Formula One

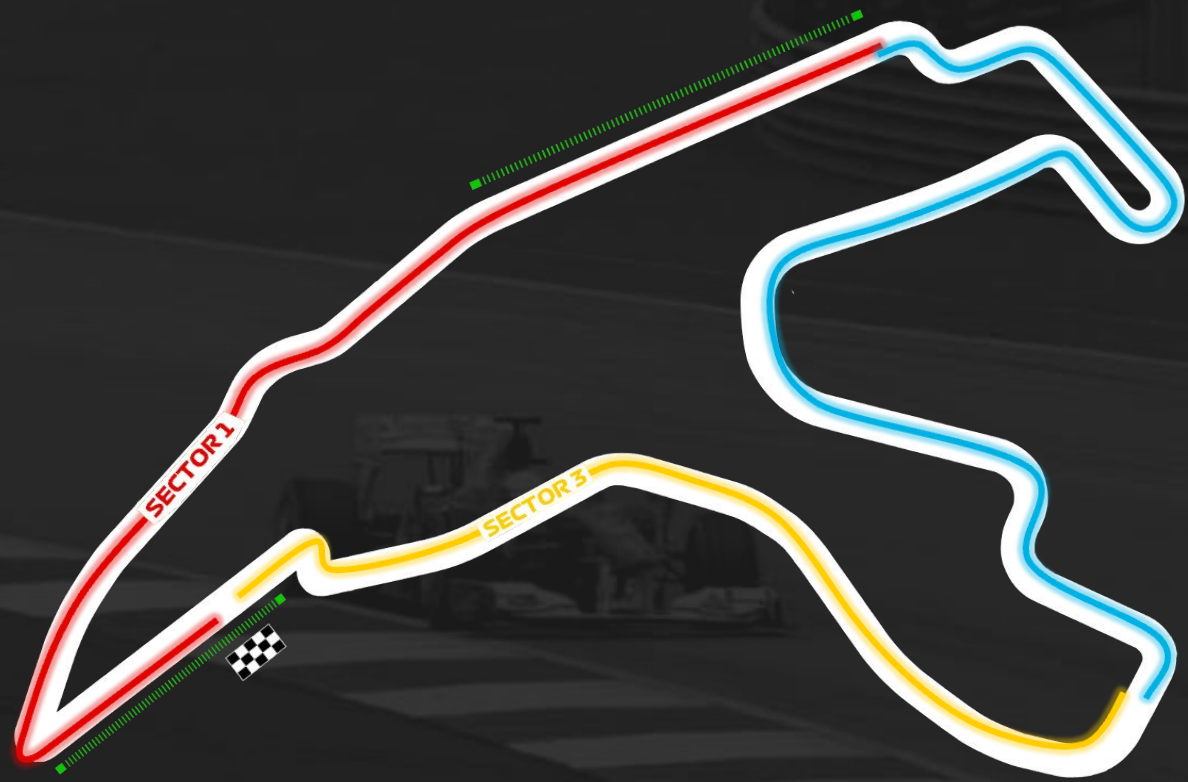
A Comprehensive Visualisation And Analysis

Introduction

Formula 1 is a high-speed motorsport that involves single-seater cars racing against each other on tracks.

Overseen by the Federation Internationale de L'Automobile and hosts a series of Grand Prix events across the globe

Singapore Grand Prix is a crucial component to our tourism industry, attracting a significant number fans who flock to the Marina Bay Circuit every year



Motivation

Our motivation was driven by two factors: Firstly, the sheer amount of data on formula one which made analysis or understanding a difficult task. Secondly, the lack of comprehensive visualisations available online. While there is a lot of information and data out there, it is often scattered across multiple sources, making it difficult to gain a complete picture of each race.

Objectives

(1) To develop an all-in-one F1 dashboard that visualizes the data in a user-friendly and interactive way

(2) To provide fans with a centralized platform to access and explore F1 data, allowing them to gain valuable insights into the sport

(3) To create a tool that serves as a valuable resource for analysts, journalists, and teams to track performance and make informed decisions based on the data.

Approach

Visualisation approach

- Sourced information from kaggle (14 csv files)
- Datasets included information on the Formula 1 races, drivers etc from 1950 to the latest 2023 season.

Data Preprocessing

- Used excel to perform basic cleaning
- SQL was utilised for more complex queries.

