Data Analytics Portfolio

Power BI : DAX, Power Query

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Katarzyna Szczęsna

Project Overview

Purpose:

The purpose of this project was to analyze the 2023 and 2024 Formula 1 seasons and extract actionable insights across drivers, teams, and races. The dashboard highlights key performance metrics, identifies trends, and supports strategic planning, performance optimization, and competitive benchmarking.

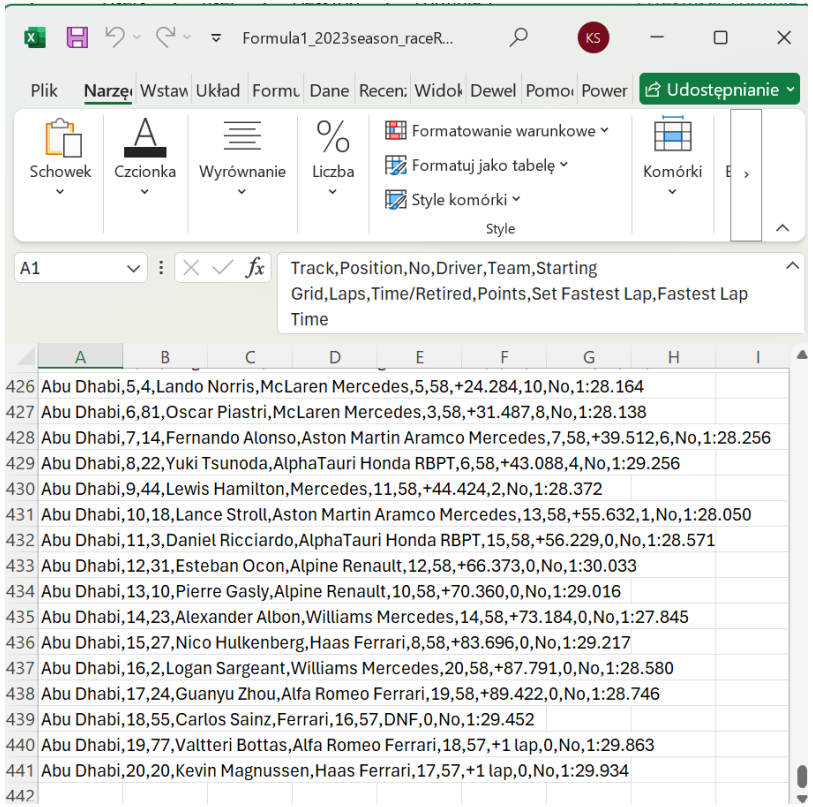
Key Achievements:

- Identified top-performing drivers and teams and highlighted patterns of consistency and peak performance
- Revealed gaps between qualifying and race performance, uncovering operational and strategic opportunities
- Provided interactive insights enabling scenario analysis and comparison across drivers and teams
- Demonstrated ability to translate complex datasets into actionable insights applicable to business performance tracking

Dataset

The dataset was sourced from Kaggle and consists of 16 individual CSV files (separate data for each season) and two Excel files created manually (images)

- Season Calendar: Grand Prix names, dates, and circuit details
- Race & Sprint Results: Driver positions, lap times, and race outcomes
- Sprint Shootout & Qualifying: Session times and grid positions
- Driver: Driver profiles including nationality, team, career highlights
- Team: Team details and historical performance
- Driver of the Day: Fan voting results per race
- Images: Manually created tables with driver and circuit images

