



The Story Behind UK Road Collisions

Where, Why, and How Bad?

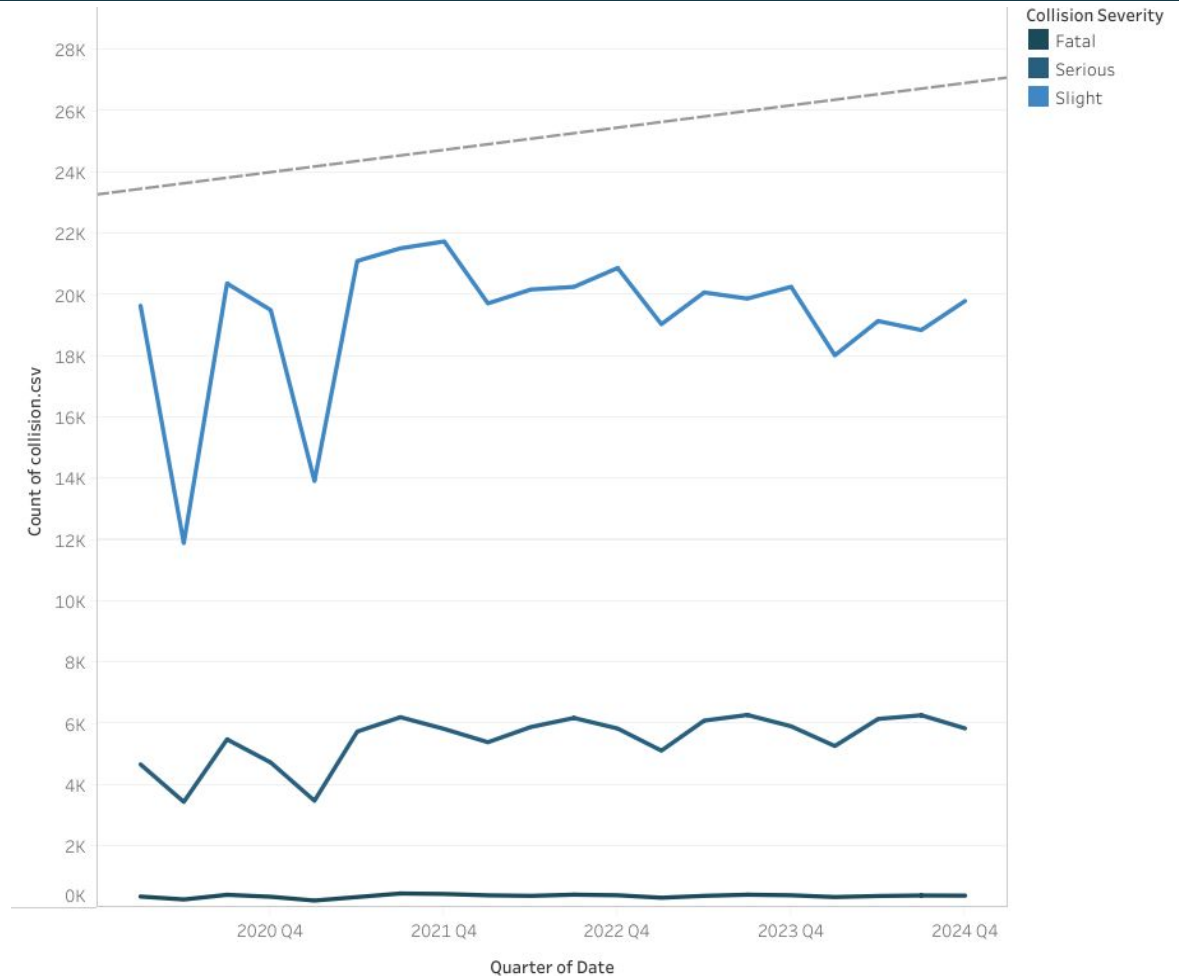


Introduction

- Road safety remains a major public concern
- Understanding why certain conditions lead to more severe outcome is important
- Exploring national road-collision data (STATS19)



