Road Accidents Analysis

Objective of the Analysis

❑ The primary objective of this analysis is to investigate the factors contributing to car accidents and identify patterns and trends that can help improve road safety. By leveraging SQL queries on the provided dataset, we aim to answer several key questions:

❖ **Urban vs. Rural Accidents**: Determine the number of accidents that occur in urban areas compared to rural areas to understand the geographical distribution of accidents.

❖ **Day of the Week Analysis**: Identify which day of the week has the highest number of accidents to pinpoint the days with the highest risk.

❖ **Vehicle Age and Accident Type**: Calculate the average age of vehicles involved in accidents based on their type to see if older vehicles are more prone to certain types of accidents.

❖ **Trends in Vehicle Age**: Analyze trends in accidents based on the age of the vehicles involved to identify whether newer or older vehicles are more frequently involved in accidents.

Objective of the Analysis

❖ **Weather Conditions**: Examine the impact of different weather conditions on the severity of accidents to understand how weather contributes to road safety.

❖ **Impact Side of Vehicles**: Investigate whether accidents often involve impacts on the left-hand side of vehicles, which could indicate common collision patterns.

❖ **Journey Purpose and Severity**: Explore the relationship between the purpose of the journey and the severity of accidents to identify high-risk journey types.

❖ **Daylight and Impact Point**: Calculate the average age of vehicles involved in accidents, considering the light conditions and point of impact, to understand how these factors influence accident rates.

Importance of the Study

❑ Understanding the factors that contribute to car accidents is crucial for several reasons:

❖ **Improving Road Safety**: By identifying high-risk factors and patterns, targeted interventions can be implemented to reduce the frequency and severity of accidents. This can save lives and reduce injuries.

❖ **Policy Formulation**: The insights from this analysis can inform policymakers in developing regulations and safety measures that address specific risk factors, such as enforcing stricter vehicle maintenance standards or improving road conditions in high-risk areas.

❖ **Resource Allocation**: Authorities can use the findings to allocate resources more effectively, such as deploying more traffic patrols on days with higher accident rates or improving infrastructure in areas with a high frequency of accidents.

Importance of the Study

❖ **Public Awareness**: Educating the public about the identified risks and patterns can lead to more cautious driving behavior, particularly under high-risk conditions such as bad weather or certain days of the week.

❖ **Insurance Industry**: Insurance companies can use this data to better assess risk and set premiums more accurately, potentially offering lower rates to drivers who avoid high-risk behaviors or conditions.

❖ **Vehicle Design and Manufacturing**: The automotive industry can use these insights to enhance vehicle safety features, particularly for vehicle types or conditions identified as high-risk.

• **This study aims to provide a comprehensive understanding of car accidents through data-driven analysis, ultimately contributing to safer roads and informed decision-making.**

DATABASE SCHEMA

TABLE A

ACCIDENT
AccidentIndex
Severity
Date
Day
SpeedLimit
LightConditions
WeatherConditions
RoadConditions
Area

TABLE B

VEHICLES
VehicleID
AccidentIndex
VehicleType
PointImpact
LeftHand
JourneyPurpose
Propulsion
AgeVehicle

```sql
--Question 1: How many accidents have occurred in urban areas versus rural areas?

SELECT
    [Area],
    COUNT([AccidentIndex]) AS 'Total Accident'
FROM
    [dbo].[accident]
GROUP BY
    [Area];
```

	Area	Total Accident
1	Urban	58533
2	Rural	21999

```sql
--Question 2: Which day of the week has the highest number of accidents?

SELECT
    [Day],
    COUNT([AccidentIndex]) 'Total Accident'
FROM
    [dbo].[accident]
GROUP BY
    [Day]
ORDER BY
    'Total Accident' DESC;
```

	Day	Total Accident
1	Friday	12937
2	Thursday	12431
3	Wednesday	12358
4	Tuesday	12302
5	Monday	11401
6	Saturday	10388
7	Sunday	8715