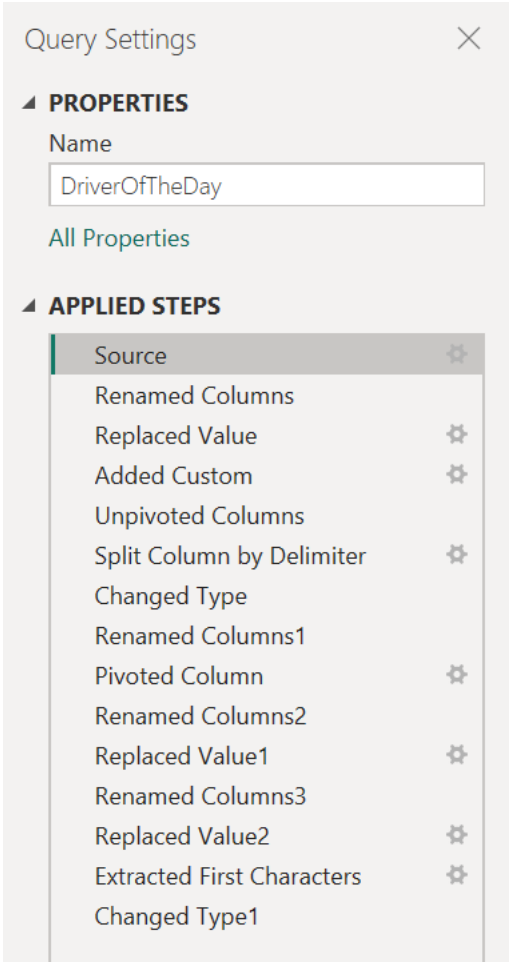


Data Transformation (Power Query)

- Merged separate source tables for the 2023 and 2024 seasons into a unified dataset and created a custom RaceID to distinguish seasons and races
- Standardized and corrected data types
- Performed pivot and unpivot transformations to optimize the data model
- Cleaned the dataset by removing, renaming, and reordering columns

```
= Table.NestedJoin(#"Renamed Columns", {"Country", "Year"},
    SeasonCalendar, {"Country", "Year"}, "SeasonCalendar",
    JoinKind.LeftOuter)
```

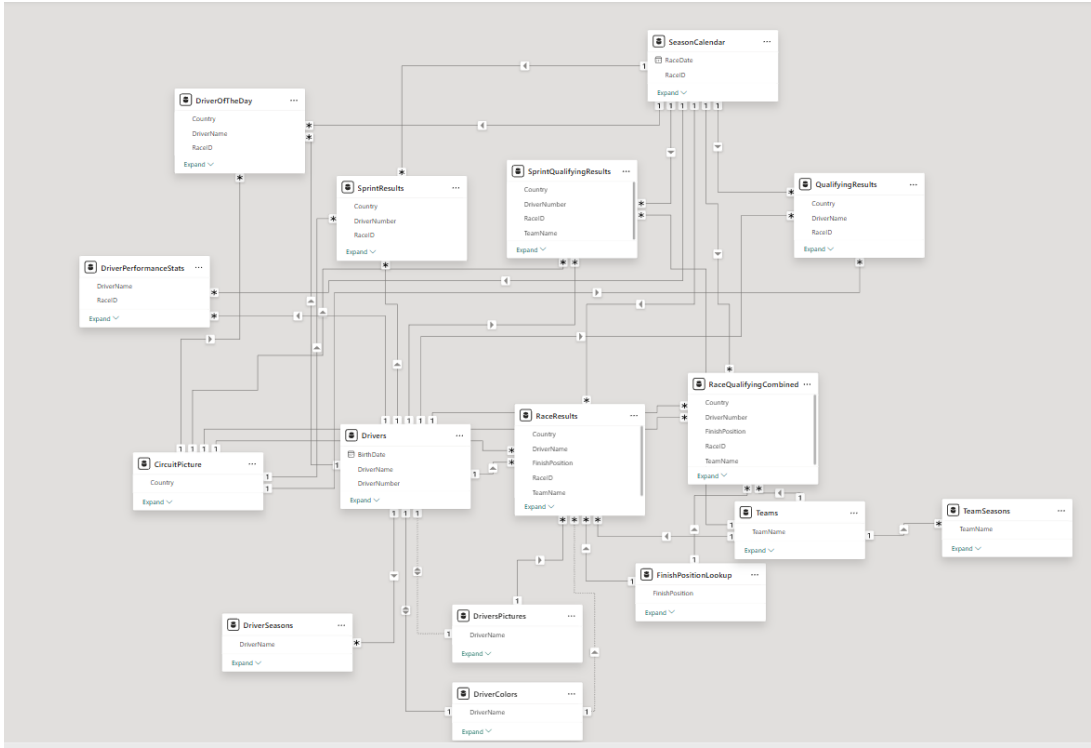
```
= Table.AddColumn(#"Removed Columns", "RaceID", each [Country] & "_" &
    Text.From([Year]))
```



Data Model & Relationships

The Power BI semantic model was built on cleansed and transformed source data, with a focus on scalability, analytical flexibility, and performance.

