Formula 1 Elo Calculator

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Link To The Code

Formula 1

Running since 1950, the Formula One World Championship (F1) is the highest level of open wheel racing organised by the Fédération Internationale de l'Automobile (FIA), the body that regulates worldwide automobile racing.

There have been:

- 74 World Championships
- Over 1000 World Championship races
- Over 800 drivers

Elo Rating System

Elo Rating System Calculation

The expected result of a player is given by:

$$E_p = \frac{1}{1 + 10^{\frac{R_o - R_p}{400}}}$$

The updated Elo of a player is given by:

$$R'_p = R_p + K(S_p - E_p)$$

Elo Rating System Example

For a player with Elo of 1400 and opponent with Elo 1800:

$$E_p = \frac{1}{1 + 10^{\frac{1800 - 1400}{400}}} = \frac{1}{1 + 10^{\frac{400}{400}}} = \frac{1}{1 + 10^1} = \frac{1}{11} = 0.\overline{09}$$

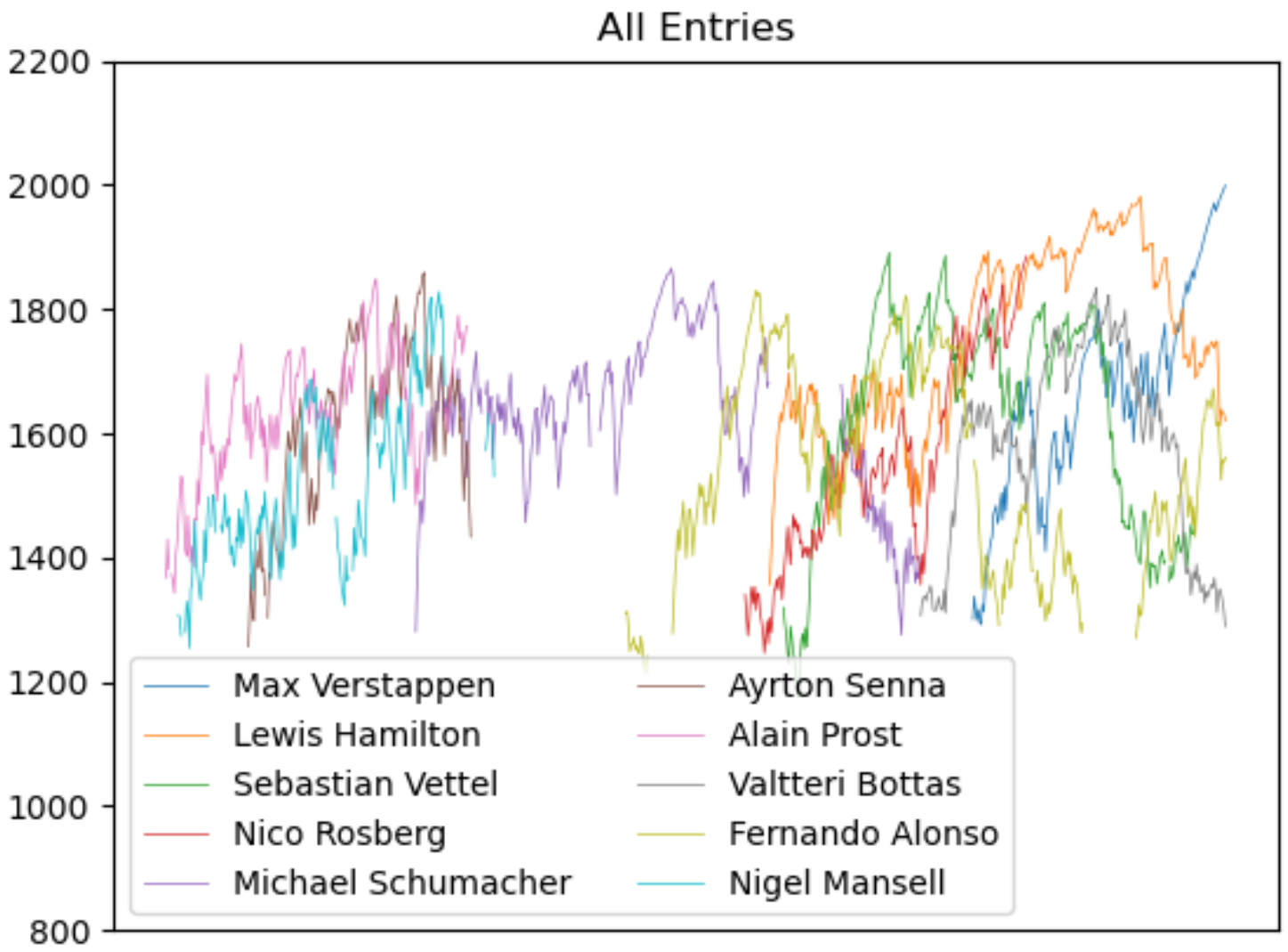
If the player wins (given a K of 9):

$$R'_p = 1400 + 9(1 - 0.\overline{09}) = 1400 + 9(0.\overline{90}) = 1400 + 8.\overline{18} \approx 1408$$

