Visualisation_Netherlands_Traffic_Accidents_2016

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Visualisation of Netherlands Traffic (Accidents) Data 2016

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Executive Summary

Introduction

This research delves into accidents and their impacts on road users in the Netherlands in 2016. Given its importance as a means to study and analyze the types, causes, impacts, and other factors of accidents across the country, this study will help policymakers develop action plans that could protect lives and properties and improve travel and other significant accessibility variables across the country.

Objectives and Scope of the Study

The fundamental aims of this study are:
to examine the spread and types of accidents across the various provinces in the Netherlands;
to understand the temporal distribution of these incidents across the country;
to identify the various offenders involved in accidents across the country;
to understand the characteristics of victims and casualties across the country; and
to examine the number of cars, lorries, vans, pedestrians, etc., involved in accidents. We also aim to derive meaningful insights based on the available data.

Organization of the Study

The study is divided into six chapters, each examining a different scenario related to the accidents observed in the Netherlands in 2016. Chapter one explores the locations where these accidents occurred across the country. Chapter two examines the time at which the accidents took place. Chapter three investigates the offenders involved in accidents across the country. Chapter four delves into the victims across the country. Chapter five analyzes the types of accidents observed across the country, and chapter six presents the conclusion and recommendations. The appendix includes a dashboard designed to provide a holistic overview of traffic accidents across the country.

Methodology

We utilized the SAS Visual Analytics platform to visualize our data and illustrate various impacts, relationships, and other key findings. The data gathered for this study is already on the SAS Visual Analytics platform. We created geo maps, bar charts, time-series charts, and other statistical illustrations that best visualize our findings. Moreover, to ensure optimal outcomes, we used the dataset to generate new variables, such as geographical, categorical, and hierarchical variables, to effectively present the desired information. Bar charts, butterfly charts, geo maps, and time series plots were all employed to visualize our data.

Significance and Impact of our Study

The core aim of this research has been to provide crucial information to various stakeholders across the country regarding the impact of these accidents. Based on the findings, this study intends to help policymakers design policies that could not only save lives but also protect properties and time. At a time when the world is experiencing a drop in revenue generated by states, coupled with competing financial obligations in various sectors, preventing and mitigating the loss of lives and properties could improve the road safety of various road users and also help the government save money and time. These saved resources can then be used to further develop other sectors that crucially need these funds.

Limitation of the Study

Due to the high volume of unknown data, a more comprehensive analysis was not possible, as information on these variables was lacking. Furthermore, interpreting some of the variables proved extremely challenging due to the limited information available on SAS and online. A more comprehensive dataset in the future could further simplify the analysis.

Chapter 1- Distribution of Accidents Across the Country

Summary

In this chapter, we have examined the spread of accidents across the country, including the total number of accidents, casualties, and the lethal ratio (which indicates the number of fatalities per the number of accidents observed). We have also identified the roads where these accidents are prevalent and the types of accidents occurring across the various provinces in the Netherlands.

Figure 1 shows a geo map indicating the spread of accidents and the lethal ratio across the country. Provinces with a higher number of accidents are represented by larger circles on the map, and the shade of the color corresponds to the lethal ratio (darker circles indicate a higher number of fatalities).

Figure 2 is a bar chart showing the number of accidents on various types of roads across the country and the types of accidents occurring on these roads. By creating an interactive relationship between the two graphs, the number of accidents, types of accidents, and the roads where these accidents occur can be determined.

The region with the highest number of accidents is North Holland, and straight roads are the road type with the highest number of accidents across the regions. These findings are further illustrated by Figures 3 and 4, respectively. In Appendix 2, a bar chart shows that more accidents take place in urban areas than outside urban areas.