- Designed a multi-table relational data model integrating race results, qualifying, sprint, and calendar data
- Used RaceID and DriverNumber as primary identifiers to ensure consistent relationships across seasons
- Structured the model to support cross-filtering, time-based analysis, and advanced DAX calculations



DAX Measures

- Developed dynamic performance KPIs for drivers and teams, including total points and ranking metrics
- Implemented statistical performance measures (average, min, max finishing positions) for comparative team analysis
- Built dynamic text measures to generate automated analytical insights within the dashboard
- Designed cumulative and ranking calculations to enable longitudinal season analysis

```
TeamsWithConsistentPointsText =
VAR TeamsWithPoints =
    FILTER(
        VALUES('RaceResults'[TeamName]),
        CALCULATE([WorstTeamPoints]) > 0
    )
VAR TeamList =
    CONCATENATEX(TeamsWithPoints, 'RaceResults'[TeamName], " & ")
RETURN
    TeamList & " are the only teams who scored points in each race"
```

```
TotalPoints =
CALCULATE(
    SUM(RaceResults[RacePoints]),
    FILTER(
        RaceResults,
        RaceResults[DriverName] = DriverSeasons[DriverName]
            && RaceResults[Year] = DriverSeasons[Year]
    )
)
```

```
Wins =
CALCULATE(
    COUNTROWS(RaceResults),
    RaceResults[FinishPositionNum] = 1
)
```

DAX Measures - Calculated Tables

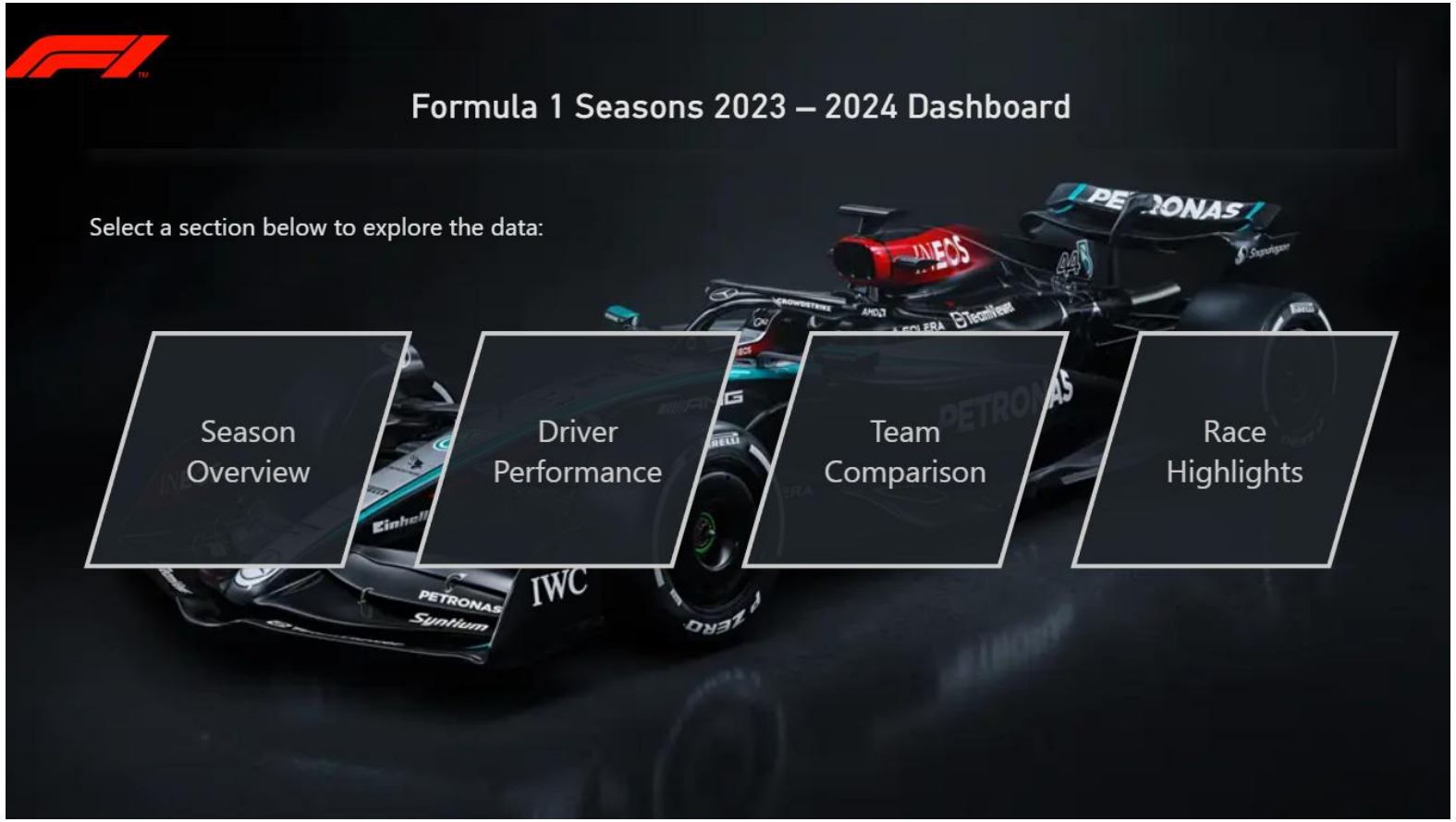
Created FinishPositionLookup table to enable proper sorting and ranking of finish positions containing non-numeric values (DNF, NC).

```
FinishPositionLookup =
DATATABLE(
    "FinishPosition", STRING, "FinishSort", INTEGER,
    {
        {"1", 1},
        {"2", 2},
        {"3", 3},
        {"4", 4},
        {"5", 5},
        {"6", 6},
        {"7", 7},
        {"8", 8},
        {"9", 9},
        {"10", 10},
        {"11", 11},
        {"12", 12},
        {"13", 13},
        {"14", 14},
        {"15", 15},
        {"16", 16},
        {"17", 17},
        {"18", 18},
        {"19", 19},
        {"20", 20},
        {"DQ", 21},
        {"NC", 22}
    }
```