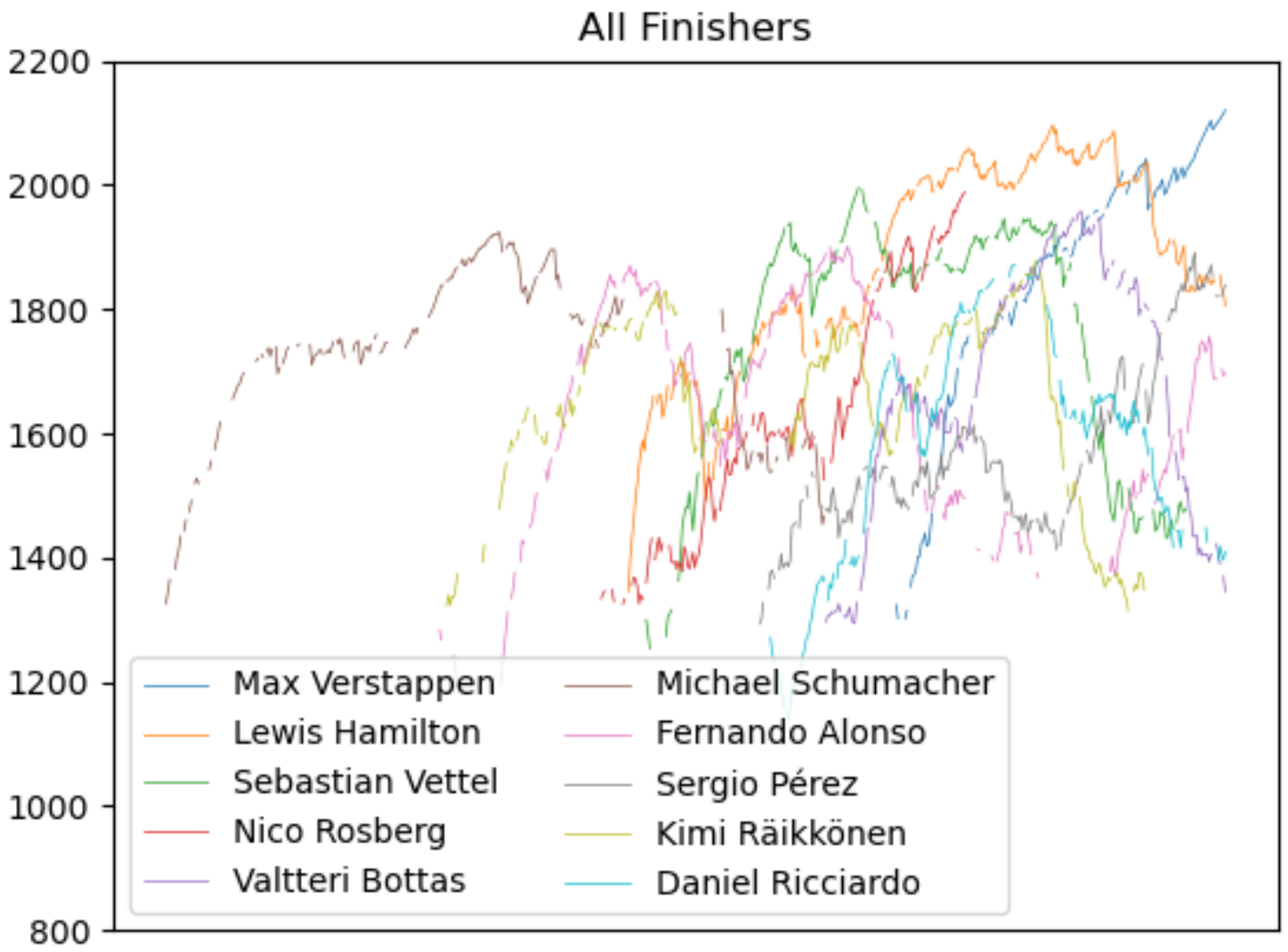
How I Calculated Elo

- Each race was considered a a series of 1 on 1 races between all drivers competing.
- The Elo changes from each 1 on 1 was summed to give a new Elo for each driver.
- This was repeated for each race in a given time period.
- A base k Value of 5 was selected.

