UK Car Accidents

2005-2015

data analysis

machine learning

TEAM 3

Our team excelled in finding, cleaning, and analyzing data, as well as implementing machine learning techniques. With meticulous attention to detail, we curated a comprehensive dataset. Leveraging advanced algorithms, we extracted valuable insights from the data, improving predictive models. Our collective expertise in data cleaning, analysis, and machine learning ensured accurate results and informed decision-making.

01 — Ahmed Hassan

responsible for data cleaning and analysis. His attention to detail ensured the dataset was accurate and suitable for analysis. Additionally, a supporter of developing machine learning models, his expertise in data analysis proved instrumental in feature selection and preparation.

02 — Hiba Shakir

She was a standout data analyst, bringing invaluable expertise to the team. Her sharp analytical skills and attention to detail allowed her to uncover meaningful insights from the dataset. Her contributions played a crucial role in informing decision-making and developing effective strategies.

03 — Fareda Mustafa

Her role as a machine learning expert was pivotal. With exceptional expertise, she analyzed the data using advanced algorithms, extracting valuable insights. Her profound understanding enabled accurate prediction models, identifying high-risk areas. Her optimization skills enhanced the team's capabilities, aiding decision-making processes.

INTRODUCTION

This report focuses on analyzing UK car accidents using data analysis and machine learning techniques. By examining a comprehensive dataset that includes factors such as location, weather conditions, road type, and vehicle characteristics, we aim to uncover insights that can enhance road safety and inform policy decisions.

Machine learning algorithms enable us to identify patterns, correlations, and predictive factors associated with accidents. By developing accurate prediction models, we can identify high-risk areas and suggest interventions to mitigate hazards.

This report has two main objectives: to provide a detailed overview of UK car accidents through exploratory analysis and to develop and evaluate machine learning models for accident prediction. The findings can inform road safety strategies, resource allocation, and efforts to reduce accident occurrence and severity.

The subsequent sections will cover data collection, exploratory analysis results, machine learning models, and their implications. We will also offer recommendations for policymakers and highlight areas for future research in road safety analysis using data analysis and machine learning.

UK CAR ACCIDENTS

This report analyzes UK car accidents using data analysis and machine learning. It aims to uncover insights into road safety and inform policy decisions. Through exploratory analysis and predictive modeling, we identify patterns and high-risk areas. The findings guide road safety strategies and resource allocation. Recommendations for policymakers and future research directions will be discussed.

Finding Data

The large dataset of 3 million rows and numerous columns was chosen for its comprehensive nature, enabling a detailed analysis of UK car accidents and providing a robust foundation for accurate predictive modeling.

Analysis data

The extensive dataset with 3 million rows offers a significant advantage in data analysis. Its large volume provides a rich pool of information, enabling thorough exploration and uncovering meaningful patterns. With this substantial dataset, we can derive more reliable and statistically significant insights to drive informed decision-making.

Machine learning models

The inclusion of a large dataset with 3 million rows supports our machine-learning efforts by providing a diverse and representative sample. The abundance of data enhances the models' ability to generalize and make accurate predictions, capturing the complexity of real-world scenarios. The increased sample size allows for more nuanced pattern recognition, leading to improved model performance and reliability.

ANALYSIS

01

graph to present accidents between genders

02

Bgraph between Accidents & Age Band of Driver

03

Graph between of Accidents & Driver Home Area Type

04

Graphs Weather_Conditions and Road_Type

05

graph of Accidents type

06

graph of Age_of_Vehicle

07

Graphs Number of Casualities and Road_Type

08

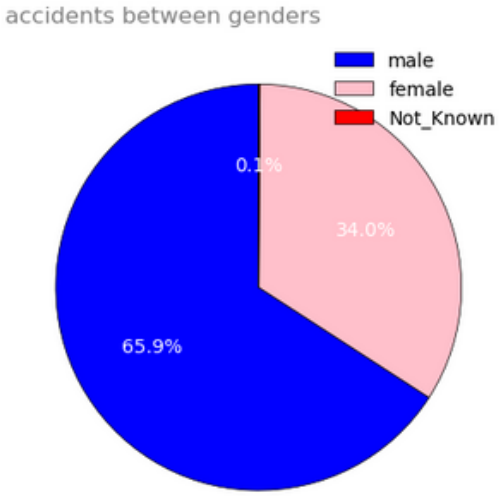
Graphs Number of Casualities and Weather Conditions

