# Car Price Prediction System

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# ABSTRACT

The goal of this project is to develop a car price prediction algorithm. Our objective is to create a model that accurately predicts car prices based on various attributes of the vehicles. This model will be useful for both buyers and sellers to understand the fair market value of cars, facilitating better decision-making in the automotive market.

## Informal Description (Ill-posed Problem)

Imagine you're looking to buy or sell a car and want to know its fair market value. This project aims to develop a tool that takes into account various features of the car, such as make, model, year, mileage, and more, and predicts the car's price. It's like having a personal advisor who helps you understand the worth of a car based on its characteristics.

## Formal Description (Well-posed Problem)

- **Task (T)**: Predict the price of a car.
- **Experience (E)**: Analysis of historical car sales data with attributes such as make, model, year, mileage, and other relevant features.
- **Performance (P)**: The accuracy of the predicted prices, measured by metrics such as Mean Absolute Error (MAE) or Root Mean Squared Error (RMSE).

## Assumptions

- **Data Quality**: The historical car sales data is accurate and comprehensive.
- **Model Generalization**: The prediction model can generalize well to new, unseen cars.
- **Market Stability**: Car prices are relatively stable and follow discernible patterns based on the provided features.

# 1. INTRODUCTION

## Motivation

Developing a car price prediction system aims to enhance the buying and selling experience in the automotive market. By providing accurate price estimates, we can help users make informed decisions, ensuring they get fair deals.

## Benefits of Solution

- **Buyers**: Helps in understanding the fair price for a car they wish to purchase.
- **Sellers**: Assists in setting a competitive price for their car.
- **Dealers**: Facilitates inventory pricing and valuation.
- **Developers**: Provides a valuable tool for integrating into car sales platforms and applications.

### Solution Use

The model will be integrated into a web application where users can input car details and receive price estimates. This requires continuous improvement and maintenance to ensure accuracy and reliability. Scalability will be crucial for handling a large number of user requests efficiently.

# 2. Dataset Finalization

## Data Sources

We will use publicly available car sales datasets from the following sources:

1. Kaggle Competition: Car Price Prediction
2. Used Cars Price Prediction Dataset
3. Australian Vehicle Prices Dataset

## Dataset Features

1. **Car Attributes**: Make, model, year, mileage, condition, location, and additional features like color, transmission type, etc.
2. **Historical Prices**: Previous sales prices for similar cars.

### Importance of Features

- **Make and Model**: Different brands and models have varying market values.
- **Year**: Newer cars generally have higher prices.
- **Mileage**: Lower mileage often correlates with higher prices.
- **Condition**: Well-maintained cars are valued higher.
- **Location**: Prices can vary significantly by region.

### Previous Applications

Car price prediction models have been used in various applications, including:

- **Online Car Marketplaces**: To suggest pricing to sellers.
- **Car Valuation Tools**: For insurance and loan purposes.
- **Dealership Inventory Management**: To price cars appropriately for sale.