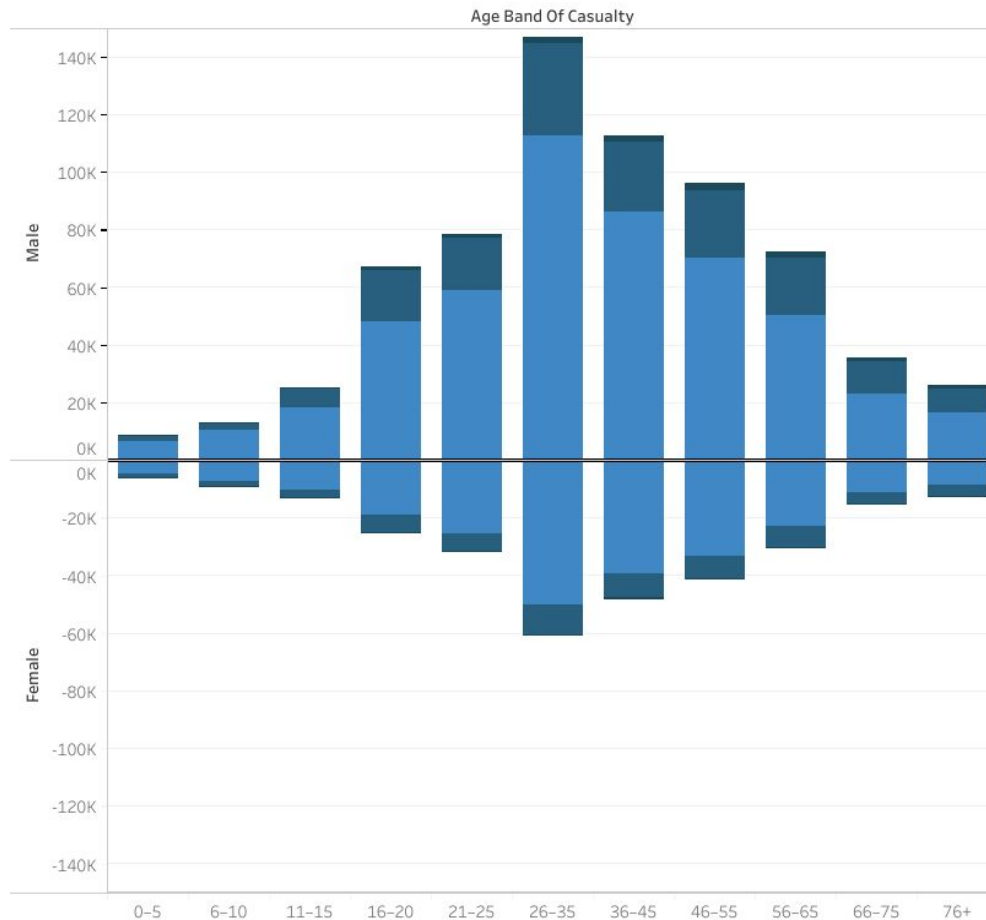
Collision Trends Over Time

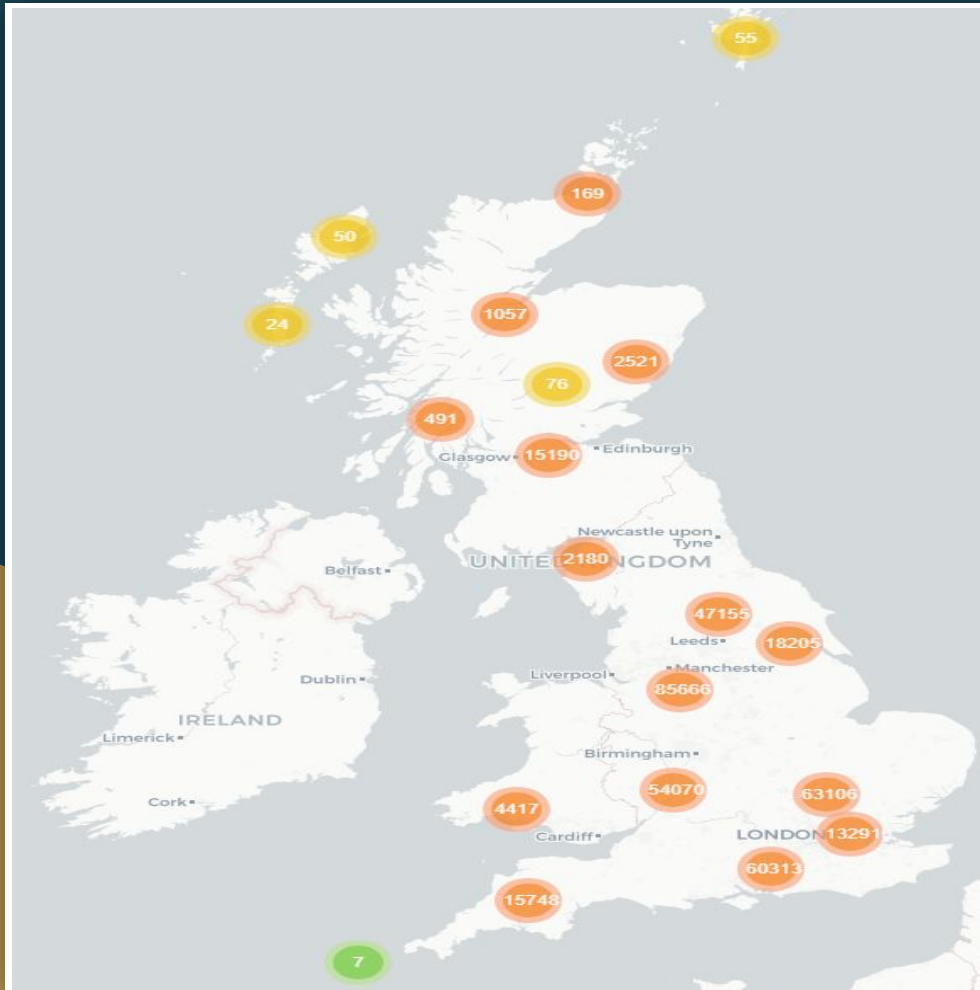


Age and Gender Patterns in Casualties

- Male casualties: 392,615
(fatality rate: 1.54%)
- Female casualties: 242,085
(fatality rate: 0.78%)