09

Graphs Accident Severity and Road Type

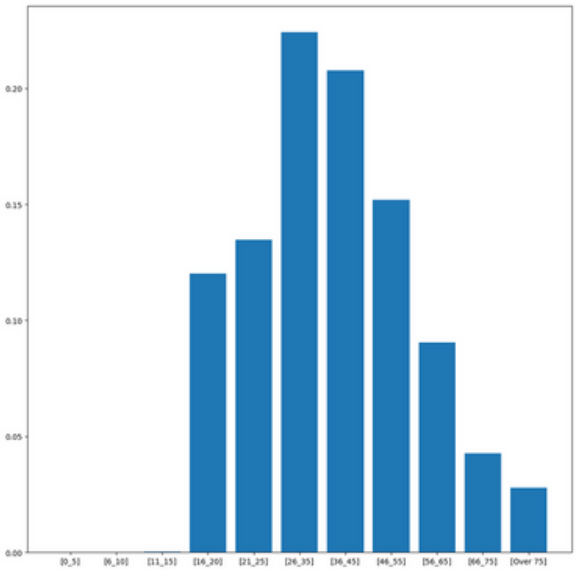
GRAPH TO PRESENT ACCIDENTS BETWEEN GENDERS

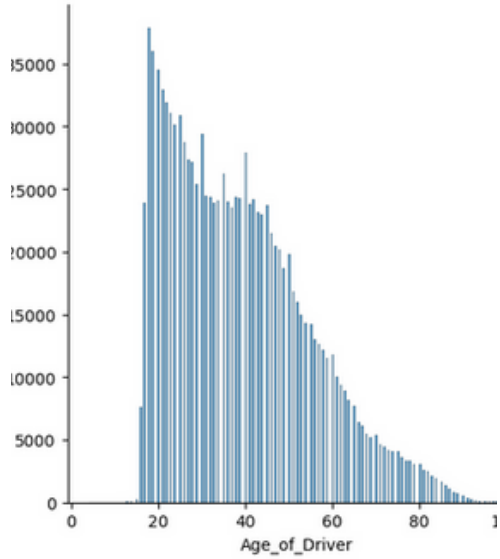
"Who causes more accidents, boys or girls?



GRAPH BETWEEN ACCIDENTS & AGE BAND OF DRIVER

"Who causes the highest number of accidents based on age group?

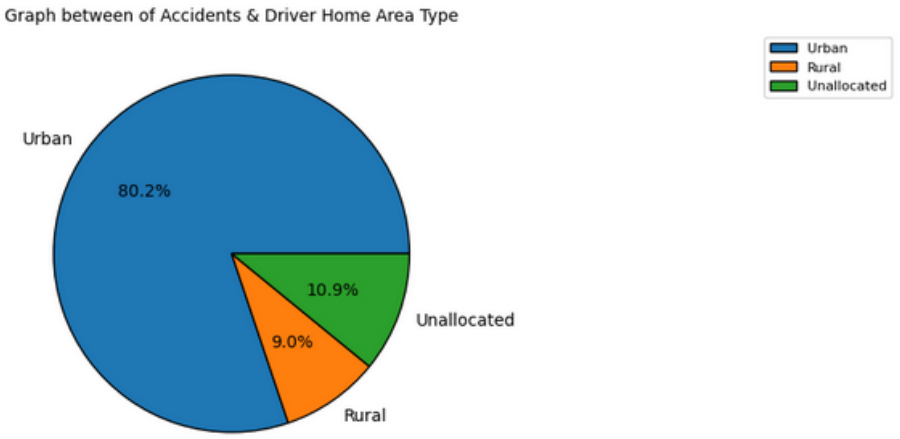




100% **Our analysis methodology demonstrates remarkable effectiveness in delivering accurate and insightful results.**

