



PowerBI

# UK Accidents

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Policy



# Team Member



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# Table of Contents

1. | Dataset

2. | Data Source

3. | Data Insight



The background features a low-angle, grayscale photograph of a modern building with a grid of windows. Overlaid on this are several large, stylized geometric shapes: a yellow hexagon in the top right, a yellow pentagon in the bottom left, and a white-outlined hexagon in the bottom left. A thick white line also runs diagonally across the upper right portion of the image.

# Objective

Study the causes that  
affect the severity of  
road accidents.

A decorative graphic on the left side of the slide. It consists of two vertical lines at the top: a thin white line on the left and a thicker black line on the right. These lines extend downwards and terminate at the top vertex of a dark blue hexagon. The hexagon is solid and has a thin white border.

**01**

# Dataset



# 01.

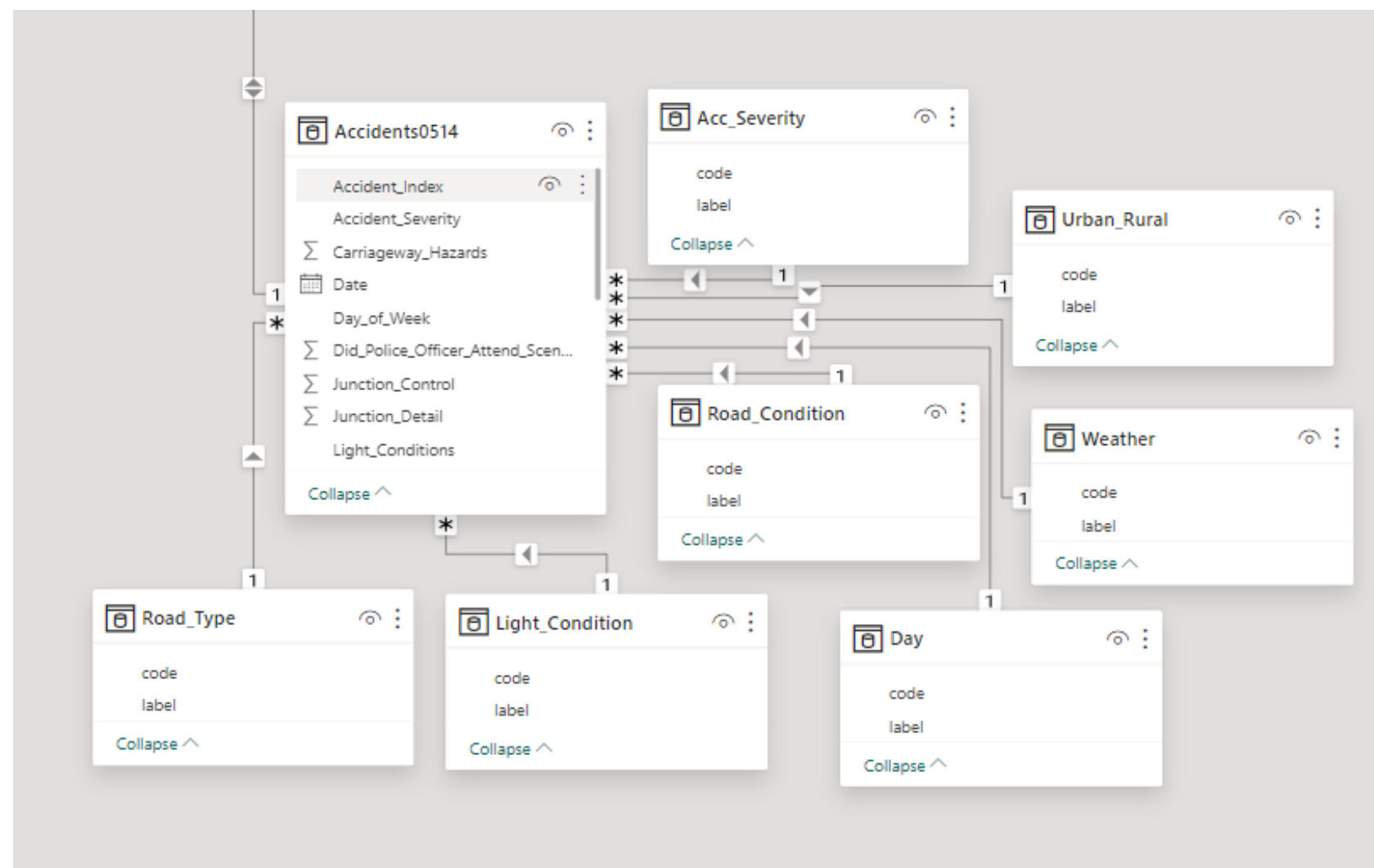
## Accidents

The accident file provides details about the **circumstances of an accident** from 2005 to 2014 such as weather, location lat/long, area type, road type, date, time, day of week, and much more.

- Rows: **1640597** unique values
- Columns: **32** columns
- Selected Columns: Accident Index, Accident Severity, Number of Casualties, Road Type, Light Condition, Weather Conditions, Road Surface Condition, Urban or Rural

01.