EDA

- Performed basic univariate analysis on each selected metric individually using visualisations

Dashboard Planning

- Brainstorming and sketching out ideas
- Identifying the KPI's
- Our primary tools for data visualisation were Tableau and R

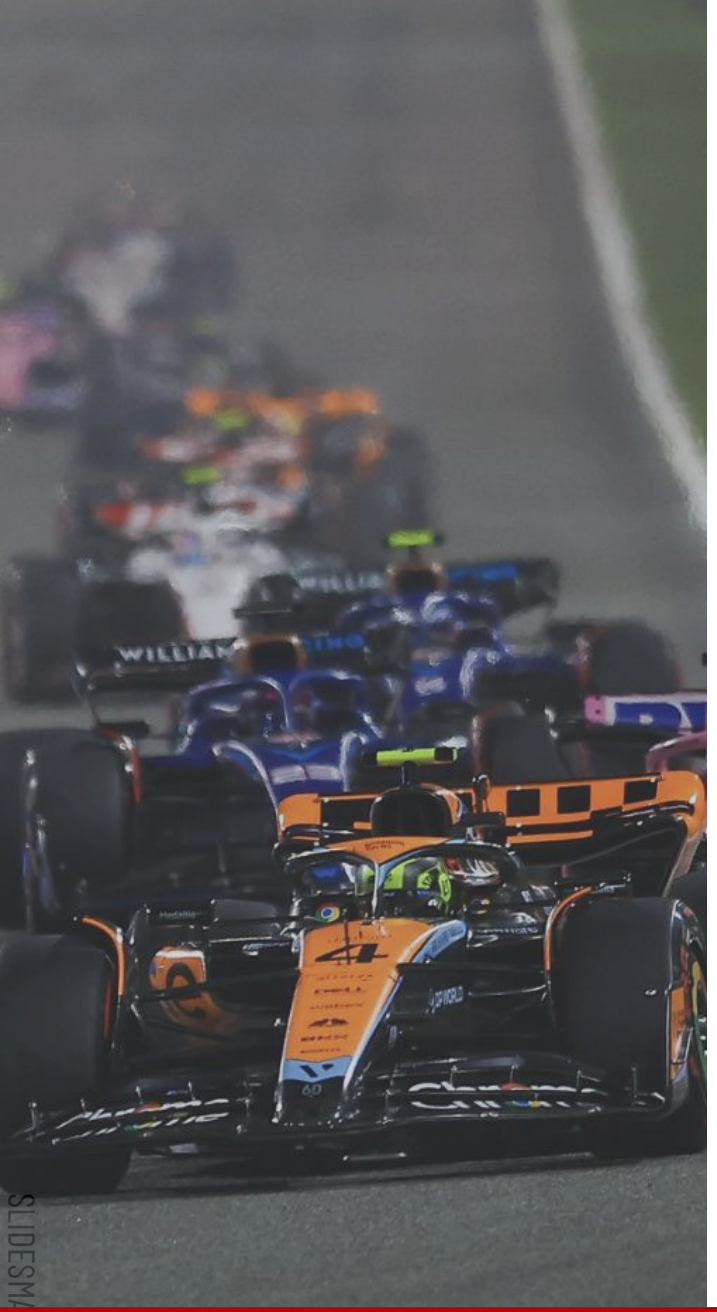
Dashboards

Homepage

Driver

Constructors

GOAT



#1 Homepage Dashboard

What it conveys	Analysis	Key Visualisations
General understanding of race details (locations, tracks, drivers), champions for a given year	The most popular tracks and locations, overall champion, and which team participated the most from 2011-present	Race Information Champions Driver Lineup History Seasonal Point Progression