Figure 1: Geo Map: Accidents Across Provinces

Figure 2: Bar Charts: Types of Accidents On Road Type

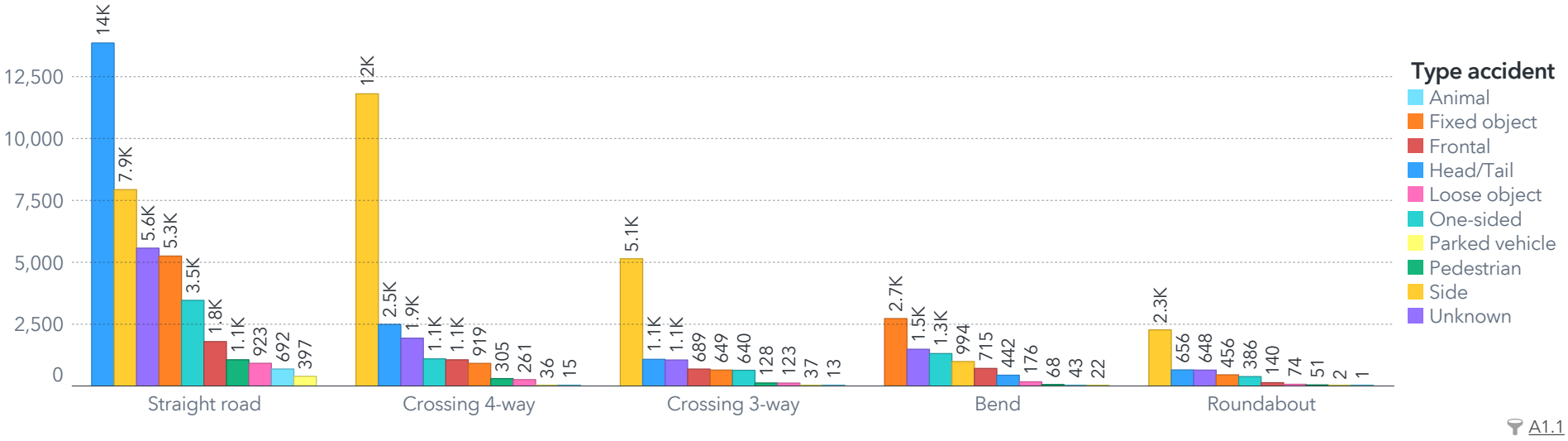


Figure 3: Geo Map: Distribution Of Accidents Across Counties