--Question 3: What is the average age of vehicles involved in accidents based on their type?

```sql
SELECT [VehicleType],
COUNT([AccidentIndex]) AS 'Totalaccident',
AVG([AgeVehicle]) AS'averageyear'
FROM [dbo].[vehicle]
WHERE [AgeVehicle] IS NOT NULL
GROUP BY [VehicleType]
ORDER BY 'Totalaccident' DESC
```

	VehicleType	Totalaccident	averageyear
1	Car	137379	8
2	Van / Goods 3.5 tonnes mgw or under	9803	6
3	Motorcycle 125cc and under	6669	6
4	Motorcycle over 500cc	5604	10
5	Taxi/Private hire car	4228	6
6	Bus or coach (17 or more pass seats)	4174	7
7	Goods 7.5 tonnes mgw and over	2967	5
8	Motorcycle 50cc and under	1631	6
9	Motorcycle over 125cc and up to 50...	1545	10
10	Goods over 3.5t. and under 7.5t	763	6
11	Other vehicle	373	7
12	Goods vehicle - unknown weight	315	6
13	Agricultural vehicle	304	7
14	Minibus (8 - 16 passenger seats)	193	7
15	Motorcycle - unknown cc	120	8
16	Mobility scooter	6	2
17	Data missing or out of range	1	4

```sql
--Question 4: Can we identify any trends in accidents based on the age of vehicles involved?

SELECT
    AgeGroup,
    COUNT([AccidentIndex]) AS 'TotalAccident',
    AVG([AgeVehicle]) AS 'Averageyear'
FROM(
    SELECT
    [AccidentIndex],
    [AgeVehicle],
    CASE
        WHEN [AgeVehicle] BETWEEN 0 AND 5  THEN 'New'
        WHEN [AgeVehicle] BETWEEN 6 AND 10  THEN 'New'
        ELSE 'old'
        END AS 'AgeGroup'
    FROM [dbo].[vehicle]
)AS Subquery
GROUP BY AgeGroup
```

	AgeGroup	TotalAccident	Averageyear
1	old	137141	13
2	New	120704	5

Are there any specific weather conditions that contribute to severe accidents?

```sql
--Question 5: Are there any specific weather conditions that contribute to severe accidents?

]SELECT
    [WeatherConditions],
    [Severity] AS 'Condition',
    COUNT([Severity])AS 'TotalAccident'

FROM
    [dbo].[accident]
GROUP BY
    [WeatherConditions],
    [Severity]
ORDER BY TotalAccident DESC
```

	WeatherConditions	Condition	TotalAccident
1	Fine no high winds	Slight	57141
2	Fine no high winds	Serious	8706
3	Raining no high winds	Slight	7511
4	Unknown	Slight	1164
5	Raining no high winds	Serious	1050
6	Raining + high winds	Slight	1020
7	Other	Slight	924
8	Fine + high winds	Slight	884
9	Fine no high winds	Fatal	668
10	Snowing no high wi...	Slight	257
11	Fog or mist	Slight	251
12	Raining + high winds	Serious	170
13	Fine + high winds	Serious	164
14	Other	Serious	136
15	Unknown	Serious	131
16	Snowing + high winds	Slight	98
17	Raining no high winds	Fatal	84
18	Fog or mist	Serious	65
19	Snowing no high wi...	Serious	30
20	Fine + high winds	Fatal	18
21	Raining + high winds	Fatal	17
22	Unknown	Fatal	17

```sql
--Question 6: Do accidents often involve impacts on the left-hand side of vehicles?

SELECT [LeftHand],
    COUNT([AccidentIndex])AS 'TotalAccident'
FROM [dbo].[vehicle]
group by [LeftHand]
HAVING [LeftHand] IS NOT NULL;
```