HOMEPAGE

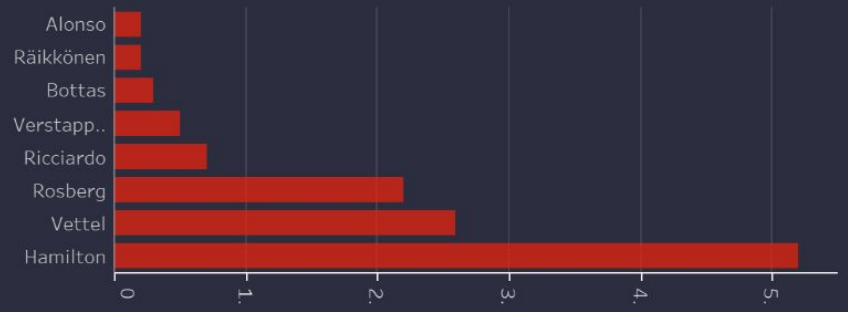
Select A Year: 2013 – 2018

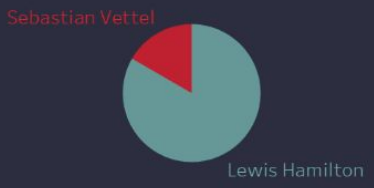
Driver | Team | GOAT

Race Infomation

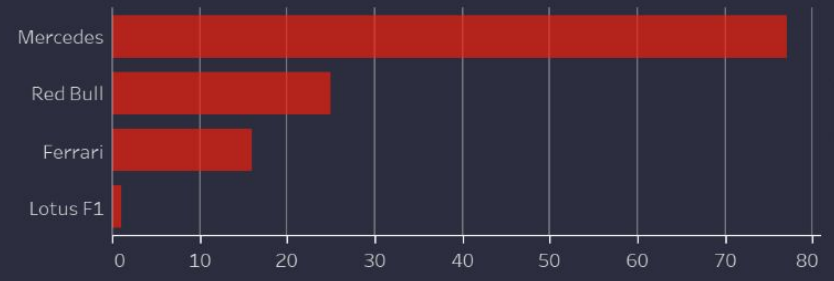
Champions

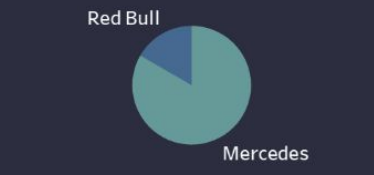
Drivers





Constructors



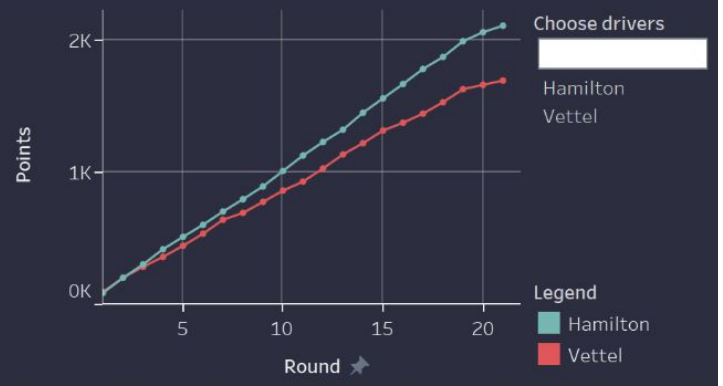


Driver Lineup

Constructor Names	Surname	
Caterham	Ericsson	1
	Kobayashi	1
	Lotterer	1
	Pic	1
	Stevens	1
	van der Garde	1
Ferrari	Alonso	1
	Massa	1