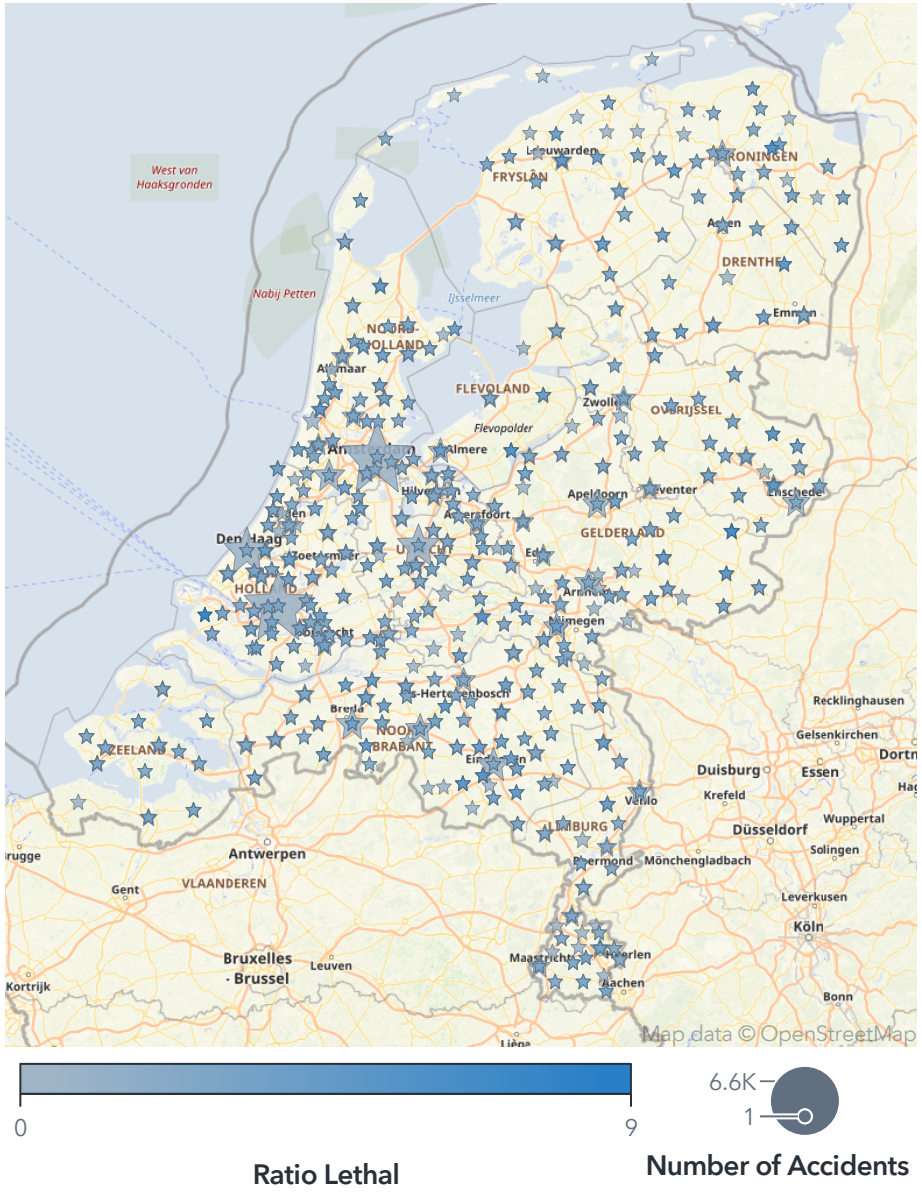
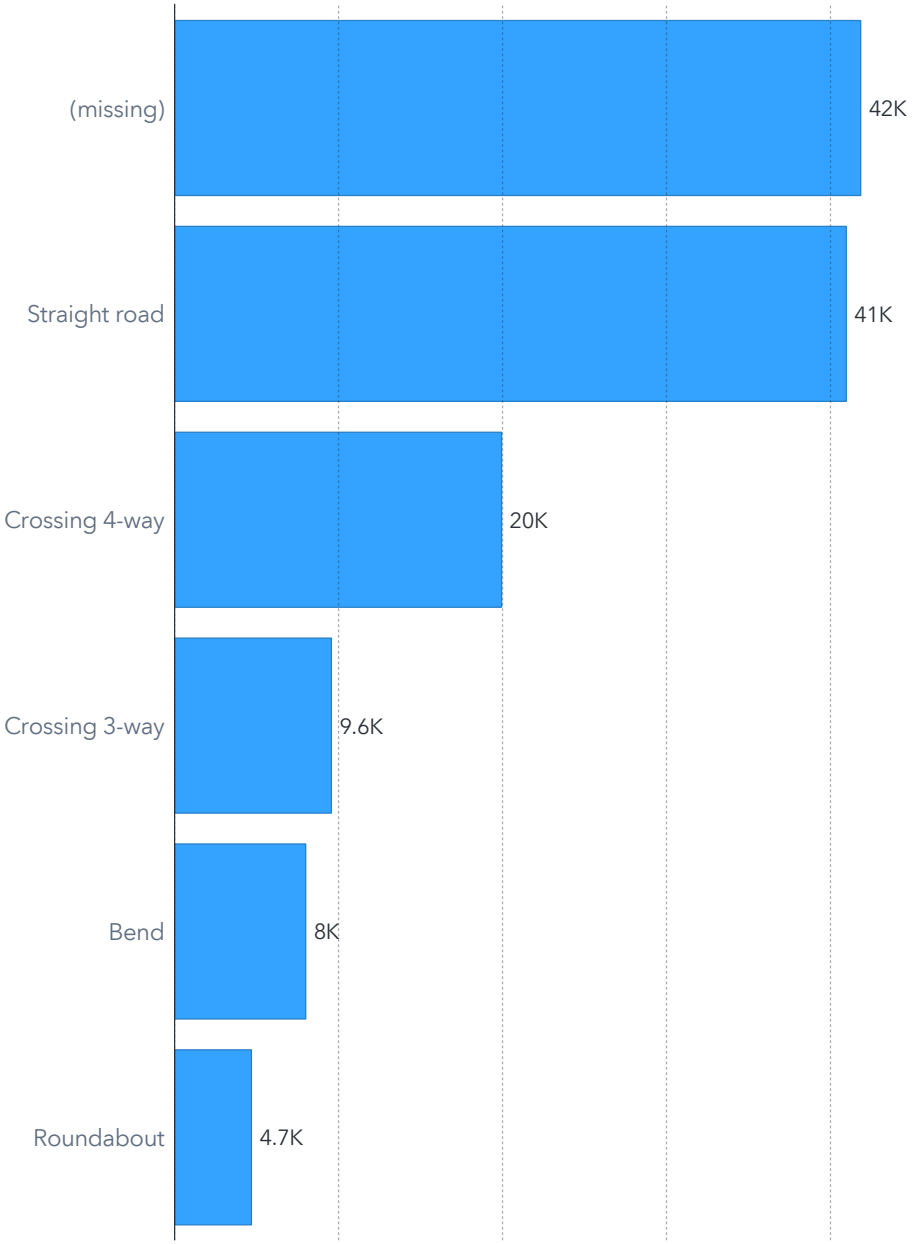