# Accidents (Model)



01

Accident Severity

02

Road Condition

03

Urban/Rural

04

Road Type

05

Light Condition

06

Weather

07

Day



# 02.

## Casualties

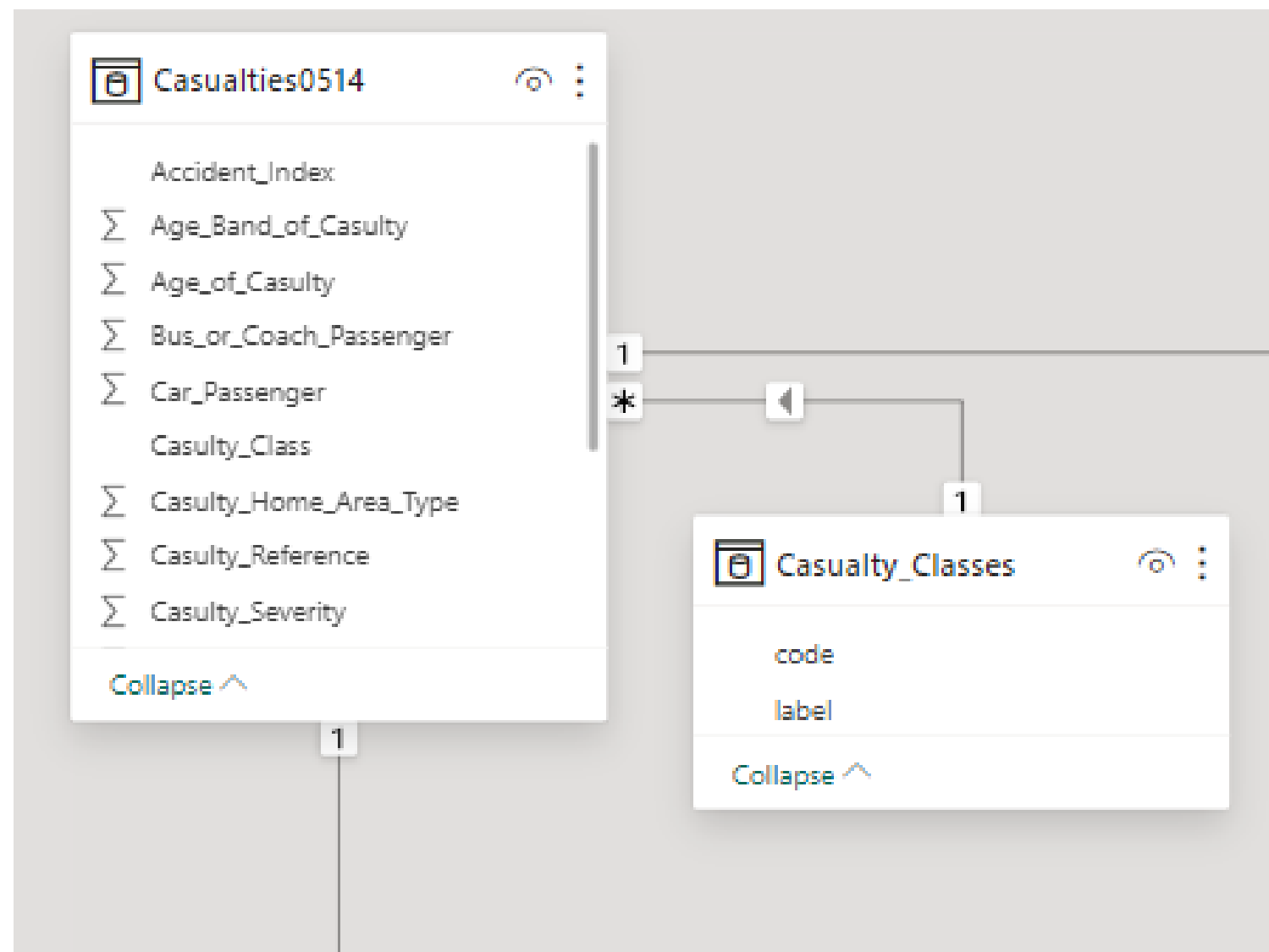
The casualties file details the **circumstances of casualties** from 2005 to 2014 such as casualty age, sex, severity, social class, casualty type, and much more.

- Rows: **1640597** unique values
- Columns: **15** columns
- Selected Columns: Accident Index, Sex of Casualty, Age of Casualties, Casualty Severity, Casualties Class



02.

## Casualties (Model)



01

Casualty Class

Driver,  
Passenger, or  
Pedestrian

# 03.

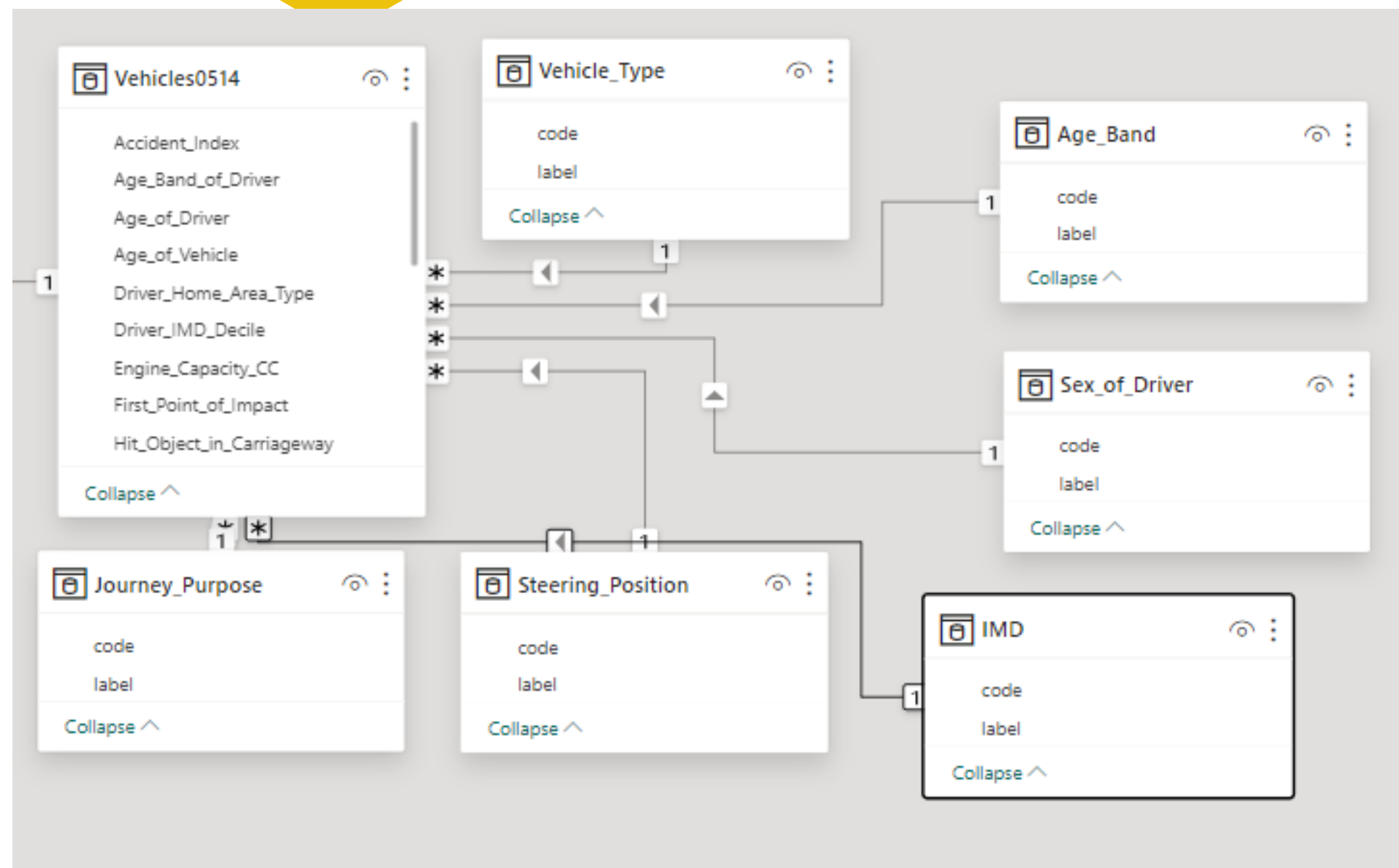
## Vehicles

The vehicles file provides details about the **circumstances of vehicles** from 2005 to 2014 such as vehicle type, age of driver, sex of the driver, age of vehicle, engine type, journey purpose, and much more.

- Rows: **1640597** unique values
- Columns: **22** columns
- Selected Columns: Accident Index, Vehicle Reference, Vehicle Type, Left Hand Drive, Age of Driver, Engine Capacity CC, Age of Vehicle, Driver IMD, Journey Purpose

03.