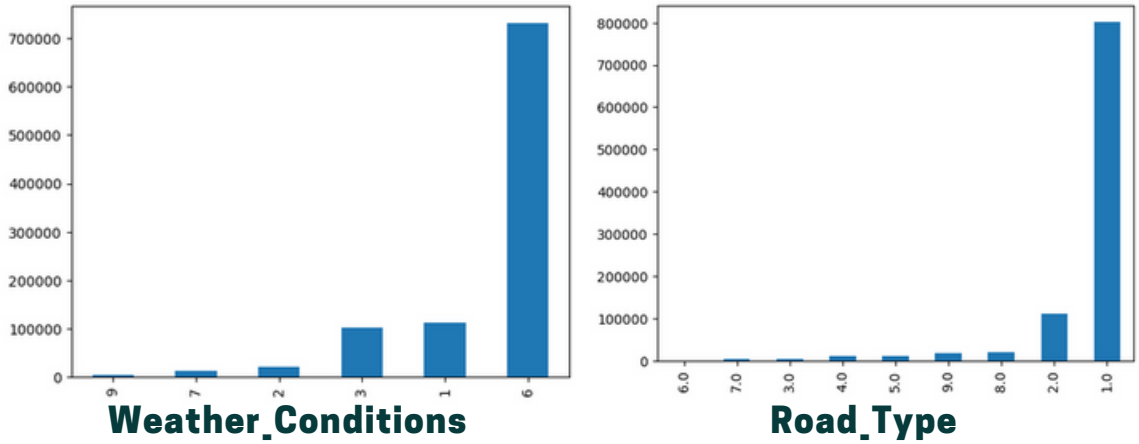
GRAPH BETWEEN OF ACCIDENTS & DRIVER HOME AREA TYPE

Where is the highest number of accidents?



GRAPHS WEATHER_CONDITIONS AND ROAD_TYPE

"Who causes the highest number of accidents based on age group?



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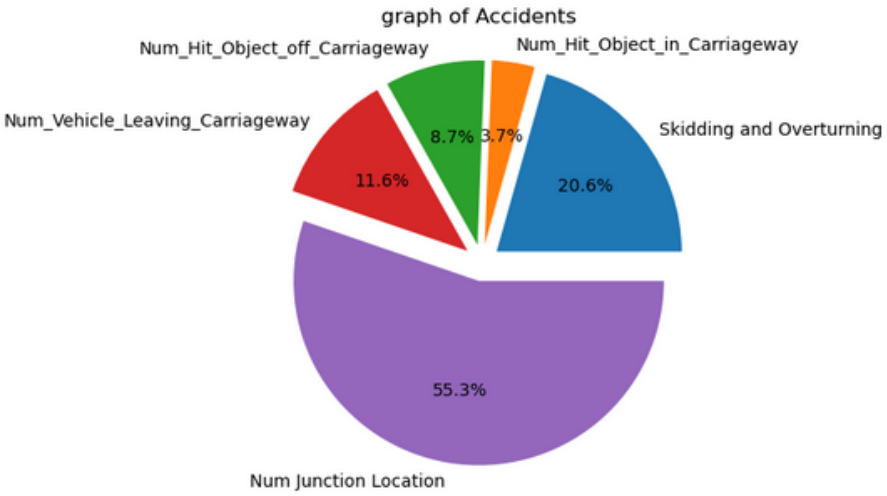
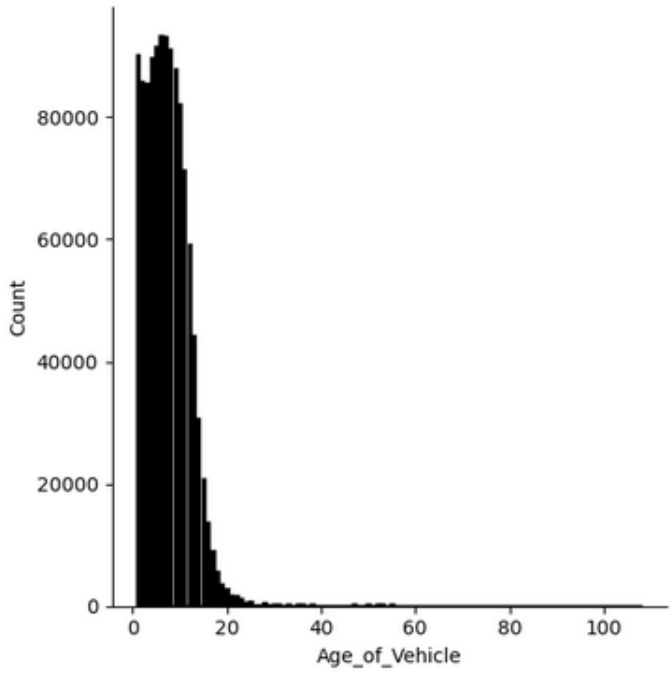
GRAPH OF ACCIDENTS TYPE

What is the most common type of accidents that occur?