Figure 4: Bar Chart: Road Type and Number of Accidents



Chapter 2- Time Of the Accidents.

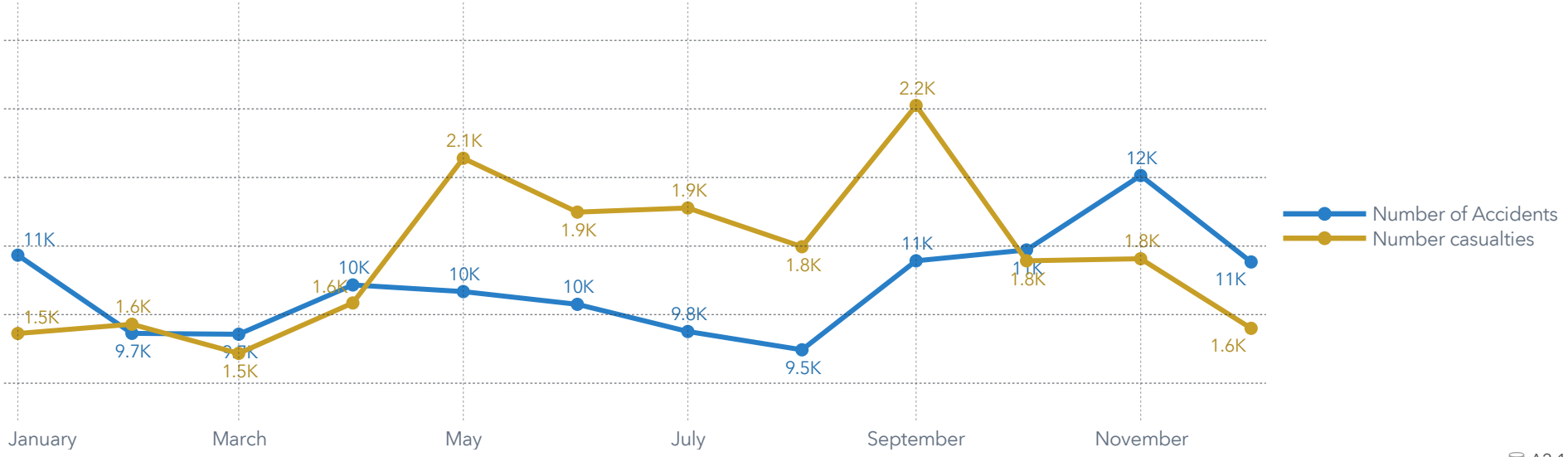
Summary

In this chapter, we have examined the times when these accidents occur across the country. Figure 5, a time series graph showing the distribution of accidents across the various months, has been linked with Figure 6, a bar chart indicating the frequency of accidents based on weather conditions. Our graphs show that the number of accidents is highest in November, while the number of casualties is highest in September. From Figure 6, we can see that the deadliest accidents happen in strong windy conditions.

Furthermore, Figure 7, a line plot showing the hourly times when accidents occur, indicates that the highest number of accidents take place during the evening peak times, around 5 pm. Figure 8 is a time series plot of the weekly number of accidents. Tuesdays, Thursdays, and Fridays have the highest number of accidents. However, Sunday, which has the lowest number of accidents, has the highest lethal ratio, meaning more people lose their lives in accidents happening on this day.

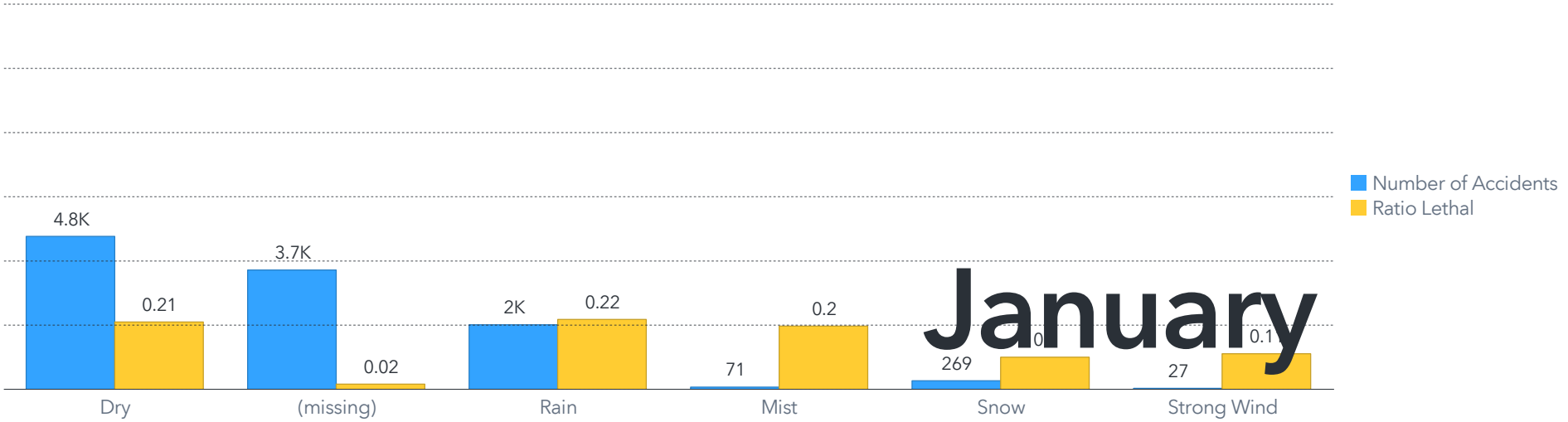
In Appendix 2, the butterfly bar chart illustrates that more accidents take place during school holiday seasons than in other general holidays.