Created DriverPerformanceStats to aggregate driver achievements such as wins, podiums, and fastest laps for statistical analysis.

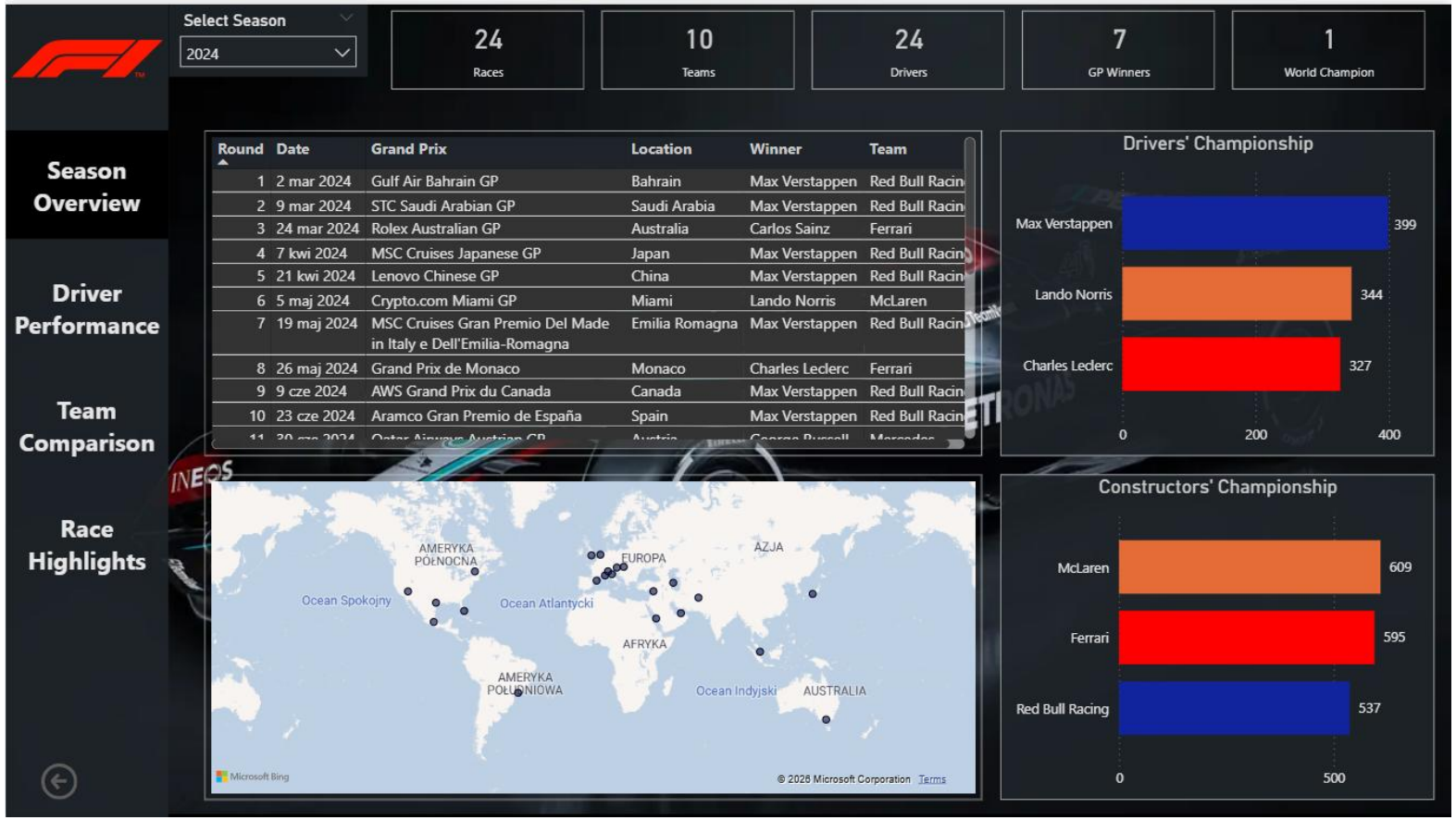
```
DriverPerformanceStats =
UNION(
    SELECTCOLUMNS(
        FILTER(RaceResults, RaceResults[FinishPositionNum] = 1),
        "DriverName", RaceResults[DriverName],
        "RaceID", RaceResults[RaceID],
        "StatType", "Win",
        "Year", LOOKUPVALUE(SeasonCalendar[Year], SeasonCalendar[RaceID], RaceResults[RaceID]),
        "GrandPrix", LOOKUPVALUE(SeasonCalendar[GrandPrix], SeasonCalendar[RaceID], RaceResults[RaceID]),
        "Country", LOOKUPVALUE(SeasonCalendar[Country], SeasonCalendar[RaceID], RaceResults[RaceID])
    ),
    SELECTCOLUMNS(
        FILTER(RaceResults, RaceResults[FinishPositionNum] IN {1, 2, 3}),
        "DriverName", RaceResults[DriverName],
        "RaceID", RaceResults[RaceID],
        "StatType", "Podium",
        "Year", LOOKUPVALUE(SeasonCalendar[Year], SeasonCalendar[RaceID], RaceResults[RaceID]),
        "GrandPrix", LOOKUPVALUE(SeasonCalendar[GrandPrix], SeasonCalendar[RaceID], RaceResults[RaceID]),
        "Country", LOOKUPVALUE(SeasonCalendar[Country], SeasonCalendar[RaceID], RaceResults[RaceID])
    ),
    SELECTCOLUMNS(
        FILTER(RaceResults, RaceResults[FastestLapFlag] = "Yes"),
        "DriverName", RaceResults[DriverName],
        "RaceID", RaceResults[RaceID],
        "StatType", "Fastest Lap",
        "Year", LOOKUPVALUE(SeasonCalendar[Year], SeasonCalendar[RaceID], RaceResults[RaceID]),
```

Final Dashboard & Key Insights



- Presents the dashboard structure
- Enables navigation to one of the four analytical sections

