

An aerial night photograph of a city, likely London, showing a dense network of roads and buildings illuminated by streetlights and city lights. The sky is dark with some clouds, and the overall scene is bathed in a warm, golden light from the city below.

UK ROAD ACCIDENT SEVERITY

An Analysis, Visualization
and Predictive Model

Introduction

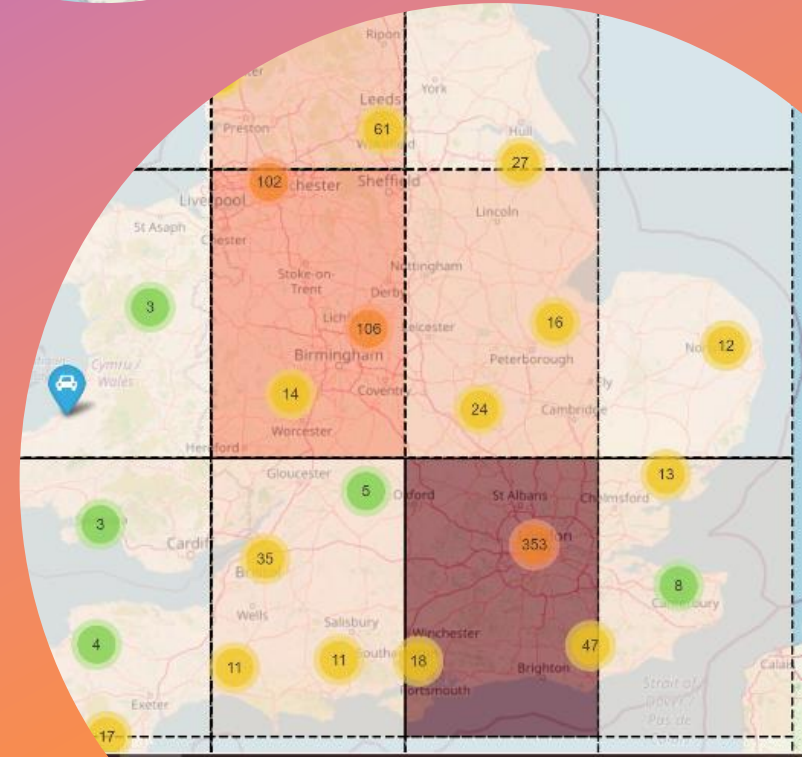
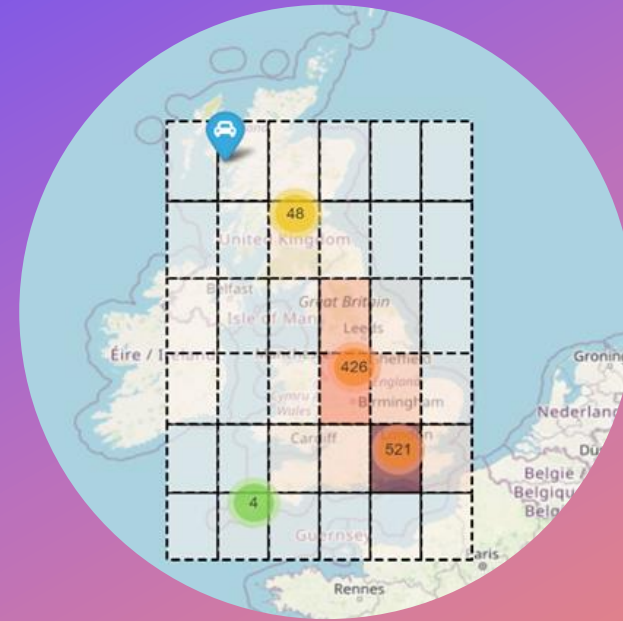
- IBM Data Science Capstone Project
- Data Source:
 - Road Safety Data – Accidents 2018
 - UK Department for Transport
 - Data.gov.uk

Problem

- Thousands of road accidents each year
- How to improve road safety through a data science solution
- Machine Learning: A predictive model for crash likelihood based on location, weather conditions, road conditions