Figure 5: Time Series Graph: Monthly Total Accidents and Casualties



A2.1

Figure 6: Bar Chart: Number of Accidents and Ratio Lethal Based on Weather Conditions



A2.2

Figure 7: Line Plot: Hourly Number of Accidents

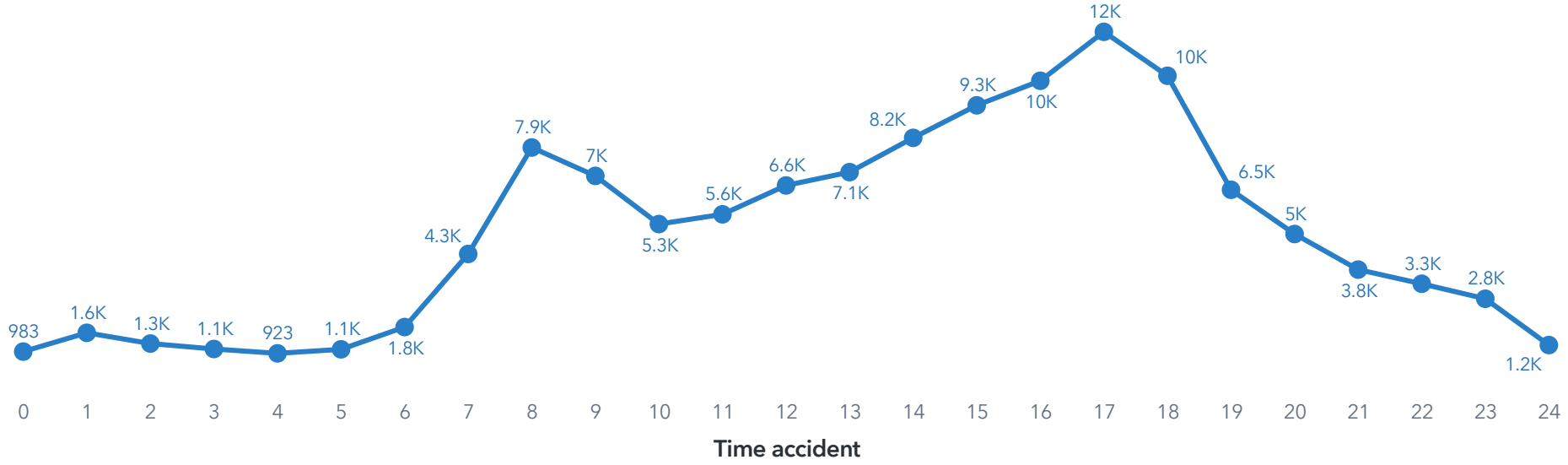
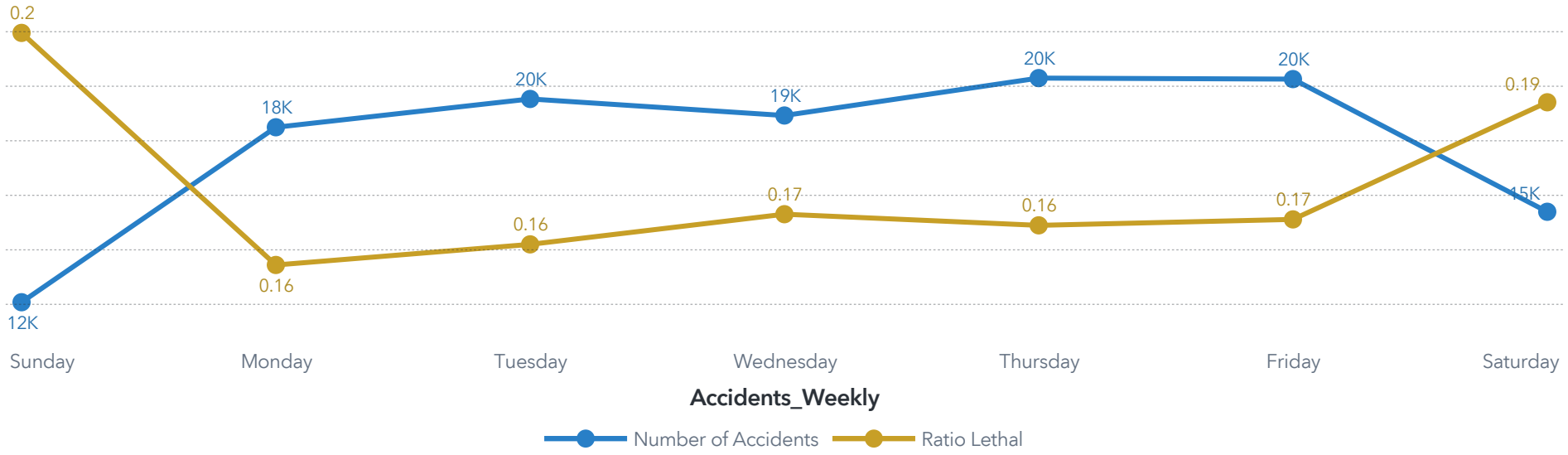