## Vehicles (Model)



01

Vehicle Type

02

Age Band

03

Sex of Driver

04

Journey Purpose

05

Steering Position

06

IMD

Index of  
Multiple  
Deprivation

A decorative graphic on the left side of the slide. It features a dark blue hexagon with the number '02' in yellow. Above the hexagon are two vertical lines: a thin white line on the left and a thicker dark blue line on the right.

02

# Data Cleaning

# 01.

## MySQL

- Change the date to MYSQL default date format 'YYYY-MM-DD'
- Understand the columns and data types of each table

```
def convert_date_format(date):  
    try:  
        # Try to convert the date from '%d/%m/%Y' to '%Y-%m-%d'  
        return pd.to_datetime(date, format="%d/%m/%Y").strftime("%Y-%m-%d")  
    except ValueError:  
        # If the date is already in the '%Y-%m-%d' format, leave it as is  
        return date  
  
df["Date"] = df["Date"].apply(convert_date_format)
```



# 01.

## PowerBI

- Change the data type (Int, date, time, ...)
- Apply relationships and data modeling
- Missing values (replace from previous)

label	code
Daylight	1
Darkness - lights lit	4
Darkness - lights unlit	5
Darkness - no lighting	6
Darkness - lighting unknown	7
Data missing or out of range	-1

A decorative graphic on the left side of the slide. It consists of two vertical lines at the top: a thin white line on the left and a thicker black line on the right. These lines extend downwards and terminate at the top vertex of a dark blue hexagon. The hexagon is solid and has a thin white border.

**03**

# Data Source

# MySQL

- Use MySQL as the database
- Define all tables in the schema

# FastAPI Backend

- Creating Models
- CRUD all tables
- Routing through API

# FastAPI

```
from sqlalchemy import Boolean, Column, ForeignKey, Integer, String
from database import Base

class Casualties(Base):
    __tablename__ = "casualties0514"
    Accident_Index = Column(String(15), primary_key=True, index=True)
    Vehicle_Reference = Column(Integer)
    Casulty_Reference = Column(Integer)
    Casulty_Class = Column(Integer)
    Sex_of_Casulty = Column(Integer)
    Age_of_Casulty = Column(Integer)
    Age_Band_of_Casulty = Column(Integer)
    Casulty_Severity = Column(Integer)
    Pedestrian_Location = Column(Integer)
    Pedestrian_Movement = Column(Integer)
    Car_Passenger = Column(Integer)
    Bus_or_Coach_Passenger = Column(Integer)
    Pedestrian_Road_Maintenance_Worker = Column(Integer)
    Casulty_Type = Column(Integer)
    Casulty_Home_Area_Type = Column(Integer)
```

# FastAPI

```
@app.post("/acc_severity/", status_code=status.HTTP_201_CREATED)
async def create_severity(accident_severity: AccidentSeverity, db: db_dependency):
    db_severity = models.Accident_Serverity(**accident_severity.dict())
    db.add(db_severity)
    db.commit()

@app.get("/casualties", status_code=status.HTTP_200_OK)
async def get_all_casualties(db: db_dependency, skip: int = 0, limit: int = 100):
    db_casulties = db.query(models.Casualties).offset(skip).limit(limit).all()
    if db_casulties is None:
        raise HTTPException(status_code=404, detail="Casualties not found")
    return db_casulties
```



# PowerBI

```
let
    Source = Web.Contents("https://1e3d-103-16-62-134.ngrok-free.app/casualties?skip=0&limit=10000"),
    JsonContent = Json.Document(Source),
    TableFromList = Table.FromList(JsonContent, Splitter.SplitByNothing(), null, null, ExtraValues.Error),

    // Function to convert each record in the list to a table and transpose it
    recordToTable = (record) => Table.Transpose(Record.ToTable(record)),

    // Use List.Transform to apply the function to each record in the list
    tables = List.Transform(Table.Column(TableFromList, "Column1"), recordToTable),
```

A decorative graphic on the left side of the slide. It features a dark blue hexagon with the number '03' in yellow. Above the hexagon are two vertical lines: a thin white line on the left and a thicker dark blue line on the right.

03

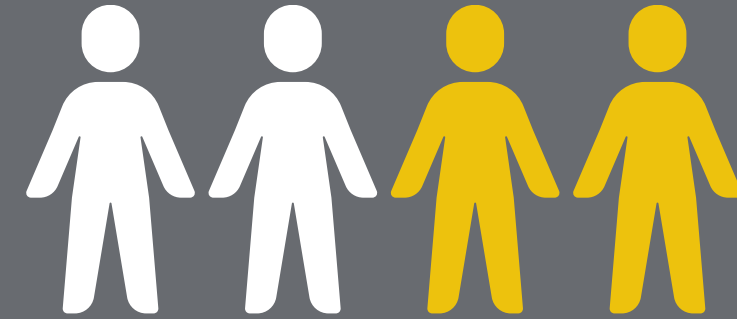
# Data Insight

# Variables

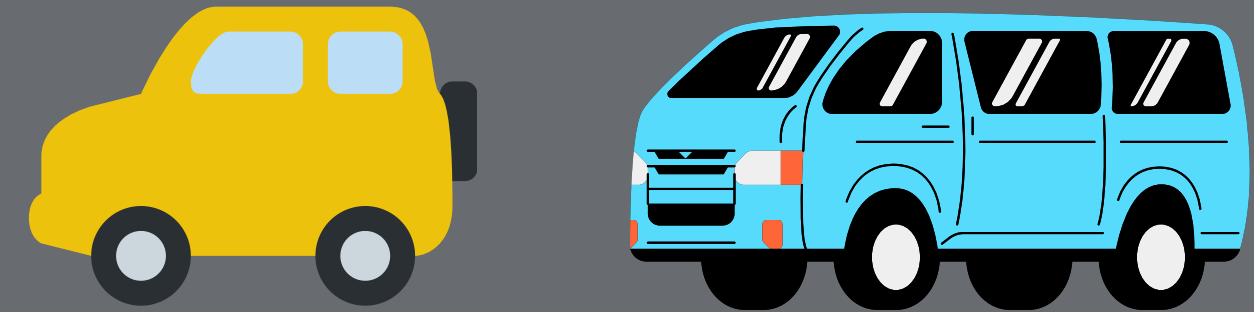
Our team decided to choose three variables that have an affects on accident severity:

- Human
- Vehicles
- Surrounding

## Human



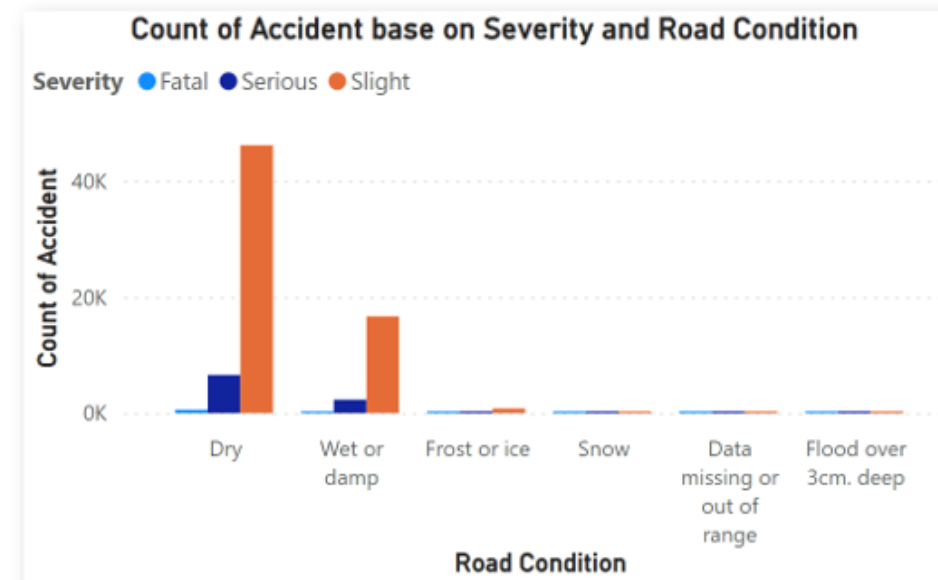
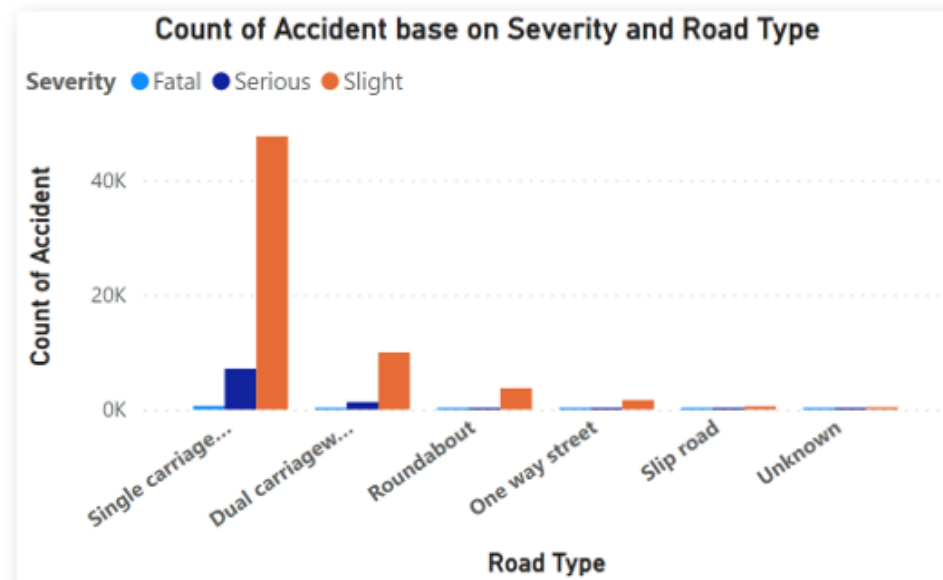
## Vehicles



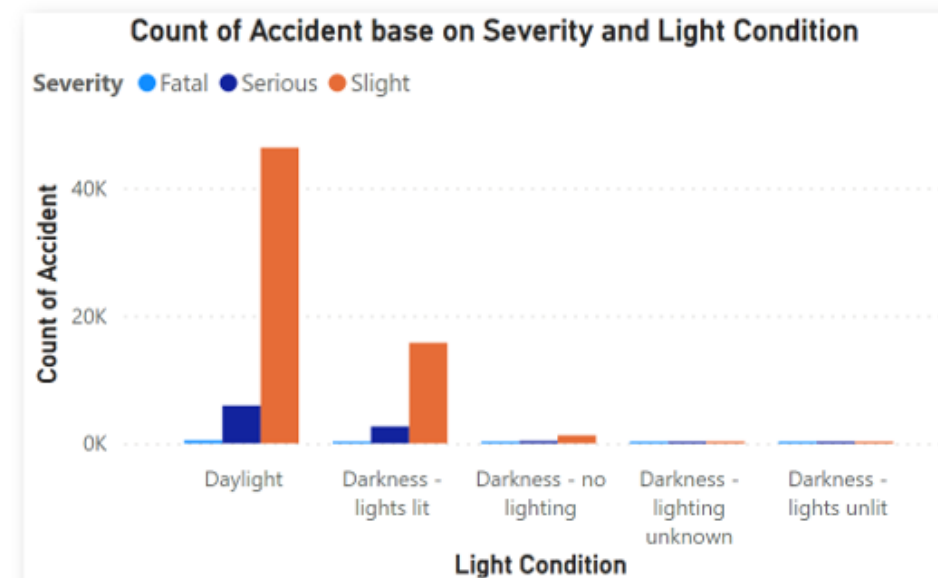
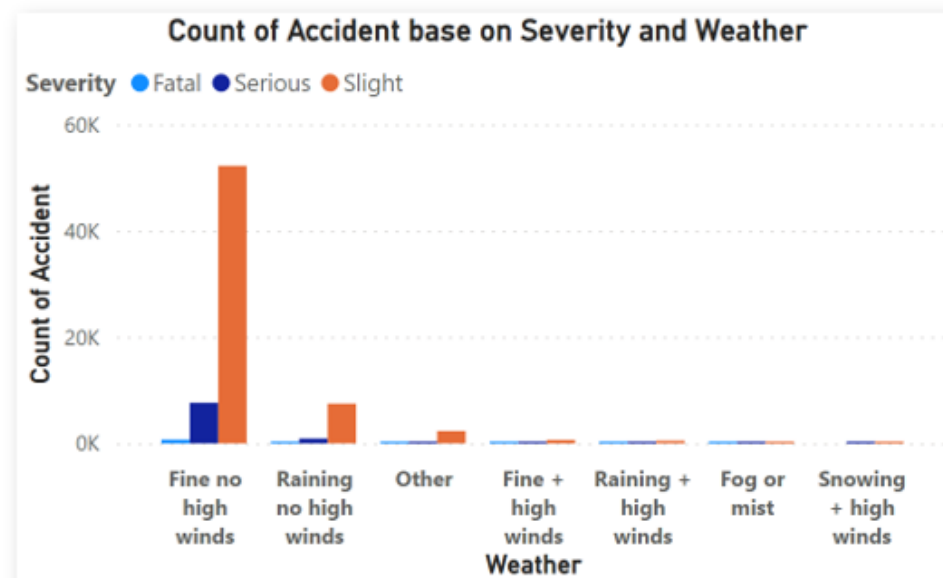
## Surrounding