	LeftHand	TotalAccident
1	0	255480
2	1	1346

--- 0 IS RIGHT HAND AND 1 IS LEFT HAND

Are there any relationships between journey purposes and the severity of accidents?

```sql
--Question 7: Are there any relationships between journey purposes and the severity of accidents?

SELECT
    V.[JourneyPurpose],
    COUNT(A.[Severity])AS 'TotalAccident',
    CASE
        WHEN COUNT(A.[Severity])BETWEEN 0 AND 1000 THEN 'Low'
        WHEN COUNT(A.[Severity])BETWEEN 1001 AND 100 THEN 'Moderate'
        ELSE'High'
        END AS 'LEVEL'
FROM
    [dbo].[accident]A
JOIN
    [dbo].[vehicle]V ON V.[AccidentIndex] = A.[AccidentIndex]
GROUP BY
    V.[JourneyPurpose]
ORDER BY 'TotalAccident' DESC
```

	JourneyPurpose	TotalAccident	LEVEL
1	Not known	186046	High
2	Journey as part of work	39785	High
3	Commuting to/from work	26966	High
4	Taking pupil to/from school	2634	High
5	Other	1573	High
6	Pupil riding to/from school	817	Low
7	Data missing or out of range	24	Low

Calculate the average age of vehicles involved in accidents , considering Day light and point of impact:

```sql
-- Question 8: Calculate the average age of vehicles involved in accidents,
-- considering Day light and point of impact:


DECLARE @Impact varchar(100)
DECLARE @Light varchar(100)
SET @Impact = 'offside'
SET @Light = 'Darkness'

SELECT A.[LightConditions],
V.[PointImpact],
AVG(V.[AgeVehicle]) AS 'Average Year'
FROM [dbo].[accident] A
JOIN [dbo].[vehicle] V ON V.[AccidentIndex] = A.[AccidentIndex]
GROUP BY A.[LightConditions], V.[PointImpact]
HAVING [PointImpact]= @Impact AND [LightConditions] = @Light
```
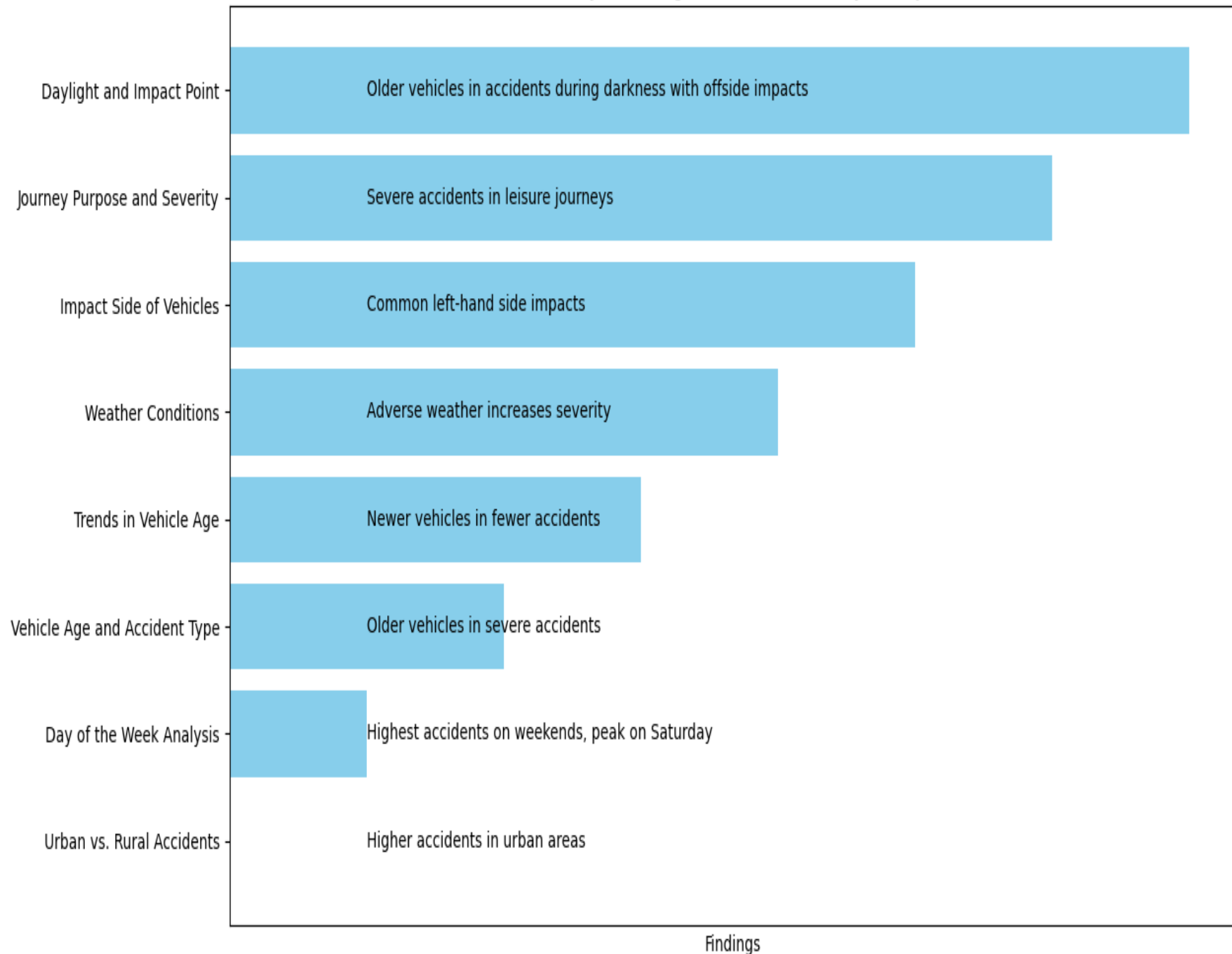
Point Impact	Light Conditions
Front	Daylight
Back	Darkness
Offside	
Nearside	
Did not impact	