Figure 8: Time Series Graph: Weekly Number of Accidents



Chapter 3- Violators of Traffic Rules-

Summary

In this chapter, we have examined the various offenders across the country. We have plotted geo maps illustrating the distribution of different offender types across the country. By linking these geo maps with a list table, we have determined the contribution of each offending group to the number of accidents across the country. From Table 1, a list table, we can see that the largest group of offenders are uninsured road users. Their contribution to the number of accidents across the various regions in the country is quite significant.

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Figure 9: Geo Map: Hit and Run Incidents Across the Provinces

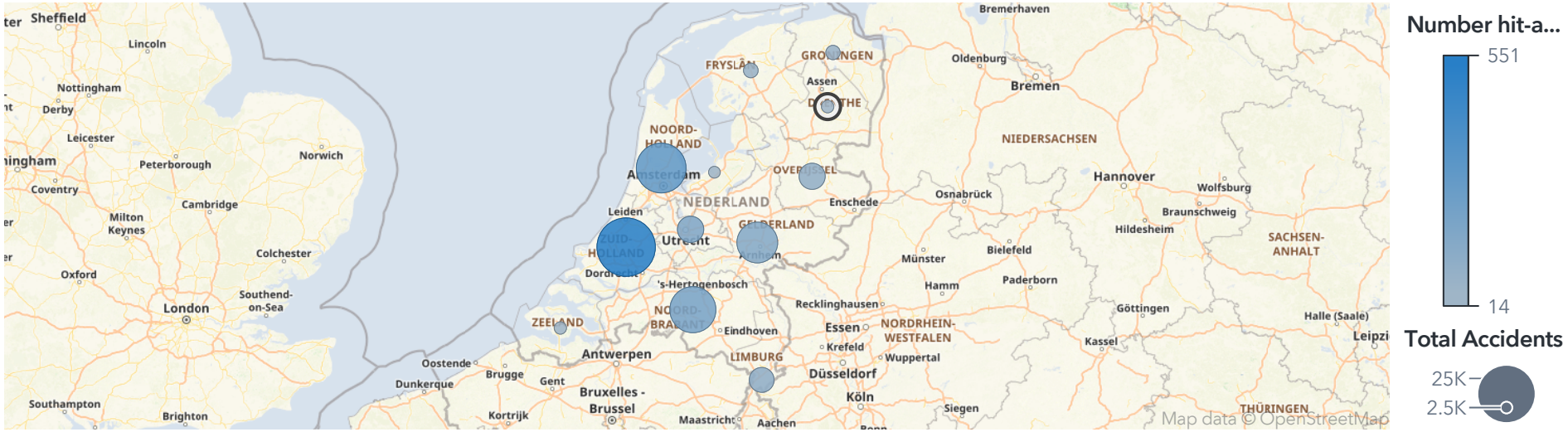


Table 1

Province name	Total Accidents ▲	Number hit-and-run	Number intoxicated (liquor/drugs)	Number no APK (vehicle testing)	Number uninsured
Flevoland	2,479	14	41	16	1029
Zeeland	2,765	16	51	21	865
Drenthe	2,847	16	45	22	1074
Groningen	3,729	44	87	21	1561
Friesland	3,884	42	68	27	1536
Limburg	8,802	78	122	59	3302
Overijssel	9,446	70	123	54	4242
Utrecht	9,539	155	112	38	3391
Gelderland	16,516	133	218	88	6242
Noord-Brabant	19,086	188	353	101	6568

Chapter 4- Victims Of the Accidents-

Summary

In this chapter, we have categorized the various ages into four groups. The rationale behind this categorization is the general assumption that new or the youngest drivers are less likely to be as cautious on the roads compared to more mature and older drivers. This grouping could help us understand the relationship between age and the number of accidents.