# Affects of Surrounding on Accidents

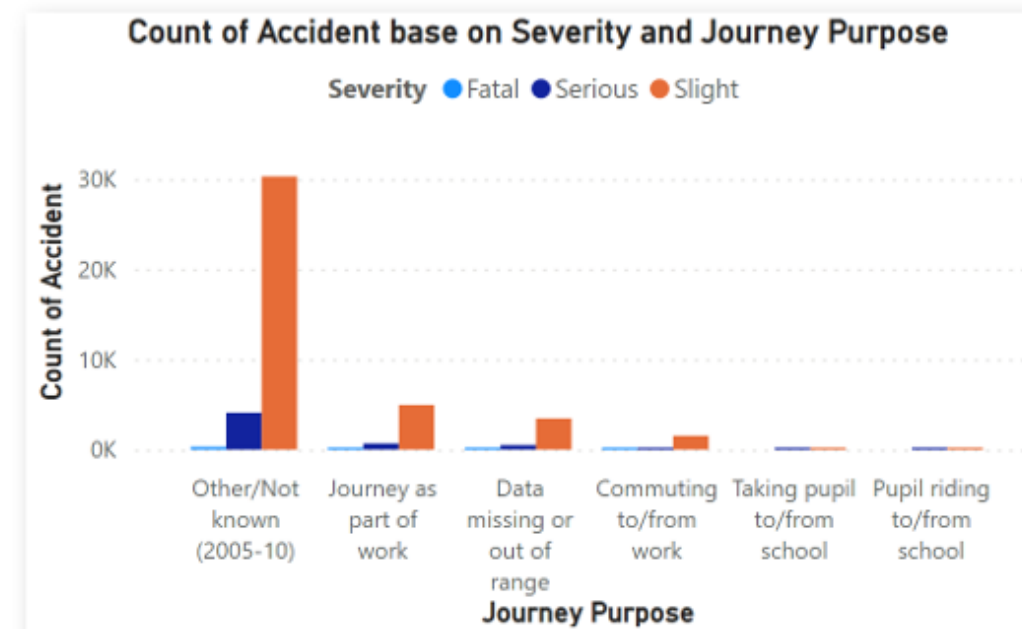
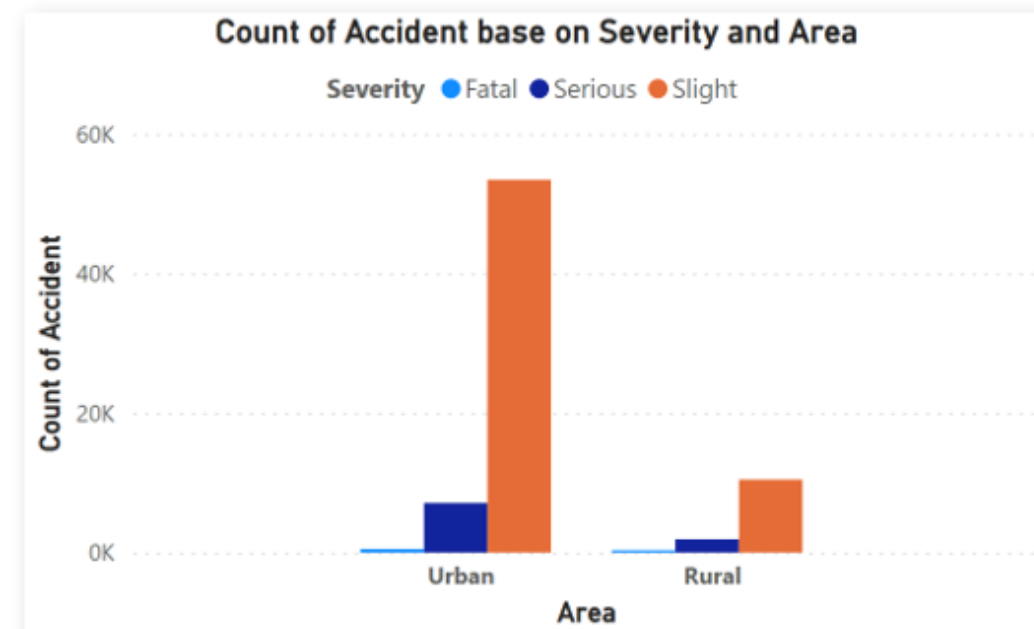


**PowerBI Server**



# Affects of Surrounding on Accidents

PowerBI Server

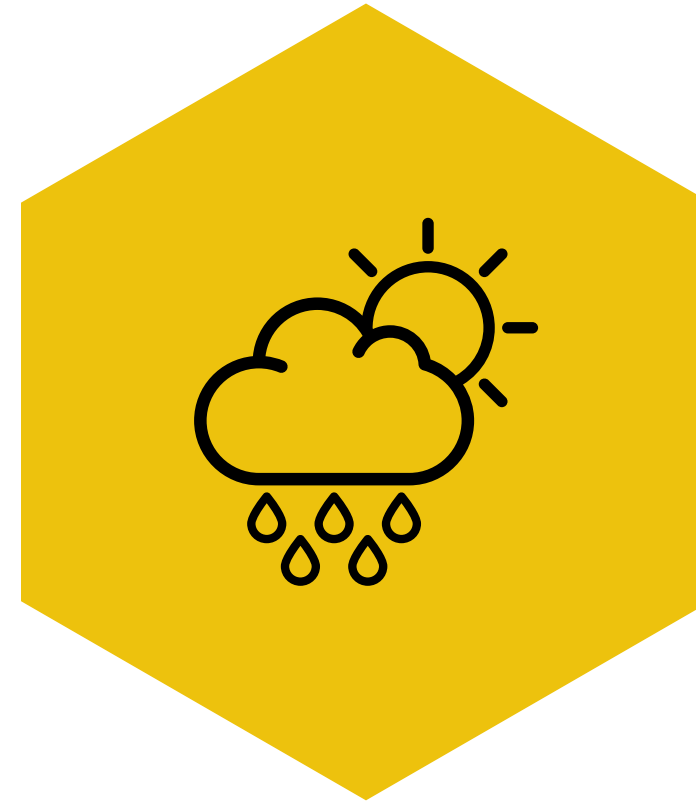




# Surrounding

## Single-Lane Hazards

Road with fewer lanes tends to have more road accidents.



## Weather

Weather conditions don't have an effect on the number of road accidents, but have a high probability of fatal accidents.