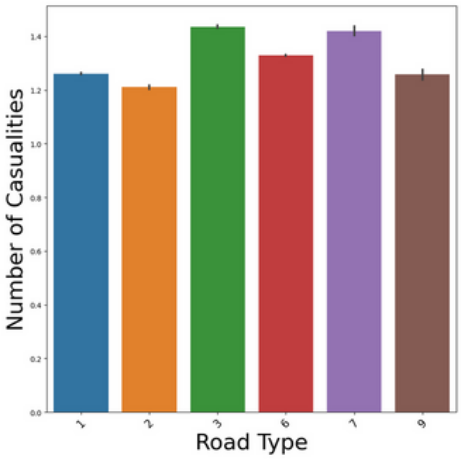


GRAPH OF AGE_OF_VEHICLE

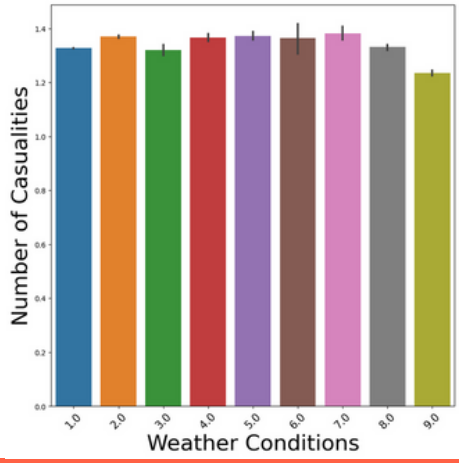


100% **Our analysis methodology demonstrates remarkable effectiveness in delivering accurate and insightful results.**

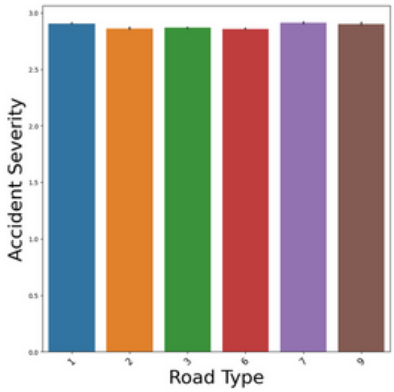
Graphs Number of Casualties and Road_Type



Graphs Number of Casualties and Weather Conditions



Graphs Accident Severity and Road Type



NEXT STEPS(ML)

We have developed a machine-learning model for analyzing car accidents. Our model extracts insights from accident data, aiding in understanding accident factors and improving road safety.

Key features of our model include comprehensive accident analysis, predictive capabilities, and the ability to conduct comparative studies. We prioritize data privacy and comply with all relevant regulations.

We would love to demonstrate our model and discuss potential collaborations. Let us know if you are interested.

01 — Find target

Our machine-learning model focuses on predicting casualty severity and accident severity in car accidents. By analyzing various factors, we aim to improve road safety and mitigate the severity of accidents.

02 — find the features

Our machine-learning model utilizes critical features such as location, weather conditions, road type, contributing factors, time of day, vehicle type, collision type, and road conditions to predict casualty severity and accident severity in car accidents. These features provide valuable insights into accident patterns and aid in implementing targeted interventions for improving road safety.

03 — find the best algorithm

Our machine-learning model utilizes advanced algorithms to predict casualty severity and accident severity in car accidents. These algorithms are carefully designed and optimized to analyze the selected features and provide accurate predictions.

MACHINE LEARNING MODEL

Our ML model uses advanced algorithms to predict casualty and accident severity in car accidents, ensuring accurate predictions from selected features.

CASUALTY_SEVERITY

SVM
87.94%
ACCURACY

DECISION TREE
88%
ACCURACY

ACCIDENT SEVERITY

SVM
86.2%
ACCURACY

DECISION TREE
86%
ACCURACY

ACKNOWLEDGEMENTS

This report focuses on analyzing UK car accidents using data analysis and machine learning. We examine various factors such as location, weather conditions, road type, and vehicle characteristics to uncover insights that enhance road safety and inform policy decisions.
Machine learning algorithms help us identify patterns, correlations, and predictive factors associated with accidents. By developing accurate prediction models, we can identify high-risk areas and suggest interventions to mitigate hazards.
The report aims to provide an overview of UK car accidents through exploratory analysis and develop and evaluate machine learning models for accident prediction. The findings can inform road safety strategies, resource allocation, and efforts to reduce accidents.
Sections in the report cover data collection, exploratory analysis, machine learning models, implications, recommendations for policymakers, and areas for future research.

We thank you for your continued support in our efforts to contribute to our follow-up report.