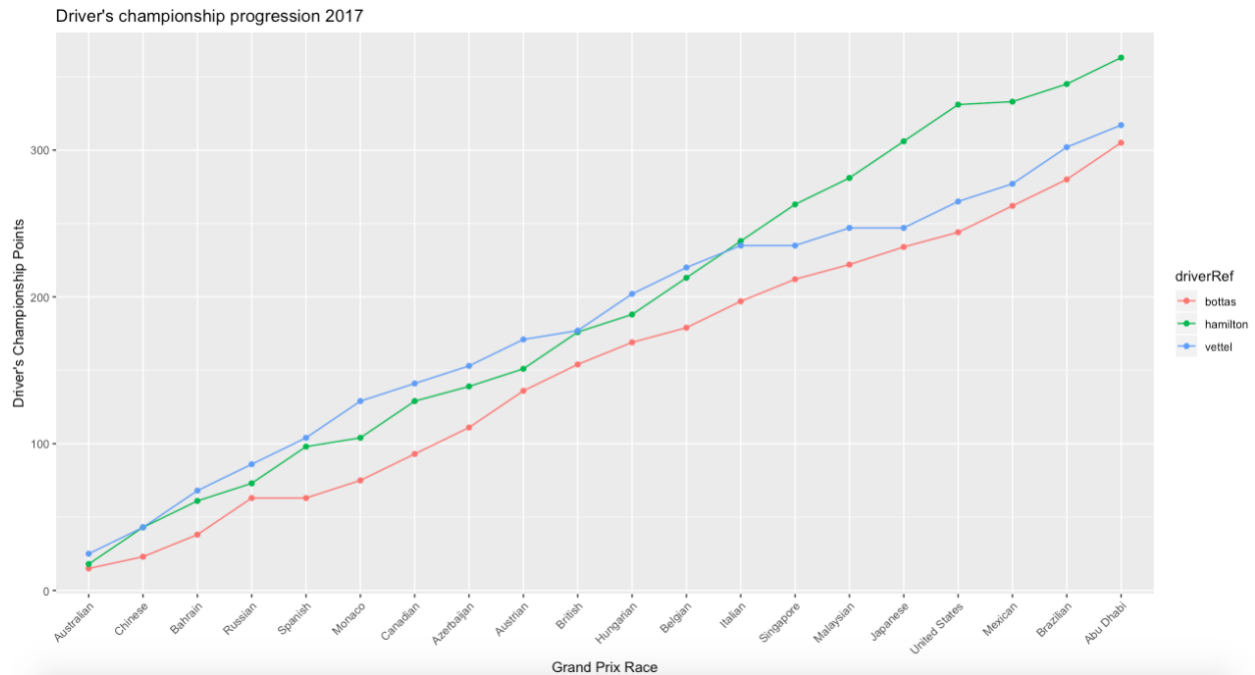


Top 3 drivers with most championships

1. Michael Schumacher – 7
2. Alain Prost – 5*
3. Juan Manuel Fangio – 5

* In 1988, according to the rules, only 11 best results were considered towards the championship points. Prost had won 7 races and secured second place in other 7 races. Senna had won 8 races and secured second place in other three races. Thus, Senna won the title by 3 points – 90 to 87

○ Top 3 drivers – 2017 points graph



<https://www.autosport.com/f1/news/132278/vettel-title-hopes-dealt-major-blow-in-japan>

After 13 rounds, the race for the driver's championship was very tight. Vettel had led for the most part of the year. However, he had to retire from Japanese Grand Prix due to suspected engine problem. Vettel could not recover from there on and Hamilton went on to win his 4th driver's championship.