History

Seasonal Point Progression



Homepage Dashboard

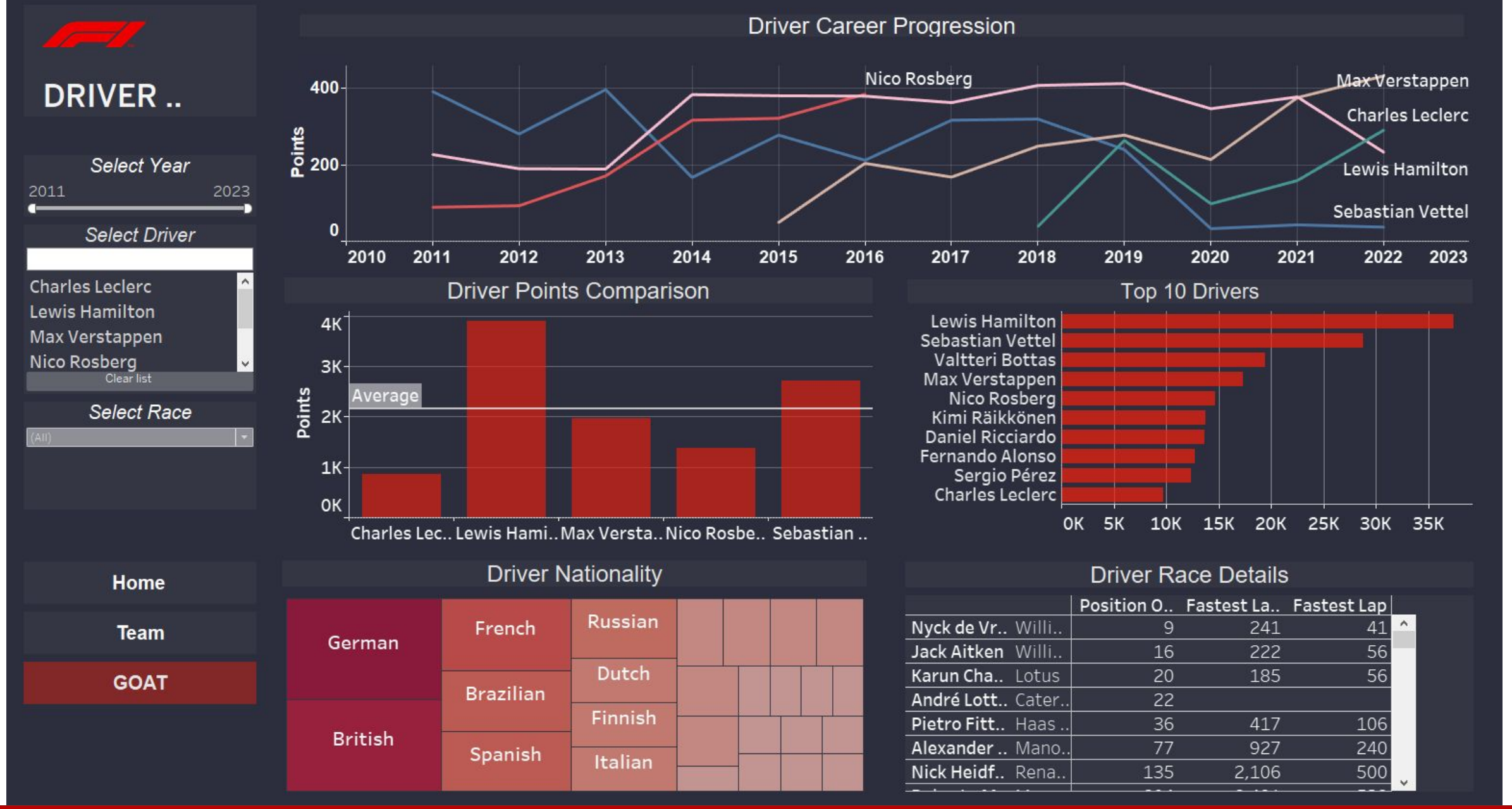
Lewis Hamilton is the GOAT - was the champion 9 times from 2011-present

Mercedes participated the most and was also the champion from 2011-present

Italy, Spain, UAE, UK held the most races from 2011-present (13 races each)

#2 Driver Dashboard

What it conveys	What we want to analyse	Key Visualisations
The overall performance of drivers based on year, location of race track , fastest lap speed, position order, fastest lap	Track and compare drivers performance metrics in a race that contribute to the driver's career progression based selected race(s), year, driver(s)	Career Progression Driver Points Comparison Top 10 Drivers Driver Nationality Driver Race Detail

