F1 Data Analysis Project

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Purpose:

This project is one of my capstone projects for my data analyst portfolio. I choose the field of F1 due to my deep interest in the sport and I believe the findings that data will tell will be awesome.

Scope / Major Project Activities:

Activity	Description
Compare car performance in varying climates	Analyze team performance across different weather conditions to identify performance patterns and assess how adverse conditions highlight driver skill over car advantage.
Predict title winners	Use historical points gaps and season progression to determine statistical thresholds where championship outcomes become highly probable for both drivers and constructors.
Predict race winners	Build predictive models based on metrics such as fast laps, race pace, and qualifying results to estimate final race positions with greater accuracy.
Analyze practice vs. race outcomes	Investigate the correlation between free practice results and actual race outcomes to assess whether early session performance is a reliable predictor of race results.
Preseason testing vs. championship standings	Examine the relationship between preseason testing performance and end-of-season results to evaluate the predictive value of early testing sessions.
Constructors' championship prediction	Develop a forecasting algorithm that uses data from the previous season to predict which team is most likely to win the constructors' championship in the current season.

This project does not include:

- **Real-time race data analysis**: The project will use historical and available past data only, without live race tracking or in-race predictive updates.
- **Mechanical or technical car performance analysis**: The project does not involve detailed mechanical engineering assessments of cars or technical failures.
- **Driver psychological or fitness evaluation**: No analysis of mental or physical performance factors affecting driver outcomes will be considered.
- **Weather prediction models**: The project will analyze performance under different weather conditions but will not build or use meteorological forecasting models.
- **Mid-season car development tracking**: The study will not account for in-season upgrades or aerodynamic package changes influencing car performance after the season starts.
- **Impact of race strategies**: The project will not model or evaluate race strategy decisions such as pit stops, tire choices, or team orders.
- **Sponsorship, financial, or marketing analysis**: Non-performance business aspects related to teams or drivers are outside the project's scope.
- **Safety car, red flag, or incident impact analysis**: Unexpected race interruptions (e.g., accidents, safety cars) will not be modeled as variables affecting outcomes.

Deliverables:

Deliverable	Description/Details
1. Climatic Performance Analysis Report	Detailed analysis of car and driver performance across different weather and track conditions, highlighting patterns and predictive factors.
2. Title Prediction Model	Statistical model identifying points thresholds that indicate high probabilities of winning championships for both drivers and teams.
3. Race Winner Prediction Model	Predictive model using fast laps, race pace, and qualifying performance to forecast final race results and podium finishes.
4. Free Practice vs. Race Performance Study	Analytical report examining the relationship between free practice results and actual race outcomes, challenging common assumptions.
5. Preseason Test Correlation Analysis	Study of the correlation between preseason test results and final championship standings, assessing reliability of early performance indicators.

6. Constructors' Championship Prediction Algorithm	Algorithm designed to predict constructors' championship outcomes based on previous season data and preseason testing performance.
7. Final Comprehensive Project Report	Consolidated document summarizing methodologies, models, key insights, and recommendations for future research or application in motorsport analytics.

Schedule Overview / Major Milestones:

The expected schedule for the project. This can be defined by milestones (e.g. "all data is cleaned and processed"), periods of time ("Week 1 / Week 2"), or other ways based on the needs of the project.

Milestone	Expected Completion Date	Description/Details

*Estimated date for completion:

This is my "if all goes well and I have everything I need, this is when I'll be done" date.