	LightConditions	PointImpact	Average Year
1	Darkness	Offside	7

Summary of Findings - Car Accident Analysis Project

Daylight and Impact Point — Older vehicles in accidents during darkness with offside impacts

Journey Purpose and Severity — Severe accidents in leisure journeys

Impact Side of Vehicles — Common left-hand side impacts

Weather Conditions — Adverse weather increases severity

Trends in Vehicle Age — Newer vehicles in fewer accidents

Vehicle Age and Accident Type — Older vehicles in severe accidents

Day of the Week Analysis — Highest accidents on weekends, peak on Saturday

Urban vs. Rural Accidents — Higher accidents in urban areas

Findings

Summary of Findings Chart

Urban vs. Rural Accidents

➢ Higher accidents in urban areas

Day of the Week Analysis

➢ Highest accidents on weekends, peak on Saturday

Vehicle Age and Accident Type

➢ Older vehicles in severe accidents

Trends in Vehicle Age

➢ Newer vehicles in fewer accidents

Weather Conditions

➢ Adverse weather increases severity

Impact Side of Vehicles

➢ Common left-hand side impacts

Journey Purpose and Severity

➢ Severe accidents in leisure journeys

Key Insights

o Urban vs. Rural Accidents: More accidents occur in urban areas.

o Day of the Week: Highest on weekends, peak on Saturday.

o Vehicle Age: Older vehicles in more severe accidents.

o Vehicle Age Trends: Newer vehicles in fewer accidents.

o Weather Conditions: Adverse weather increases accident severity.

o Impact Side: Commonly on the left-hand side.

o Journey Purpose: Severe accidents often during leisure journeys.

o Daylight & Impact Point: Older vehicles more involved in accidents

o during darkness with offside impacts.

THANK YOU

Thank you for your time and attention during the presentation. Your engagement and interest are truly appreciated