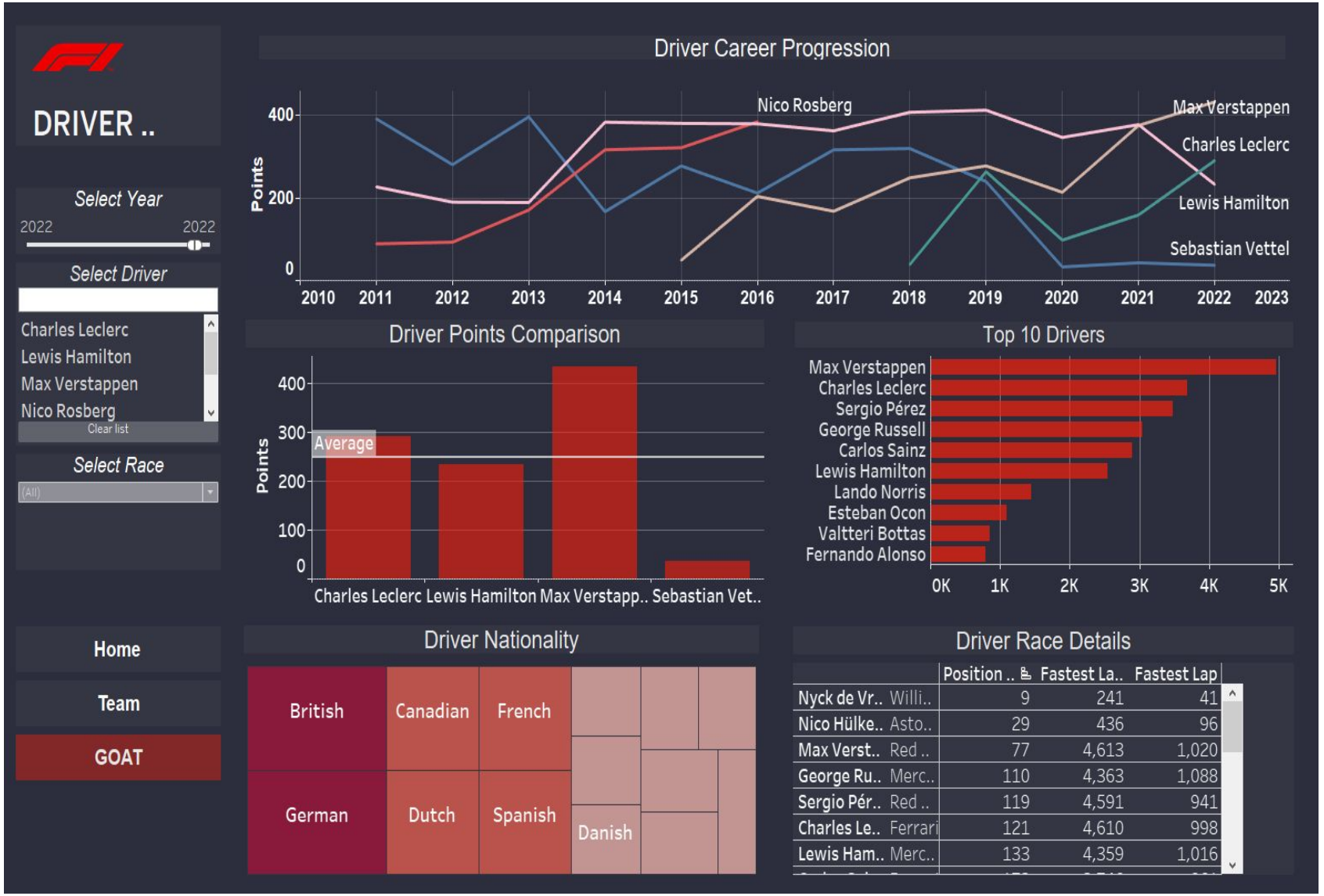

DRIVER ..
Select Year
2011
2023
Select Driver
Charles Leclerc
Lewis Hamilton
Max Verstappen
Nico Rosberg
Clear list
Select Race
(All)
Home
Team
GOAT
Driver Career Progression
Points
400
200
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Nico Rosberg
Max Verstappen
Charles Leclerc
Lewis Hamilton
Sebastian Vettel
Driver Points Comparison
Points
4K
3K
2K
1K
0K
Average
Charles Lec..
Lewis Hami..
Max Versta..
Nico Rosbe..
Sebastian ..
Top 10 Drivers
Lewis Hamilton
Sebastian Vettel
Valtteri Bottas
Max Verstappen
Nico Rosberg
Kimi Räikkönen
Daniel Ricciardo
Fernando Alonso
Sergio Pérez
Charles Leclerc
0K
5K
10K
15K
20K
25K
30K
35K
Driver Nationality
German
French
Russian
Dutch
Brazilian
British
Finnish
Spanish
Italian
Driver Race Details
Position O..
Fastest La..
Fastest Lap
Nyck de Vr.. Willi.. 9 241 41
Jack Aitken Willi.. 16 222 56
Karun Cha.. Lotus 20 185 56
André Lott.. Cater.. 22
Pietro Fitt.. Haas .. 36 417 106
Alexander .. Mano.. 77 927 240
Nick Heidf.. Rena.. 135 2,106 500