Age-distribution



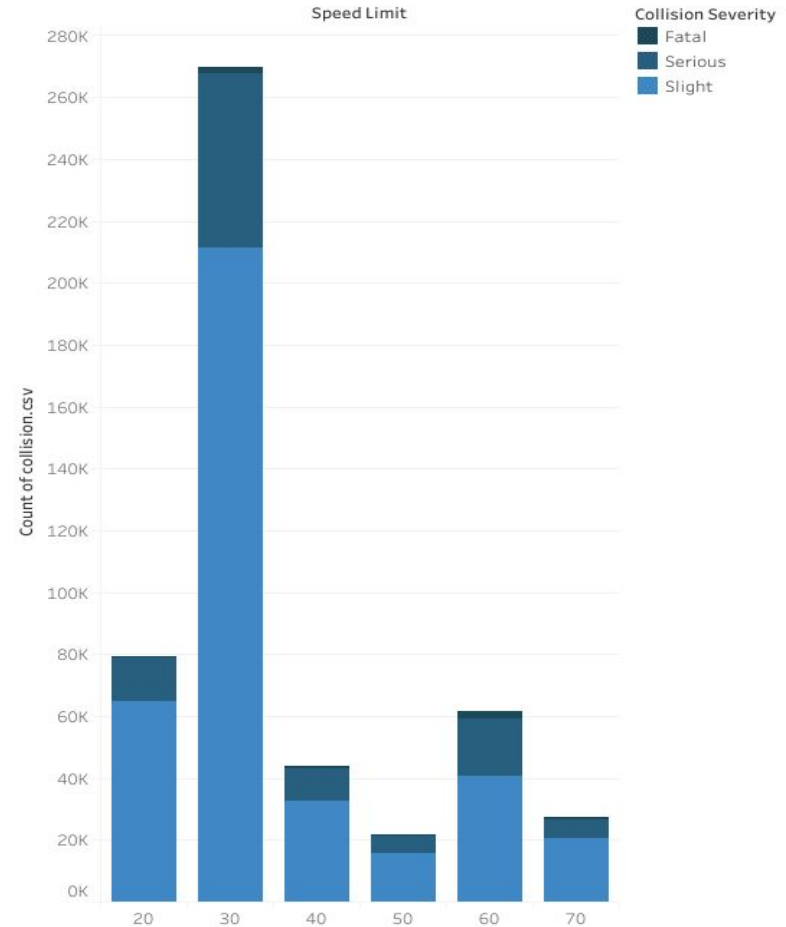


Where Collision Occur: Mapping UK Hotspots

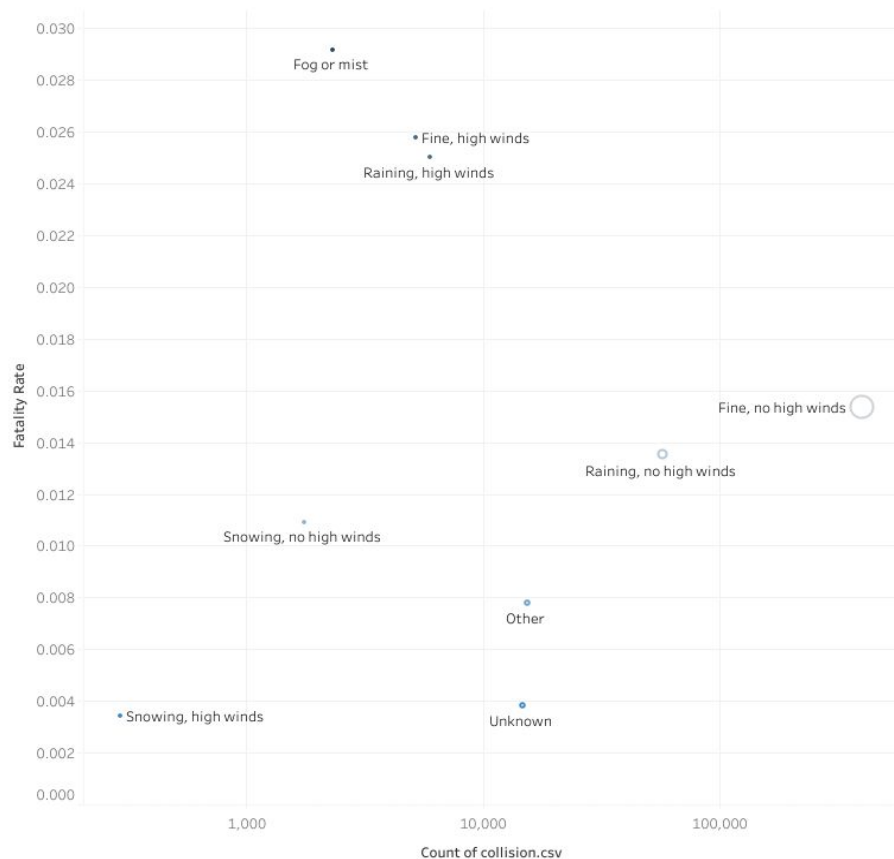
- Urban collisions: 339,903 (fatality rate: 0.82%)
- Rural collisions: 163,504 (fatality rate: 2.87%)