Season Overview

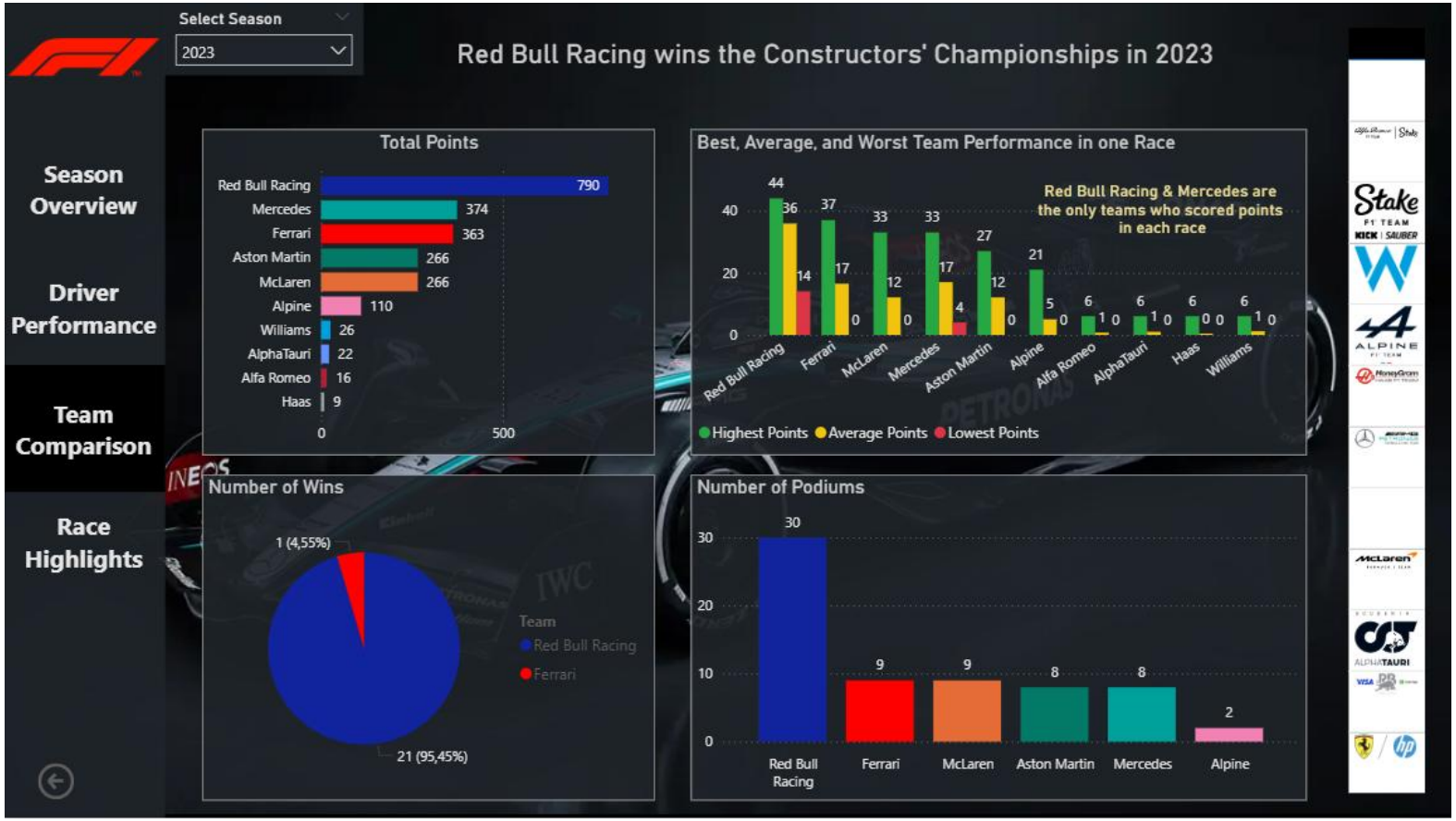


- Identified competitive dominance patterns across drivers and teams
- Analyzed global race distribution to assess market footprint and expansion opportunities
- Provided executive KPIs summarizing season outcomes and structure

