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Optimizing Race Strategy through Qualifying Performance Analysis

https://github.com/apasuparthu/SQL_Project

Job Description

I selected the Strategy Analyst role with GM Motorsports (supporting Andretti Cadillac) because it perfectly aligns with my passion for data-driven decision-making and performance analytics in racing. This role emphasizes modeling, simulations, and Python/SQL-based race strategy tools – key areas I want to specialize in. I’ve always admired the technical precision in motorsports and would love to simulate the types of strategic analyses that inform team decisions before and during F1 races.

Problem

The problem I aim to solve is: **How does a driver’s qualifying position affect their final race result across different circuits?** This is highly relevant to the job because it provides insight into the strategic importance of qualifying and its relationship to race outcomes. It’s feasible to solve using SQL and Python by extracting race and qualifying data via API and creating dashboards to compare trends across teams, drivers, and tracks.

Data Sources

API Data Source:

Source: F1 Developer API (<https://f1api.dev>)

Method: API

Description: Provides access to data about qualifying sessions, race results, driver stats, and circuits.

Relevance: This allows us to analyze race outcomes in relation to starting position — directly supporting the race strategy focus of the job.

Web Scrape Data Source:

Source: Reddit (<https://www.reddit.com/r/formula1>)

Method: Web scraping using BeautifulSoup and requests libraries

Description: Collects post titles and engagement metrics related to qualifying performance and race strategies.

Relevance: Offers qualitative insight into fan sentiment and strategy discussions that complement numerical analysis.

Solution:

I will pull qualifying and race results from the F1 API using Python and load it into an AWS RDS PostgreSQL database. Using SQL, I'll identify trends such as average position gain/loss based on grid start, and how it varies by circuit. Visualizations will include driver performance distributions, circuit comparisons, and outcome forecasts. This project demonstrates my ability to build a working analytics pipeline and simulate real-world analysis performed by strategy teams in Formula 1 – exactly what the GM Motorsports role calls for.