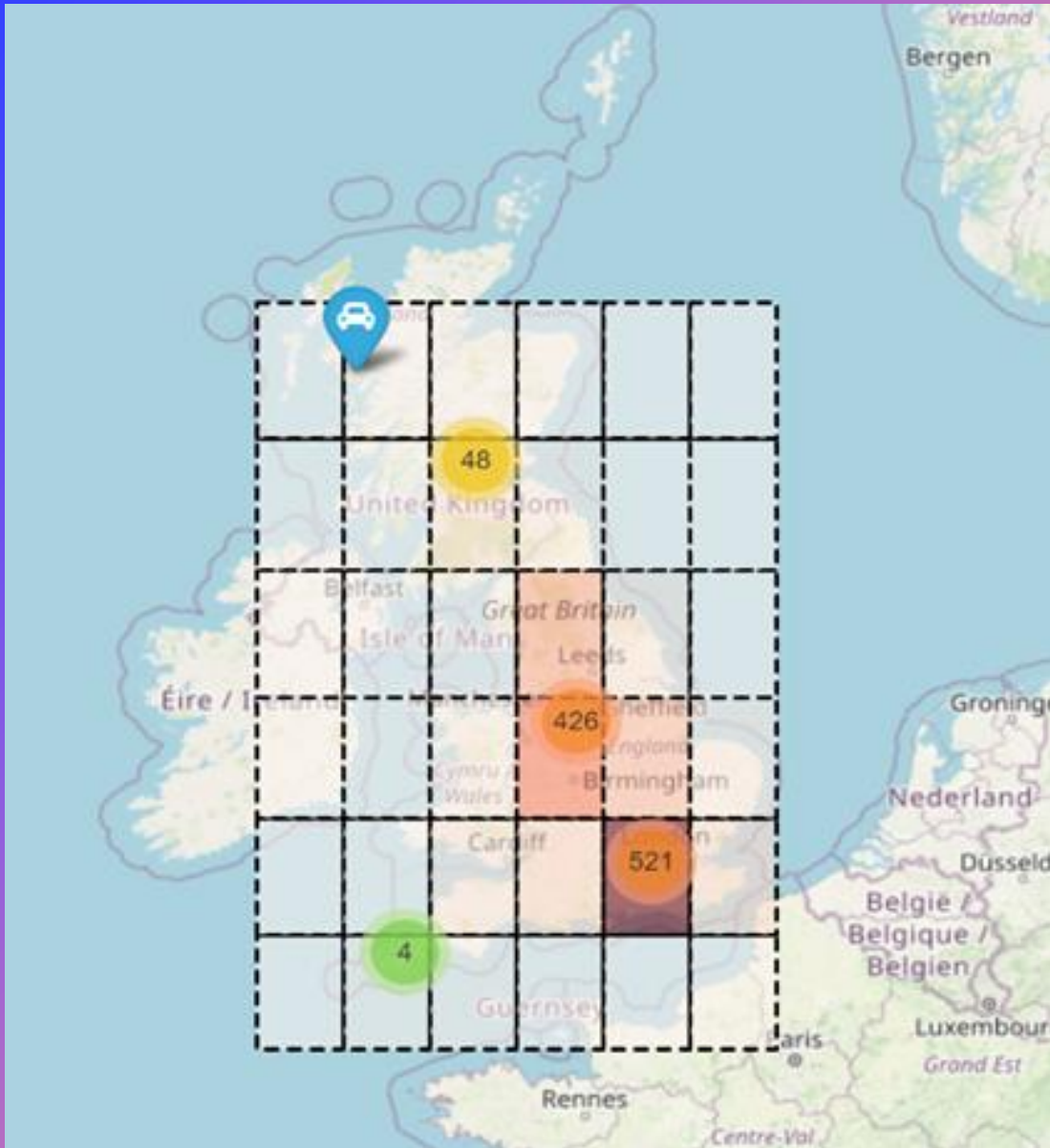
Data

- 122,635 samples
- 32 features
- Accident Severity
 - 1 – Fatal
 - 2 – Serious
 - 3 – Slight



Map Visualization of Road Accidents

- Sample set of 1000 random accidents.
- Easy visualization of accident 'hot-spots'.
- Three clear 'high-risk' zones for chance of accident and severity in descending order:
 - London
 - Birmingham
 - Leeds



PREDICTIVE MODEL

```
mirror_ob.select=1  
mirror_mod.mirror_object  
operation = "MIRROR_X":  
mirror_mod.use_x = True  
mirror_mod.use_y = False  
mirror_mod.use_z = False  
operation = "MIRROR_Y":  
mirror_mod.use_x = False  
mirror_mod.use_y = True  
mirror_mod.use_z = False  
operation = "MIRROR_Z":  
mirror_mod.use_x = False  
mirror_mod.use_y = False  
mirror_mod.use_z = True
```

```
selection at the end -add  
mirror_ob.select=1
```

```
mirror_ob.select=1
```

```
context.scene.objects.active
```

```
("Selected" + str(modifier
```

```
mirror_ob.select = 0
```

```
bpy.context.selected_ob
```

```
data.objects[one.name].sel
```

```
int("please select exactly
```

```
OPERATOR
```

```
NO CLASSE
```

```
NO CLASSE
```

```
NO CLASSE
```

```
NO CLASSE
```

```
NO CLASSE
```

Creating the Model

- Focus on 4 factors:
 - Day of week
 - Weather Conditions
 - Light Conditions
 - Road Conditions
- 3 Models:
 - Logistic Regression
 - Decision Tree
 - Random Forest

Decision Tree

Accuracy 79.71

	precision	recall	f1-score	support
1	0.000000	0.000000	0.000000	334
2	0.000000	0.000000	0.000000	4642
3	0.797122	1.000000	0.887109	19551
micro avg	0.797122	0.797122	0.797122	24527
macro avg	0.265707	0.333333	0.295703	24527
weighted avg	0.635403	0.797122	0.707134	24527

Predicted	3	All
Actual		
1	334	334
2	4642	4642
3	19551	19551
All	24527	24527

- Scored best accuracy after adjustments.
- Successfully predicted 19551 serious accidents.
- Accuracy of 79.71%

Conclusion

- Great visualization system for localizing 'hot-spots'
- Predictive model needs more work and is not implementable in the real world
 - Expand with more data and features
 - Potentially include factors such as
 - Age of driver
 - Model of car
 - Speed



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THANK YOU