Impact of Speed Limit on Fatality Rate

Speed Limit vs Collisions



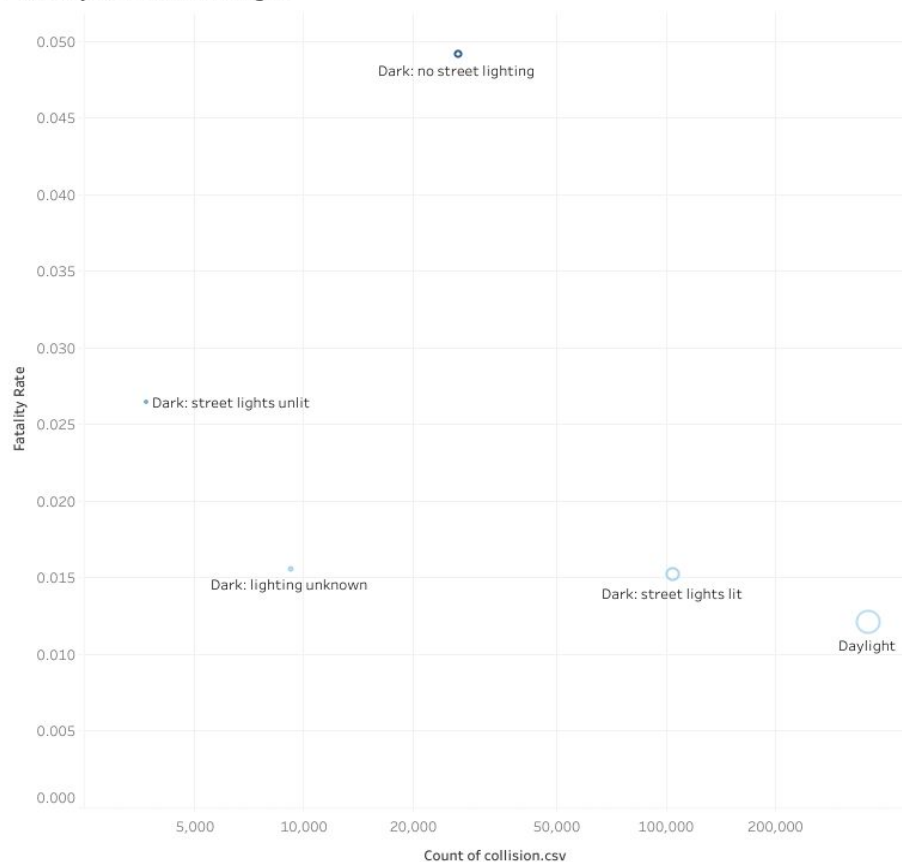
Fatality Rate across Weather



Impact of Weather Conditions on Fatality Rate

- High wind conditions: 2.48%
- No high winds conditions: 1.51%

Fatality Rate across Light



Impact of Light Conditions on Fatality Rate

- Light conditions: 1.28%
- Dark conditions: 4.64%

Modelling Approach

Model Selection



Random Forest

☒ Selected



XGBoost