Driver Dashboard

Max Verstappen may take over as the next GOAT

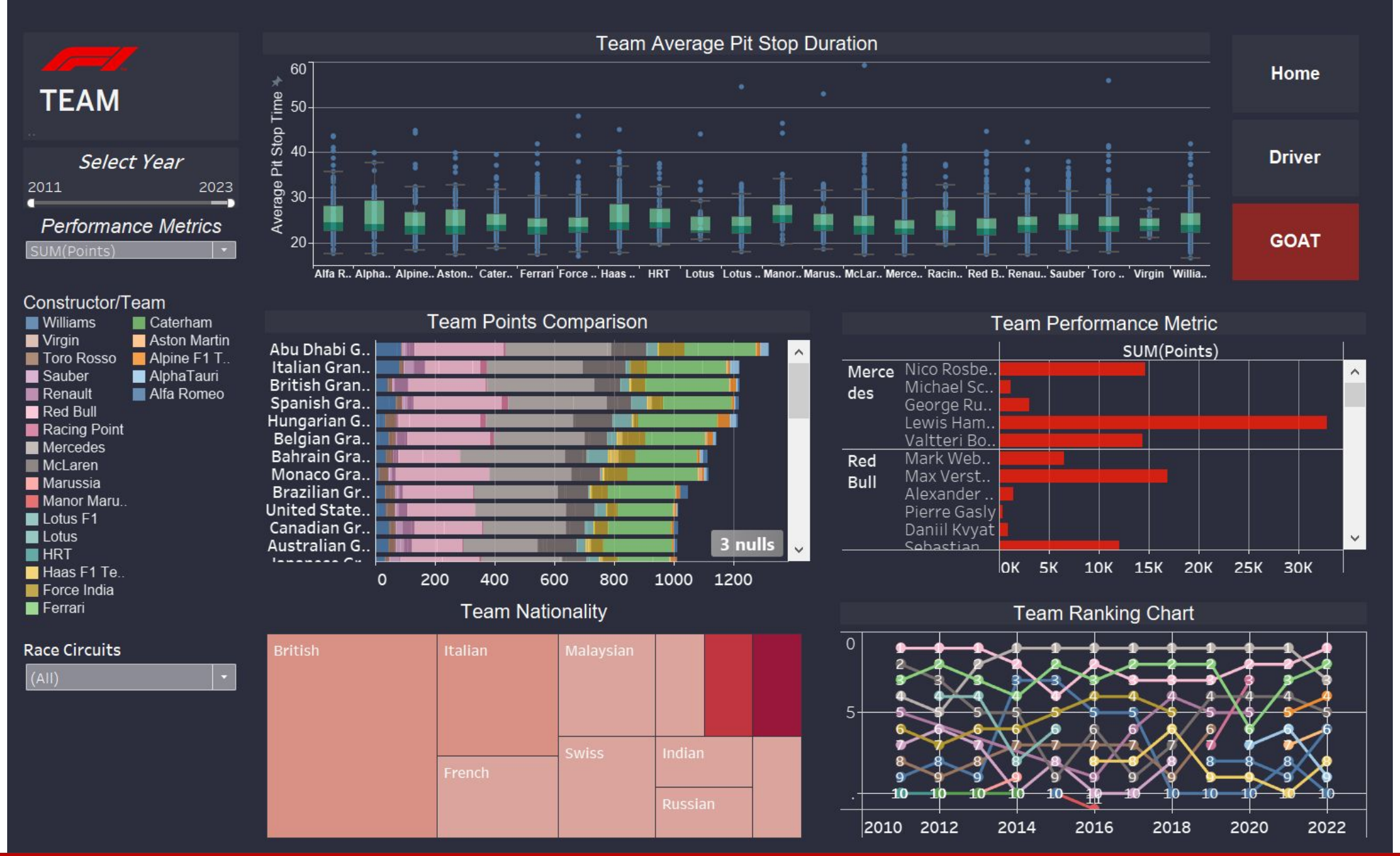
Nico Rosberg left F1 during the peak of his career

Most of the drivers are from European regions



#3 Constructor Dashboard

What it conveys	Analysis	Key Visualisations
Performance comparisons among F1 teams based on year, points, laps, lap speed, lap time, average pit stop duration	Best performing teams and their components breakdown for investigation of strengths and weaknesses for improvement	• Team Nationality • Team Ranking Chart • Team Points Comparison • Team Performance Metric by Drivers • Team Average Pit Stop Duration


