

CREATED BY ENZO WÜRTELE - DATA ANALYST

# Green Hell Predictor

2025

v1.0

HARNESSING DATA & AI FOR PERFORMANCE PREDICTION

# TODAY'S

MY PLAN

DATA COLLECTION & INTEGRATION

FEATURE ENGINEERING & AI PREDICTIONS

AWS UPDATING

PERFORMANCE VISUALISATIONS

CHALLENGES

KEY INSIGHTS & CONCLUSIONS

# AGENDA

NÜRBURGRING AI

# Vision

To create the ultimate AI-powered performance predictor for Nürburgring lap times, blending real-world data with cutting-edge machine learning to provide accurate, data-driven insights for car enthusiasts, engineers, and racing professionals.

# DATA COLLECTION & INTEGRATION

- Scraped & stored car data in PostgreSQL.
- Retrieved & processed with Pandas, handling missing values via AI.
- Built a Streamlit app with Plotly for interactive performance analysis.



# FEATURE ENGINEERING & AI PREDICTIONS



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- Enhanced data with power-to-weight ratios & acceleration metrics.
- Used AI to predict missing values and estimate Nürburgring lap times.
- Integrated insights into an interactive dashboard for performance analysis.

# AWS UPDATING

Implemented AWS Lambda to automate data updates, ensuring the latest car performance metrics are consistently reflected in the app. This serverless approach optimises scalability, reduces costs, and enhances reliability.

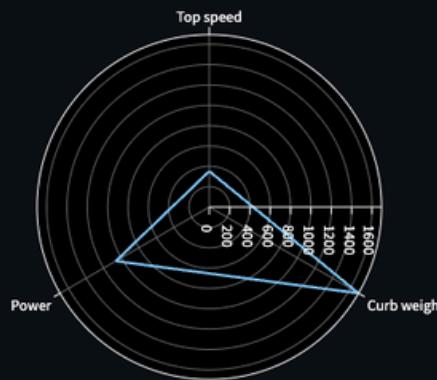




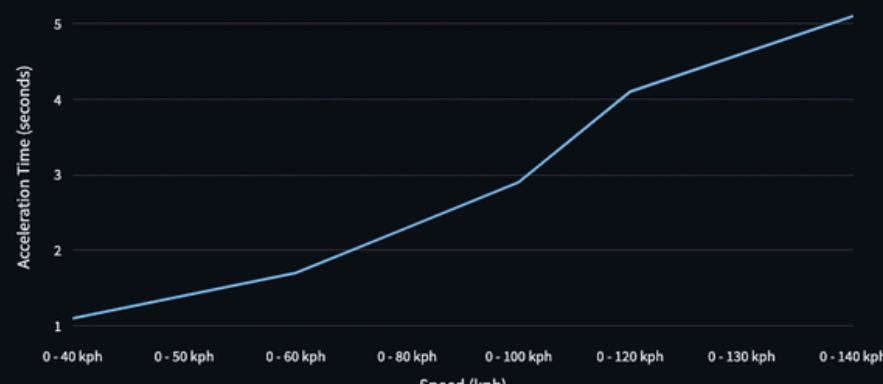
3D Performance Comparison



Performance Radar Chart for Mercedes - AMG One



Acceleration Time vs Speed for Mercedes - AMG One



- Created interactive 3D scatter plots and line graphs to analyse car performance.
- Visualised key metrics like power-to-weight, acceleration, and top speed.
- Gave users a dynamic way to compare and explore car specs.

# COMPARATIVE TOOL

- Enables car selection and side-by-side comparison through a custom-calculated point system, offering intuitive visual insights to support better purchasing decisions.

## CAR SELECTOR

Select Car:

Mercedes - AMG One

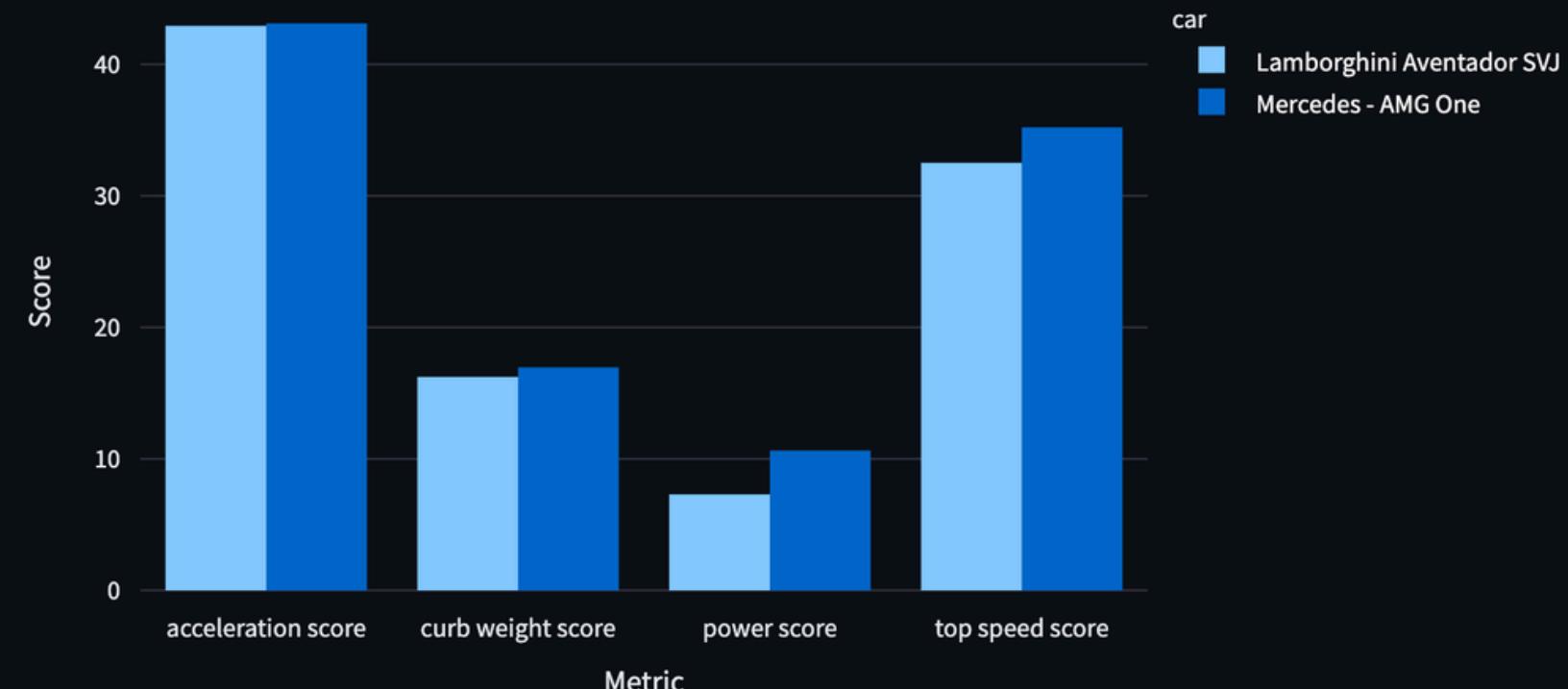
	car	driver	power_weight	Top speed	Car type	Curb weight	Power	Est. max
0	Mercedes - AMG One	Maro Engel	0.6271	352	Coupe	1695	1063	

Select Second Car:

Lamborghini Aventador SVJ

	car	driver	power_weight	Top speed	Car type	Curb weight	Power	Est. max
5	Lamborghini Aventad	Marco Mapel	0.4482	325	Coupe	1623	730	

Car Comparison: Performance Scores



# Challenges

- Data Collection & Cleaning
- Missing values in car specifications
- Inconsistent data formats across sources
- AI-Powered Predictions
- Handling missing values dynamically using AI
- Ensuring AI-generated data aligns with real-world performance
- Performance Analysis & Visualisation
- Correlation matrix returning NaN values
- Matching Streamlit's theme with interactive visualisations
- Optimising radar chart for seamless background integration
- Database & Backend Issues
- Connecting Streamlit with PostgreSQL efficiently
- Querying and structuring data for smooth retrieval
- Optimising User Experience
- Making data interactive yet simple to understand
- Choosing the best visualisations for performance insights

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# Conclusion

- AI-powered predictions effectively estimate missing car specs and lap times.
- Visualisations highlight performance trends across cars, revealing strengths and weaknesses.
- Interactive dashboards provide users with valuable insights to compare cars and enhance decision-making.
- Data-driven approach improves understanding of car performance on the Nürburgring circuit.