☐ Not Used

Problem Formulation

Binary Classification

Slight vs Serious

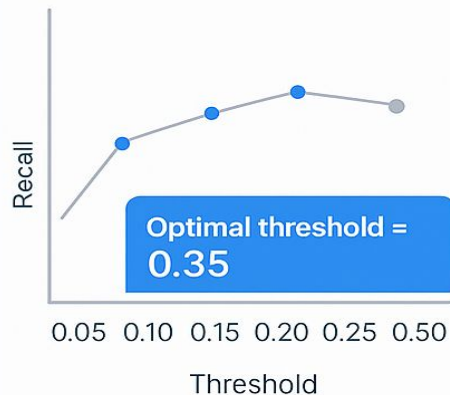
☒ Used

Multi-Class Classification

Slight, Serious, Fatal

☐ Not Used

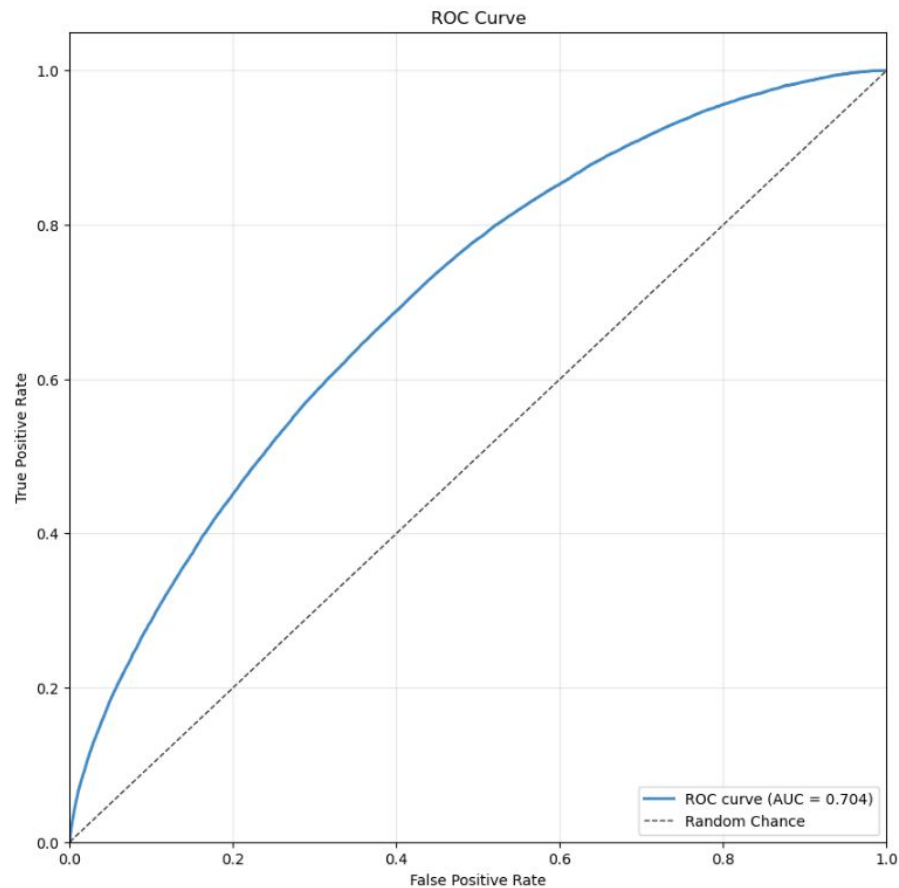
Threshold Tuning



Model Evaluation

Recall: 81%

ROC-AUC: 0.704



Key Insights & Final Thoughts

- Collision severity is inherently hard to predict
- Environmental conditions matter
- Urban hotspots vs Rural Severity