TEAM
Select Year
2011
2023
Performance Metrics
SUM(Points)
Constructor/Team
Williams
Virgin
Toro Rosso
Sauber
Renault
Red Bull
Racing Point
Mercedes
McLaren
Marussia
Manor Maru..
Lotus F1
Lotus
HRT
Haas F1 Te..
Force India
Ferrari
Caterham
Aston Martin
Alpine F1 T..
AlphaTauri
Alfa Romeo
Race Circuits
(All)
Team Average Pit Stop Duration
Average Pit Stop Time
60
50
40
30
20
Alfa R..
Alpha..
Alpine..
Aston..
Cater..
Ferrari
Force ..
Haas ..
HRT
Lotus
Lotus ..
Manor..
Marus..
McLar..
Merce..
Racin..
Red B..
Renau..
Sauber
Toro ..
Virgin
Willia..
Home
Driver
GOAT
Team Points Comparison
Abu Dhabi G..
Italian Gran..
British Gran..
Spanish Gra..
Hungarian G..
Belgian Gra..
Bahrain Gra..
Monaco Gra..
Brazilian Gr..
United State..
Canadian Gr..
Australian G..
3 nulls
0
200
400
600
800
1000
1200
Team Performance Metric
SUM(Points)
Merce des
Nico Rosbe..
Michael Sc..
George Ru..
Lewis Ham..
Valtteri Bo..
Red Bull
Mark Web..
Max Verst..
Alexander ..
Pierre Gasly
Daniil Kvyat
0K
5K
10K
15K
20K
25K
30K
Team Nationality
British
Italian
Malaysian
French
Swiss
Indian
Russian
Team Ranking Chart
0
5
10
2010
2012
2014
2016
2018
2020
2022

Constructor Dashboard

Top 3 teams are Red Bull, Ferrari and Mercedes

General worse performance for Mercedes in 2022 compared to 2021

Red Bull has least variability among top 3 teams in pit stop duration

#4 GOAT Dashboard

What it conveys

The dashboard conveys a fascinating comparison of the greatest performers of all time in Formula 1 based on our identified key metrics

What we want to analyse

How different driver perform according to 5 key metrics: Total race wins, Race win percentage, Podium Wins, Max speed and Average Points

Key Visualisations

Age vs Race Wins

Chernoff Faces

Radar Charts

GOAT | Vettel | Verstappen | Rosberg | Bottas

Hamilton vs The Rest

HAMILTON *Vs.* THE REST

Home | Team | Driver

GOAT: Lewis Hamilton

Chernoff Face Analysis

Select Chernoff Face

Sebastian Vettel

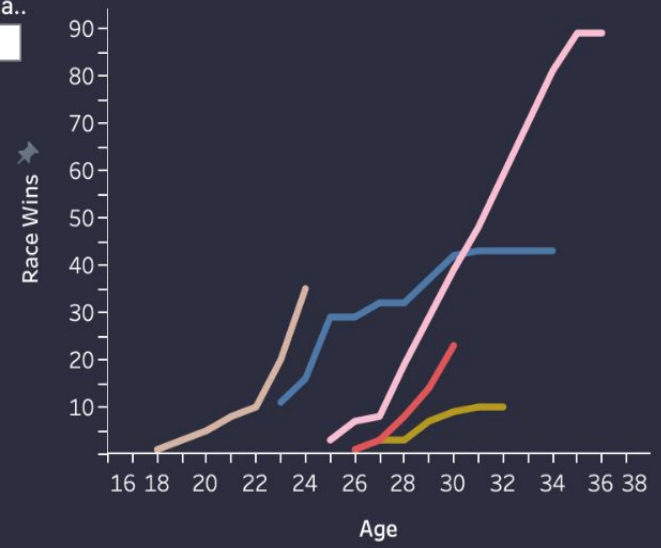
Effect of Variable:

- **Width (Mouth)**: Avg Pts
- **Smile:** Race Wins
- **Width (Eyes)**: Max speed
- **Height of Hair:** Podiums
- **Height of Nose** : Win %

Age vs Wins

Select Age Vs Win Compa..

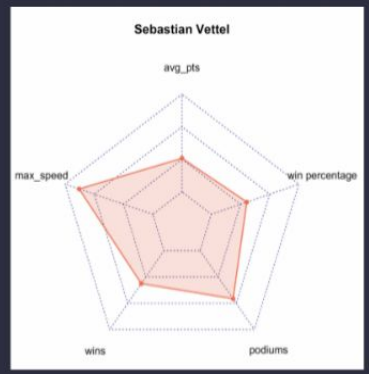
Valtteri Bottas
Sebastian Vettel
Nico Rosberg
Max Verstappen
Lewis Hamilton