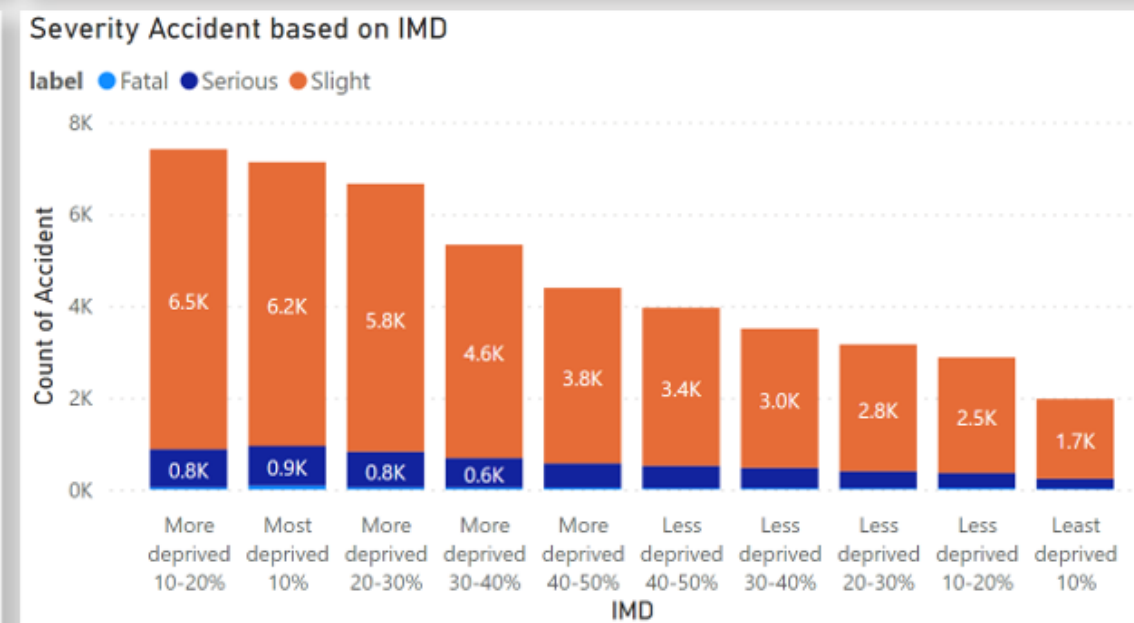
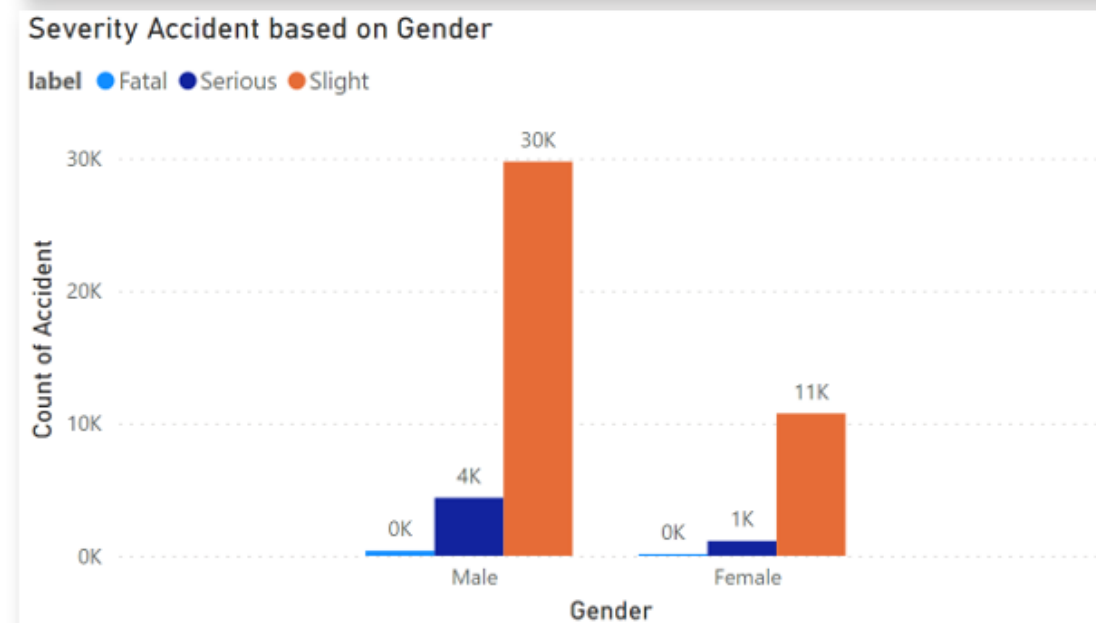
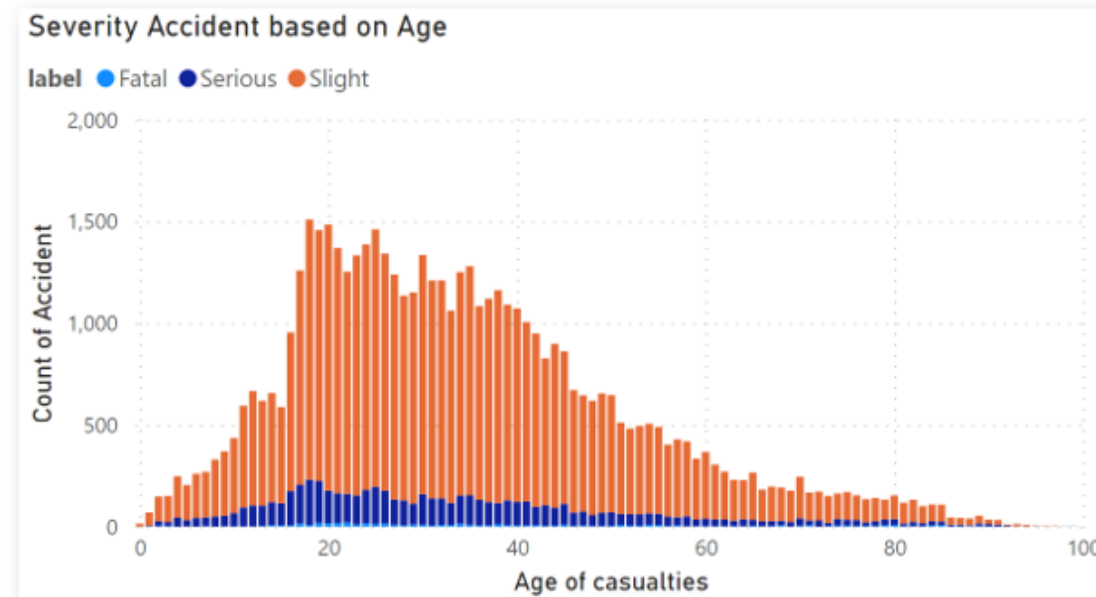
## Urban

People tends to have more road accidents in Urban Areas.



# Human

PowerBI Server



# Human Factor

## Age

Younger people tend to have more road accidents. Hight mode: 18 yrs old

18



## Passenger Type

Drivers or pedestrain face more road accidents.