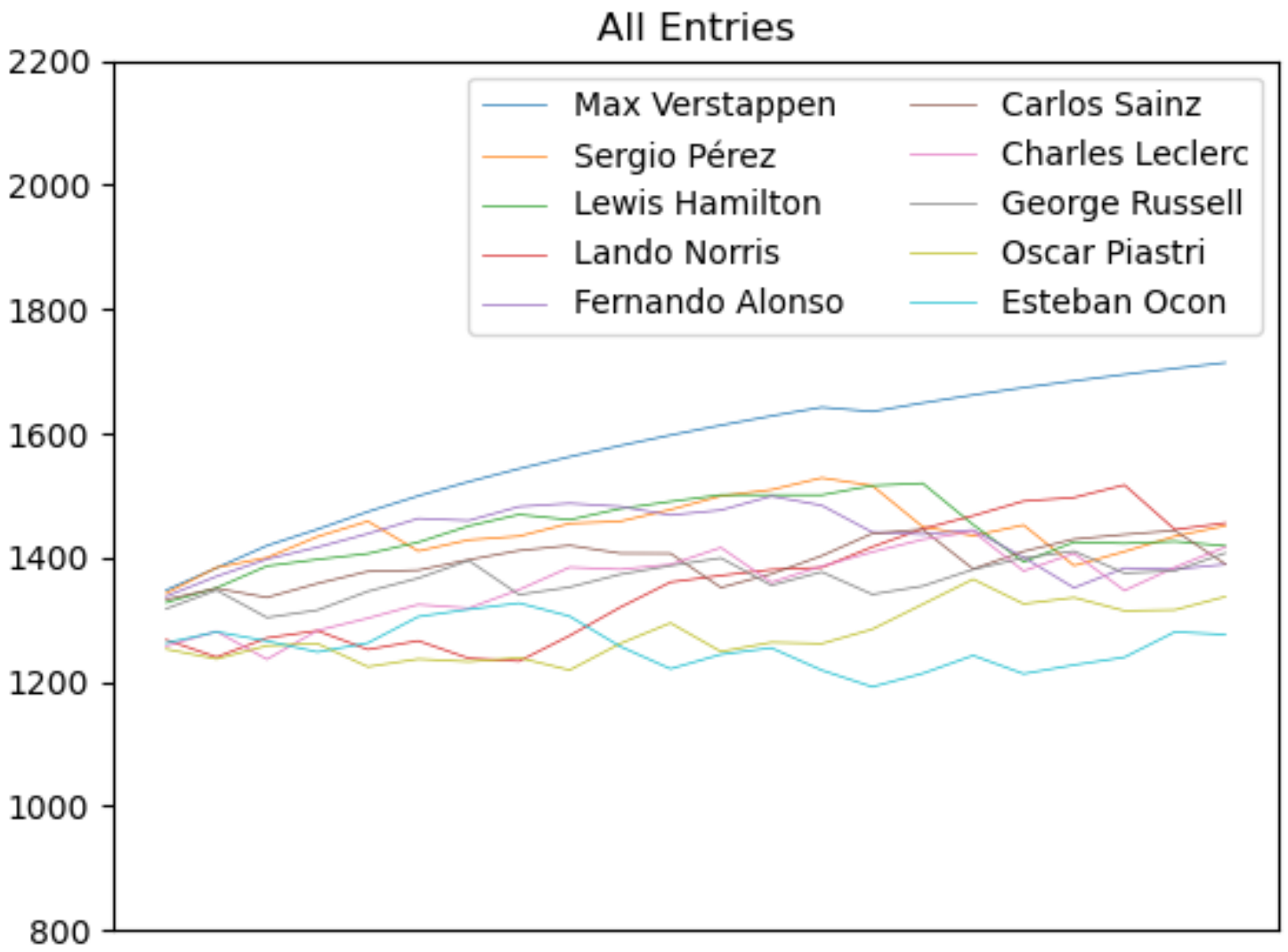
Top 10 Maximum Elo All Entries



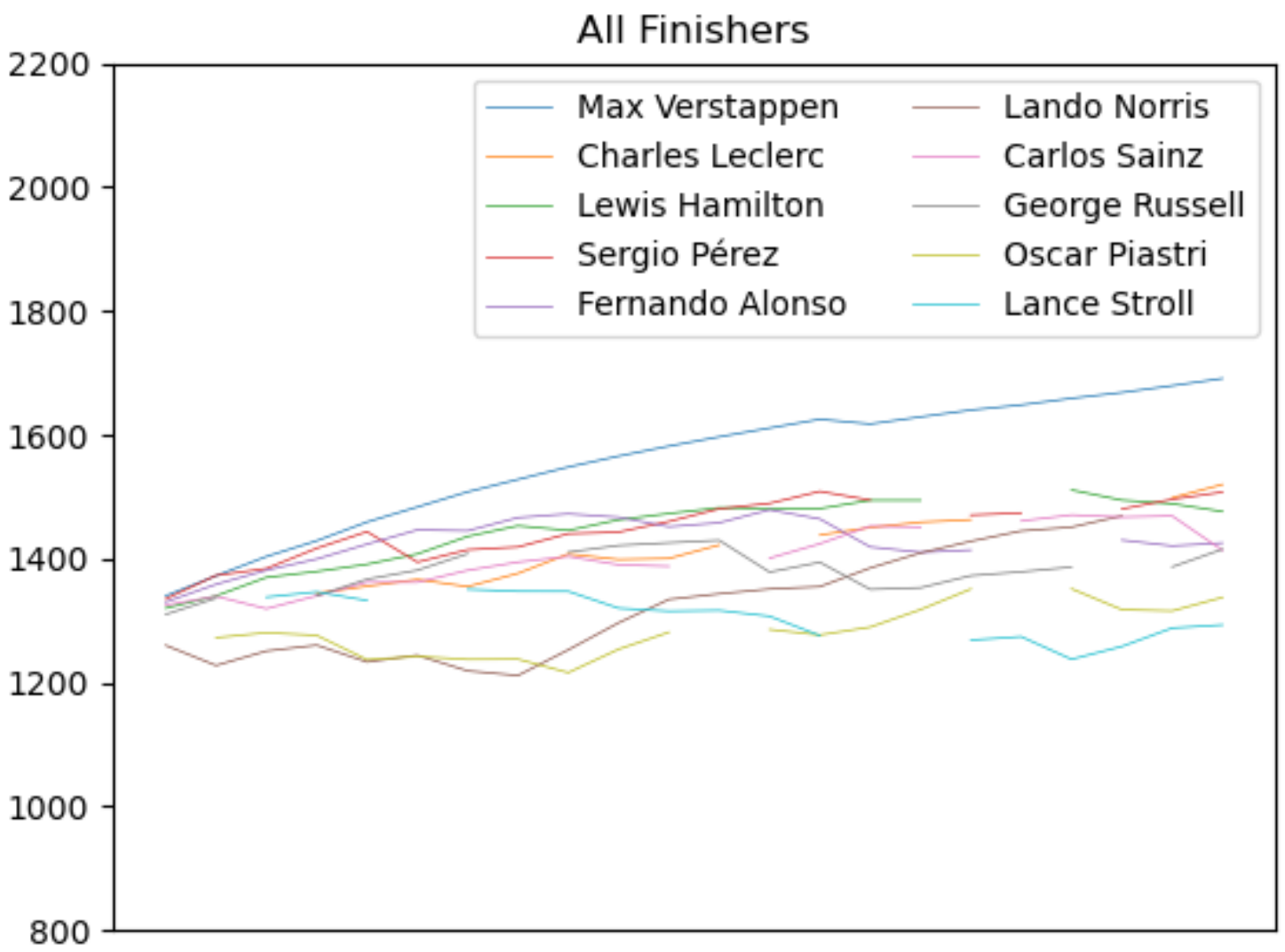
Top 10 Maximum Elo All Finishers



Top 10 Maximum Elo 2023 Entries



Top 10 Maximum Elo 2023 Finishers



Issues With The Data

- For some reason ”\N” was used as a placeholder.
  - Handled by replacing ”\N” with np.NaN
- Before 1961, cars were often shared between drivers.
  - Handled by dividing the K value in each 1 on 1 by the number of drivers.
  - Eg. Car1 with 2 drivers and Car2 with 1, the K values of all interactions would be divided by 2.

Possible Future Development

- Analyse the effect of more races in a season.
  - Perhaps vary the K value of each interaction by the number of races in a season.
- Create a way to factor in the relative performance of different cars.
- Investigate the case of inflation of the Elo values over time.
- Include results from Qualifying and the new Sprint Races.
- Compare the Elo ratings from each year against the Championship Standings.

Thanks

All data was taken from CSV's found at ergast.com and checked against other sources for accuracy.

Any Questions?