Radar Plot Analysis

Select Radar Plot

Sebastian Vettel

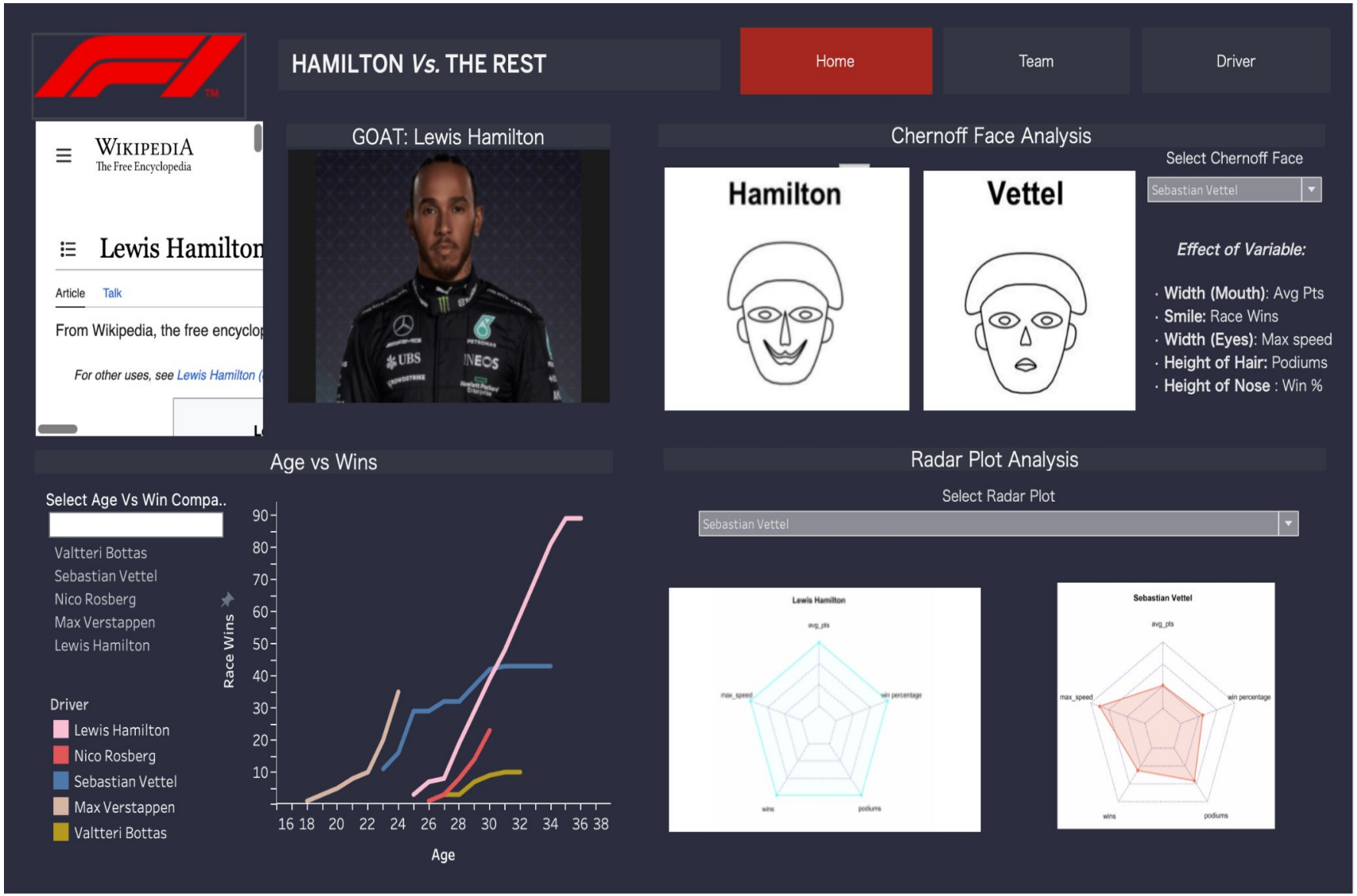


GOAT Dashboard

Apart from Hamilton, the other 4 drivers have different comparative strengths

Verstappen is on trajectory to becoming the most successful driver by age

A large disparity exists between Hamilton and the rest in terms of comprehensive success



Final Takeaways

01

Wide range of Application

Due to the highly technical nature of data in F1, along with the focus on engineering and strategy - there is a lot of scope for using visualisations and its insights to better improve team/driver performance.

02

Consistency is Key

It is possible to see through the visualisations that any champion (driver/team) in a given year or the GOAT, are consistently better than their rivals across all performance indicators. This shows the competitive nature of F1.

03

Every career has its upward slope and eventual slow-down

Even the all-time greats, the multiple-world champions, the consistently dominant teams experience the general life-cycle: A rise, a plateau and then a downfall.

There are a few exceptions.

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