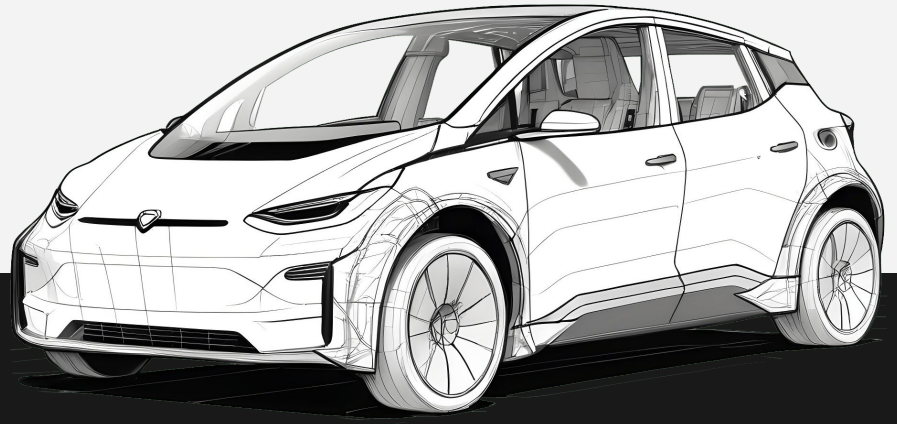
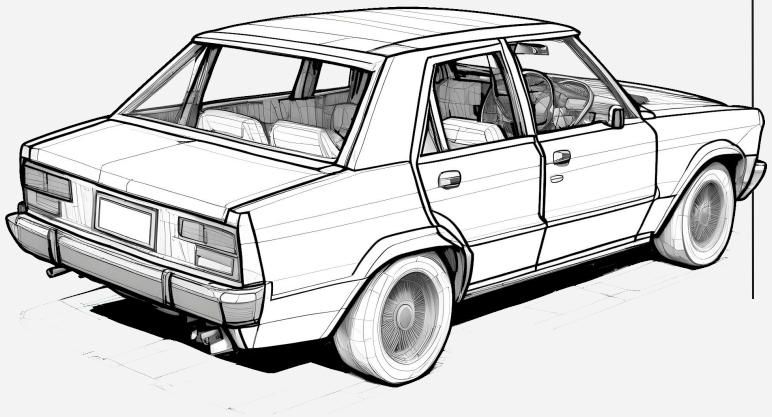
A study into Aerodynamics of electric cars

By Anush Patel



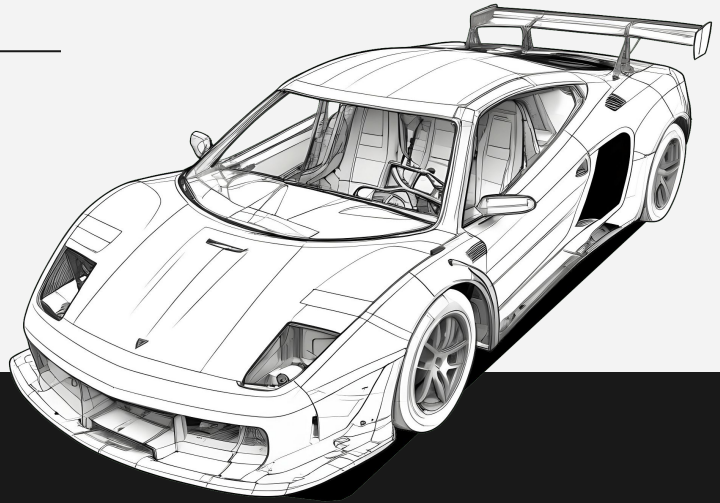
01 The problem



Currently manufactured electric cars are not optimized for aerodynamics compromising on range and speed harming both the environment and the consumer.

“Aerodynamics are for people who cannot build engines”

—Enzo Ferrari

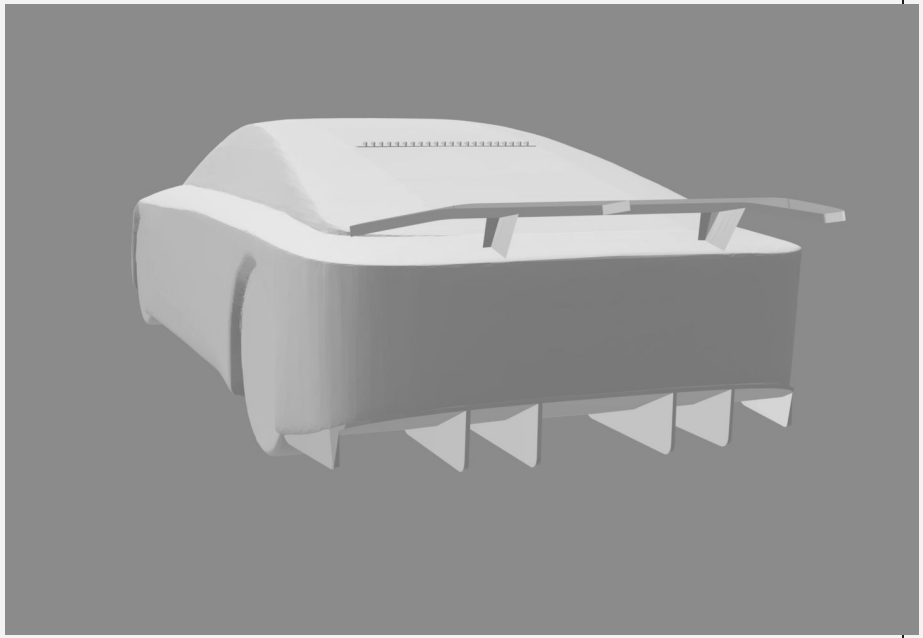


Methodology

This presentation's methodology involved using Computational Fluid Dynamics (CFD) to analyze and improve the aerodynamics of an electric vehicle. Key components like spoilers and diffusers were tested in simulations to measure their effects on drag and downforce. Results guided the final 3D model, ensuring optimized performance through passive aerodynamic modifications.