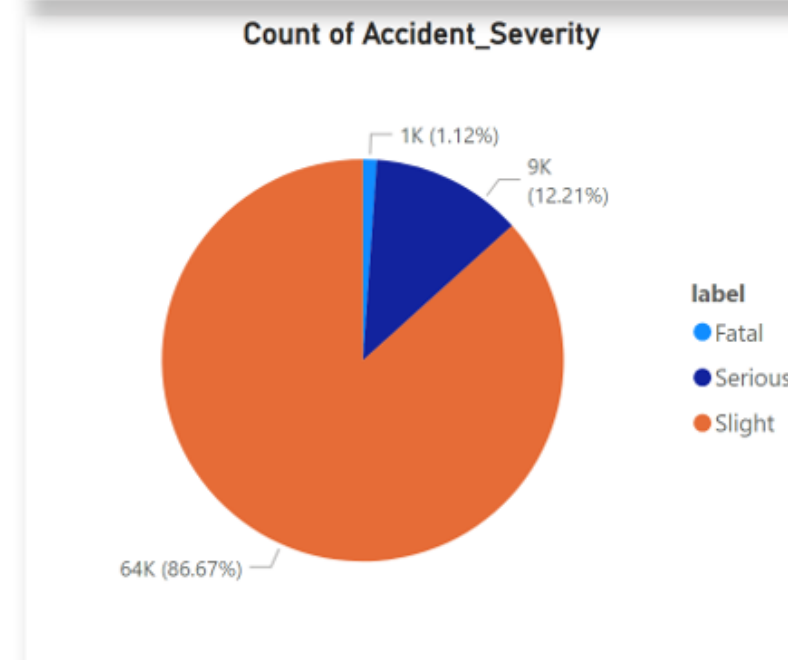
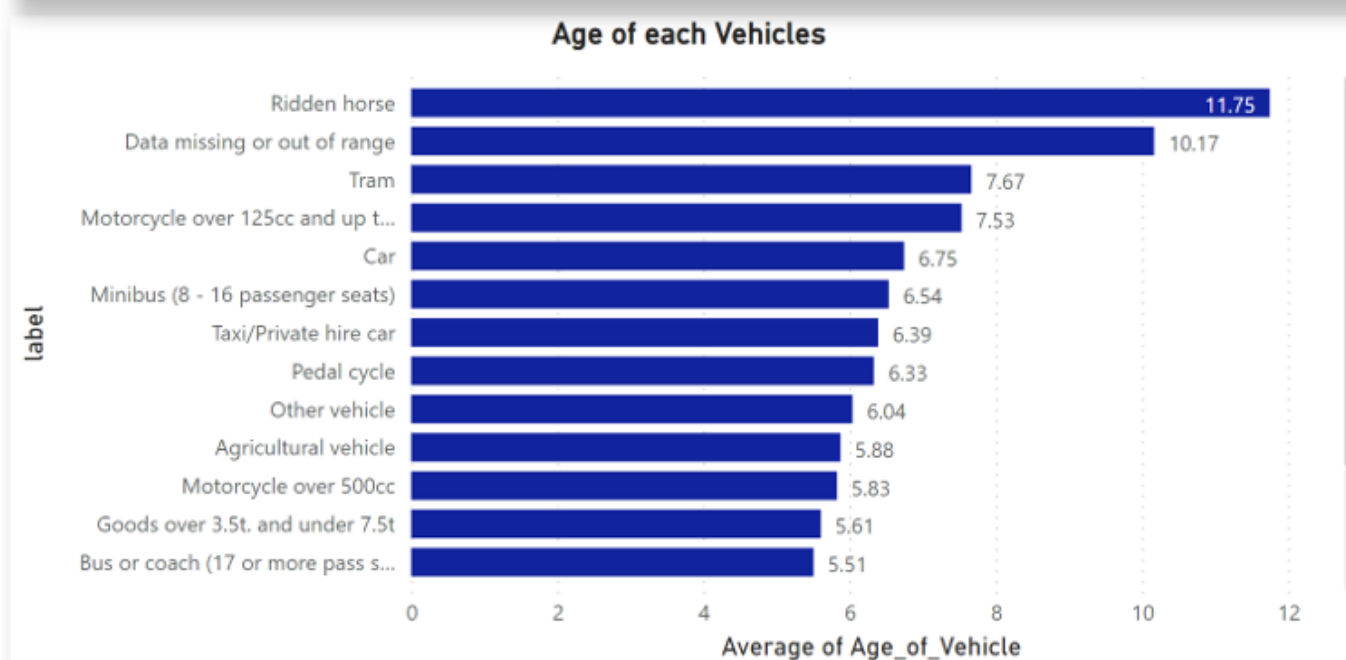
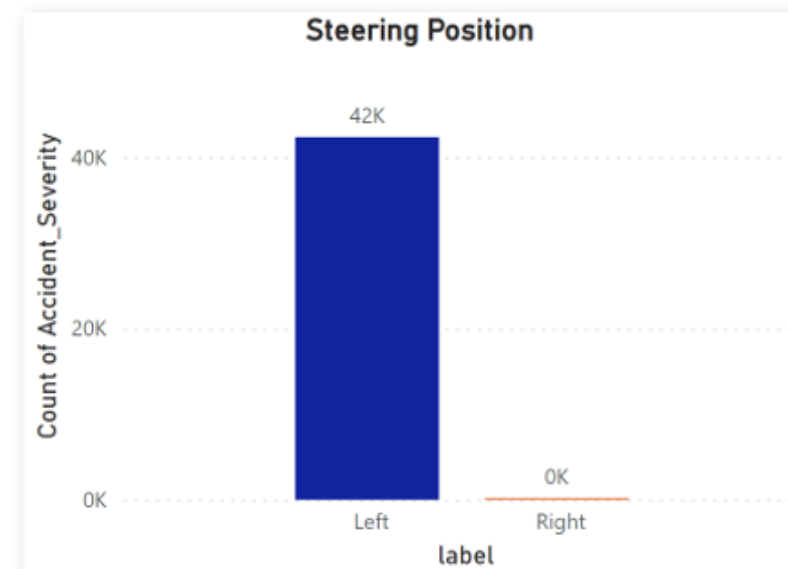
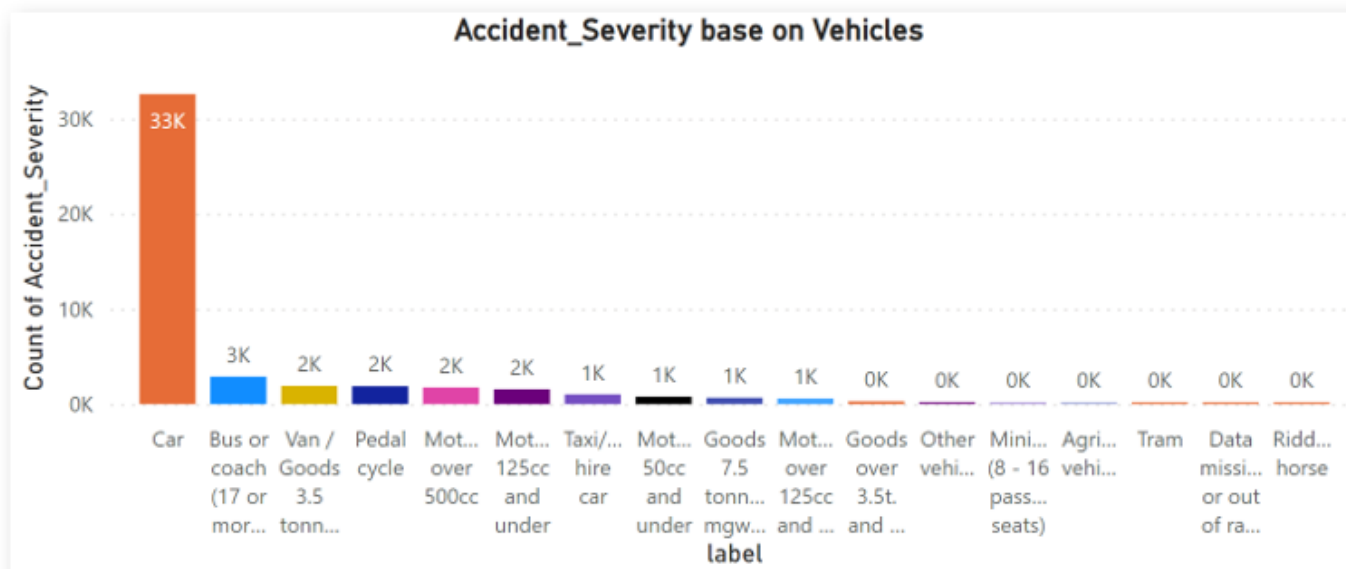


