

Optimizing Car Safety and Function using Mixture DOE and Physics

Arhan Surapaneni

Stanford University Online High School
Redwood City, CA 94568, USA
arhan@ohs.stanford.edu

Mason Chen

Stanford University Online High School
Redwood City, CA 94568, USA
Mason05@ohs.stanford.edu

Abstract

People all over the world have come to see automobiles as the preferred way to travel. They allow independence: point to point transportation without having to rely on others to get where we want to go. In a world that is quickly becoming ever dependent on technology, naturally, car manufacturers are constantly coming up with new technologies to get people to buy their products/vehicles. However, as Manufacturers break all boundaries of mechanical development, simple things like tire to terrain adaptation, and suspension optimizations for different scenarios are often overlooked, even though these small but vital acknowledgements could drastically change this billion dollar industry. Utilizing the gaming tool Hill Climber 2, in realistic modeling of sand dunes, hills and motor vehicles, different tire types and utilization of ranging variables in the components of Suspension, Engine Power, and Tires will allow us to make Lasting Claims for the Efficiency and Effectiveness of Motor Vehicles. The goal of this game is to optimize the previously mentioned components so that the vehicle is not only able to collect the most points but travel the most distance. Using a Mixture DOE Method, we can determine ideal conditions for our aforementioned components so that the driving experience can be optimized for all users, not only for bountiful return in game, but also the extensive real life applications that can be applied on the road by car manufacturers. This same Mixture DOE, analyzes and optimizes the ROI, or Return of Investment, a common business analytical tool utilized to judge the benefits of a product. In the case of this experiment the Return being higher Game Score, and Investment being Time.

Acknowledgements

Dr. Charles Chen
Patrick Giuliano

Biography / Biographies

Arhan Surapaneni is a student at Stanford University's Online High School, currently a sophomore with main interests in bio/medical fields with the aim to become a surgeon in the coming future. Ranging from experiences in various fields including working in hospital ICU's to teaching under-privileged kids in the Middle East. Participating in other conferences like IEOM Zimbabwe, winning second place in his respective competition.

Mason Chen is a student at Stanford University's Online High School, currently a sophomore with main interests in biomechanics with the aim to become a part of that field eventually. Mason has profound experience with conferences like IEOM, participating in conferences since the age of 5. Mason also enjoys swimming and other sports.