The Research

This study explores passive aerodynamic improvements by analyzing components like spoilers, vortex generators, and diffusers. A 3D model combines these features to balance low drag and high downforce for both speed and cornering. It refines flow control using past research and practical applications to enhance an already efficient electric car.



Findings

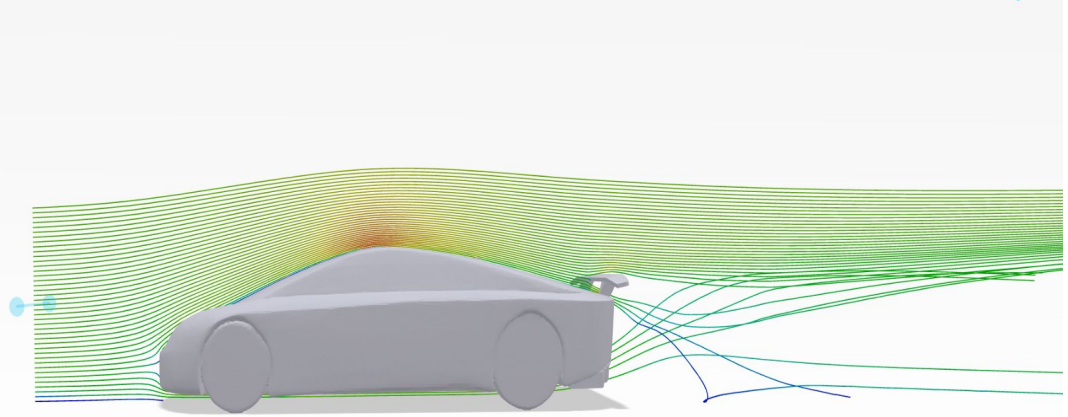
Cd Drag

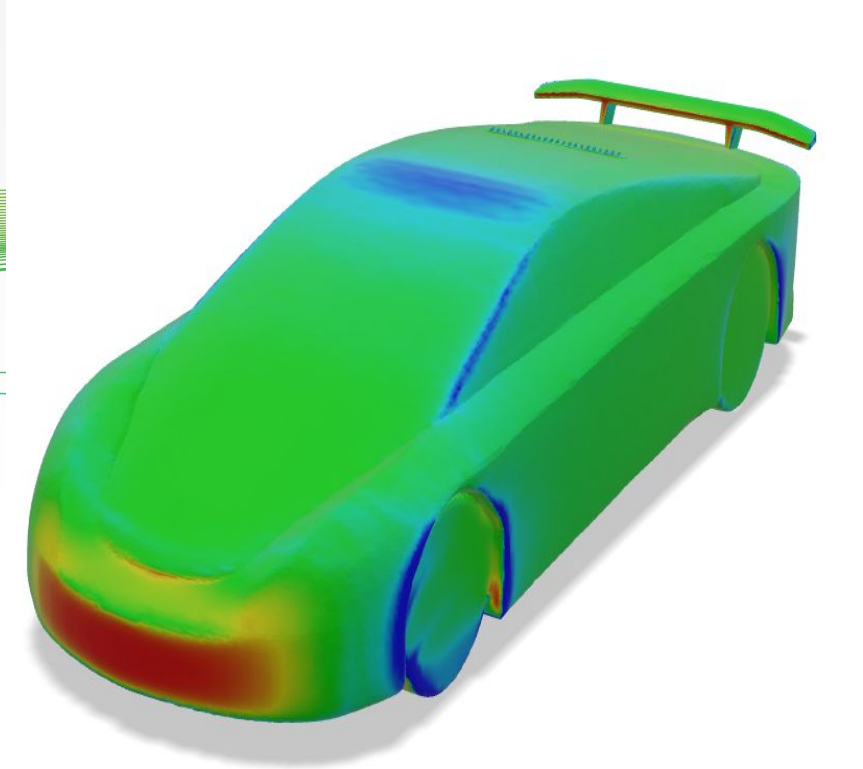
0.351

Downforce

0.681 Lift coefficient

A few more Diagrams





Real Life-Implications

This study’s aerodynamic improvements can reduce energy use in electric vehicles by lowering drag, leading to better range and efficiency. For the environment, this means less electricity demand and fewer emissions. Consumers benefit from reduced charging needs and potentially lower vehicle prices due to simpler, passive design features requiring less complex manufacturing.

Conclusion of Study

This study optimized an electric vehicle for high-speed performance using passive aerodynamic methods. Additions like a rear spoiler, vortex generators, gurney flap, and diffuser increased downforce and stability while controlling drag. The final design balances speed and efficiency, showing a strong high-downforce, performance-focused EV setup.

Thank You!

Acknowledgement to Ms. Kaci and Foothill College.

Citation

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