## More Deprived IMD

People who have more deprived IMD percentage (lower living standards) tends to face more road accidents.

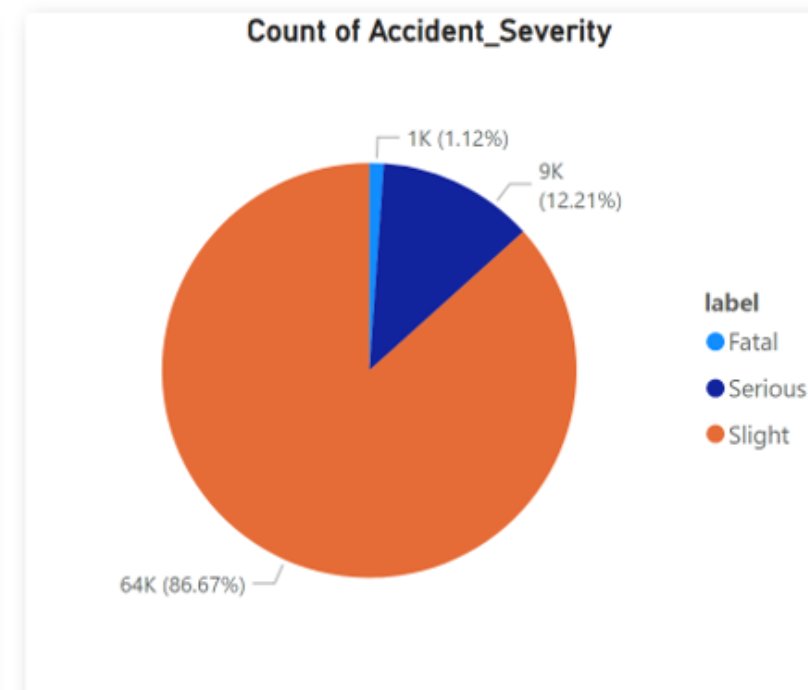
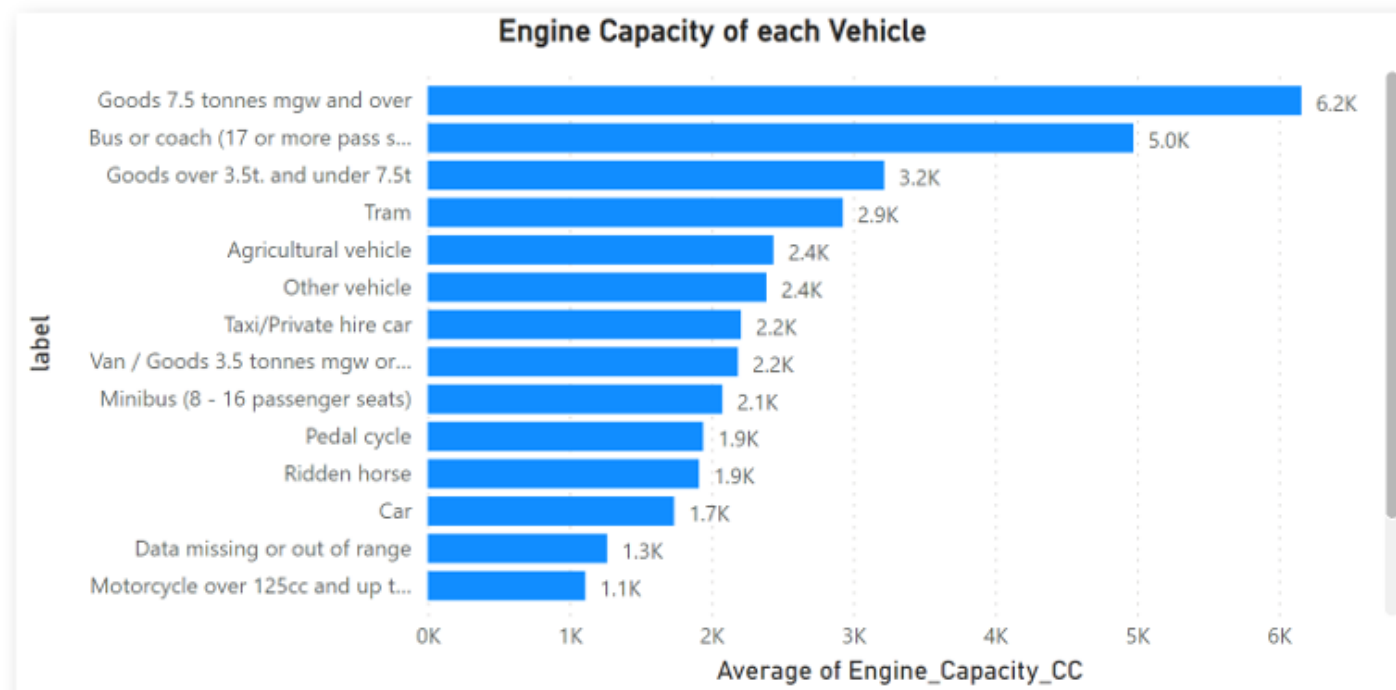
# Affects of Vehicles on Accidents

## PowerBI Server



# Affects of Vehicles on Accidents

PowerBI Server





# Vehicle

## Transport vehicles

Accidents with larger vehicles tends to increase the fatality rate.



## Car

More accidents impact from cars because of most people driving cars in the UK.

## Left Steering Wheel

More accidents from Left steering because in the UK people drive on the left lane.





**Thank You**