

## INTRODUCTION

Predictive analytics and machine learning have revolutionized several sectors, including car preventative maintenance, in the quickly evolving technology landscape of today. This project primarily focuses on the maintenance of brake pads in huge vehicles, demonstrating how these cutting-edge technologies may improve safety, reduce downtime, and maximize operational effectiveness.

The project successfully created a predictive model that predicts the ideal time for brake pad replacements. Using the potent artificial neural network (ANN) framework TensorFlow, variables including heat, journey distance, and wear rates were thoroughly examined. This data-driven strategy provides proactive maintenance, allowing for prompt interventions and reducing the likelihood of brake failures.

Businesses that manage automobiles can greatly profit from the deployment of such a predictive maintenance approach. Better safety is of the utmost importance since timely brake pad changes significantly lower the probability of accidents brought on by braking problems. In addition, preventive maintenance reduces downtime, which boosts productivity and operational effectiveness.

A significant cost reduction opportunity is also demonstrated by this project. Businesses may steer clear of the costly repairs or replacements that may be required in the event of unanticipated brake failures by proactively taking care of maintenance needs. Optimized preventative maintenance programs also result in better resource management, a reduction in wasteful spending, and an extension of the lifespan of vehicle parts.

In summary, this project serves as an example of how predictive analytics and machine learning have had a transformational influence on the field of preventive maintenance for vehicles, notably in the maintenance of brake pads for heavy trucks. Businesses may revolutionize utilizing their maintenance procedures, improve safety, and realize large operational and financial savings by utilizing the power of data and cutting-edge technology.