**Project proposal (Group 1)**

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**Project topic:** The aim of our project is to uncover patterns in Road accidents in UK. We’ll examine relationships between Accidents severity, vehicle, road, speed limit, areas and type of road and different factors contributing to cause of accidents over a period of 2021 and analyze and visualize them using various interactive data visualization techniques.

**Project description:** Connecting to the 2021 UK accident database, we will publish the data on a webserver with multiple graphs with drop-down menu, where user can select/ filter the data using graphical interface and view the corresponding results.

**Background:** We are interested in analyzing historical data for accidents happened in UK in year 2021. Our data has 100,000 unique accident record and total of 23 columns each containing a specific characteristic of the record.

**Methodology:** Python (e.g. Pandas, Matplotlib, hvplot SciPy, bokeh.models, geopandas and numpy), SQL, pgadmin, postgresql, JavaScript, Filtering using Pandas in Jupiter Notebook. Interactive visualizations using dropdown/checkbox etc.

**Aims:**

1. **Accidents by Month / Day of Week (hvplot)**

* Number of accident base on months and day of the week.
* Display accident trend, overall max and min accident counts Number of accidents by month
* Helps spot seasonal or weekly patterns

1. **Monthly Casualties in UK Road Accidents**

* Number of causalities based on month.

1. **Accidents by Day of Week and Severity**

* Display number of accidents base on level of severity on each day of the week.

1. **Accident Hotspots by Severity and Local Authority**

* Selection of level of severity and district displayed on a map.

1. **Accident severity by weather/light/road surface conditions**

* Selection on accident severity (serious, slight and fatal) and number of accidents with respect to condition type (road surface, light condition and weather condition)

1. **Road type vs number of accidents (hvplot):**

* To show overall number of accidents with respect to each road type chosen from drop down menu and which road type leads to a greater number of accidents and show minimum as well for each road type.

1. **Light conditions vs number of accidents (hvplot) Road**

* To show overall number of accidents with respect to each lighting condition chosen from drop down menu and which lighting conditions leads to a greater number of accidents and show minimum as well for each lighting condition.

1. **Road surface conditions and the number of accidents month-wise**

* To show overall number of accidents with respect to each **Road surface** chosen from drop down menu and which road surface leads to a greater number of accidents and show minimum as well for each road surface condition.

1. **Weather conditions vs the number of accidents month-wise and display the max and min accident counts**

* To show overall number of accidents with respect to each weather conditionchosen from drop down menu and which weather condition leads to a greater number of accidents and show minimum as well for each weather condition

1. **Urban vs Rural by Severity**

* To show overall number of accidents in urban and rural areas with respect to chosen accident severity and also shows maximum and minimum with each severity and overall, as well.

1. **Number of accidents by police force and month wise**

* To show number of accidents month wise with respect to police force jurisdiction and find month wise maximum and minimum for each police area month wise and overall
* It will help to know which area needs more resources in place and for what months.

1. **Vehicle Type vs Number of Accidents by Severity**

* To show number of accidents by vehicle type with respect to severity.
* Helps in knowing which vehicle is more often involved in accidents and its severity impact.

**Outcomes and Conclusion:**

This data analysis can be useful in below ways: -

#### **Identifying Key Accident Contributing Factors:**

#### **Accident Causes, and the major** contributing factors, and make the public more aware of the risk driving when the following element is present.

* Weather conditions, lighting, road surface, and vehicle type are significant factors contributing to road accidents.
* By understanding these correlations, the public can be more informed about the risks associated with different driving conditions, enabling safer driving behavior.

#### **Leveraging Seasonal and Temporal Trends:**

* The analysis identifies patterns, such as increased accidents during winter or rush hour, allowing broadcasters and authorities to proactively issue driving safety reminders during high-risk periods.
* Planning for roadworks and safety campaigns can be optimized by understanding these trends.

1. **Enhancing Police Effectiveness:**

* Increase effectiveness of police presence by deploying the force in target accident hot spot and make appropriate enforcement.
* Adjust patrol schedules or install speed cameras where needed.

#### **Informing Infrastructural improvements:**

* Redesign dangerous intersections.
* Plan safer pedestrian crossings and bike lanes.
* Install protective divider in dangerous road ways.

#### **Guiding Insurance Risk Assessment:**

* Assess accident risk in certain areas or demographics.
* Adjust premiums based on data-driven risk.

**References:**

* <https://www.kaggle.com/datasets/xavierberge/road-accident-dataset>?
* Chatgbt