Driver Performance

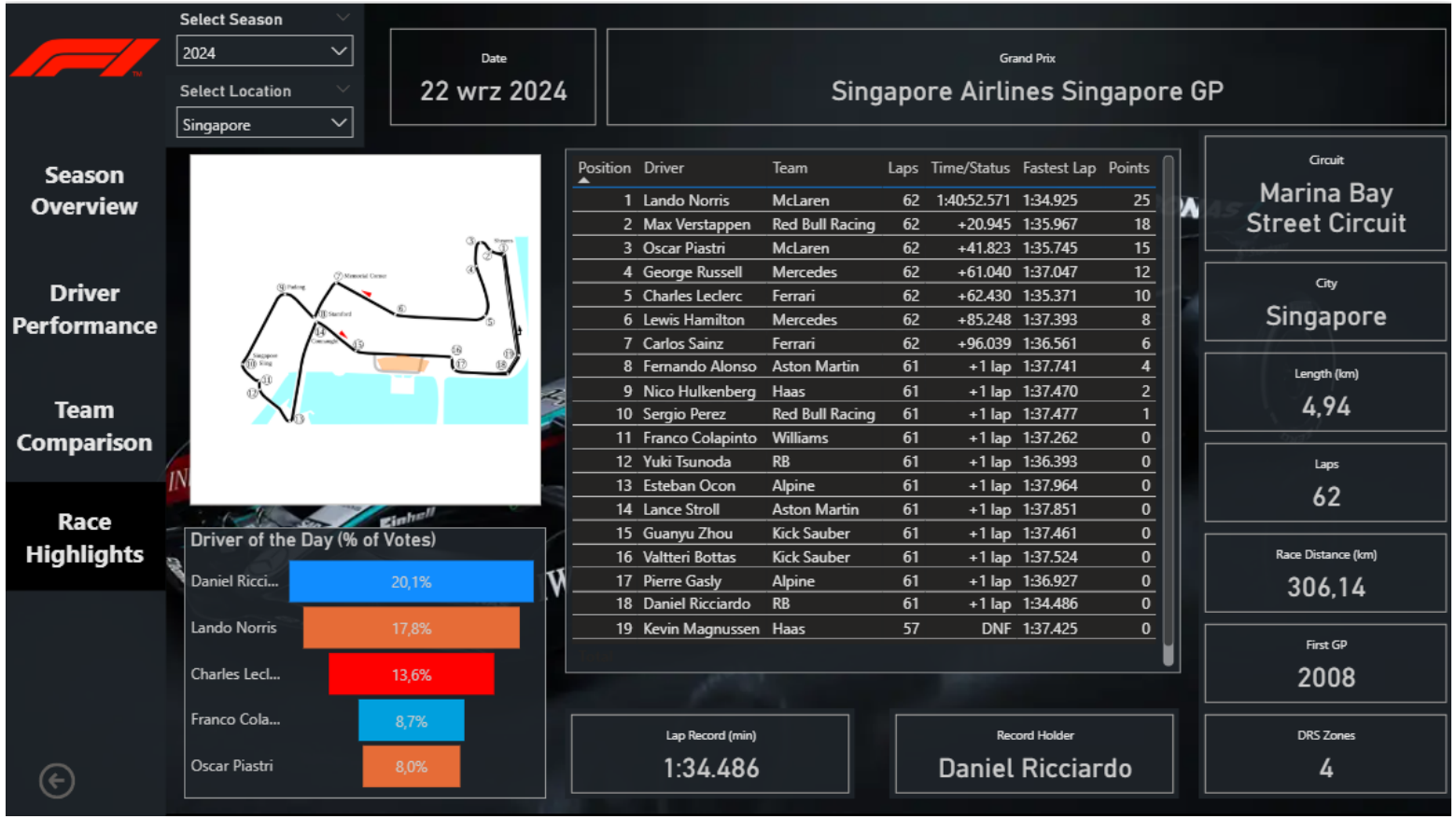
- Benchmarked drivers using points, wins, and podium metrics
- Analyzed consistency and cumulative performance trends across the season
- Identified gaps between qualifying potential and race execution
- Identified high-impact races and outlier results

Team Comparison



- Highlighted championship dominance driven by consistent team performance
- Showed trends in results to support decision-making and optimization
- Compared team performance to uncover gaps in strategy or execution

Race Highlights



- Extracted key track factors to guide technical and operational decisions
- Used fan-engagement data to surface commercial value beyond performance
- Surfaced race-specific performance patterns useful for forecasting future results