From Figure 14, we can see that elderly people (51 and above) are involved in more lethal accidents than any other group. Table 2 shows a cross-table illustrating the number of accidents, type of accidents, road type where the accident occurred, etc., for each age group.

Table 3 also shows us the number of trucks, cars, bikes, motorcycles, passenger cars, etc., involved in accidents across the country. This table is complemented by geo map illustrations for the various parties/victims involved in these accidents.

Figure 13: Geo Map: Number of Accidents and Ratio Lethal Based on Province

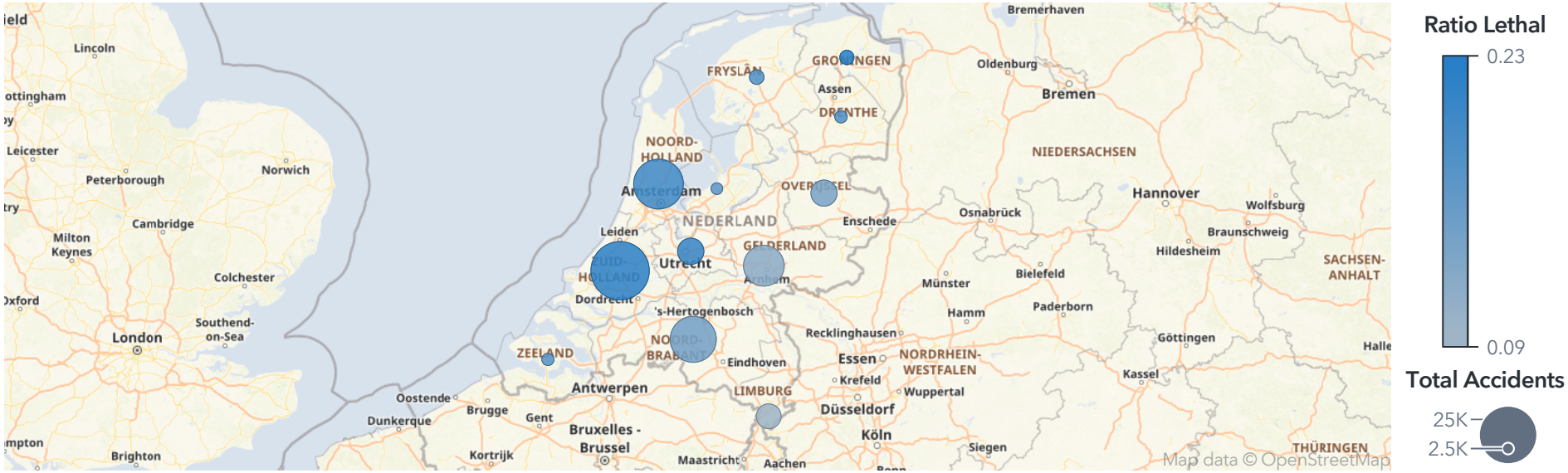


Table 2

Road situation ▼	Straight road	Roundabout	Crossing 4-way	Crossing 3-way	Bend	(missing)
Age of Victims ▼	**Total Accidents**	**Total Accidents**	**Total Accidents**	**Total Accidents**	**Total Accidents**	**Total Accidents**
51 to 90	395	11	166	69	68	19
31 to 50	278	6	141	64	50	7
18 to 30	233	7	111	34	66	15
0 to17	48	8	32	10	9	6
(missing)	40,010	4,655	19,492	9,386	7,802	41,794

Figure 15: Geo Map: Accidents Involving Trucks

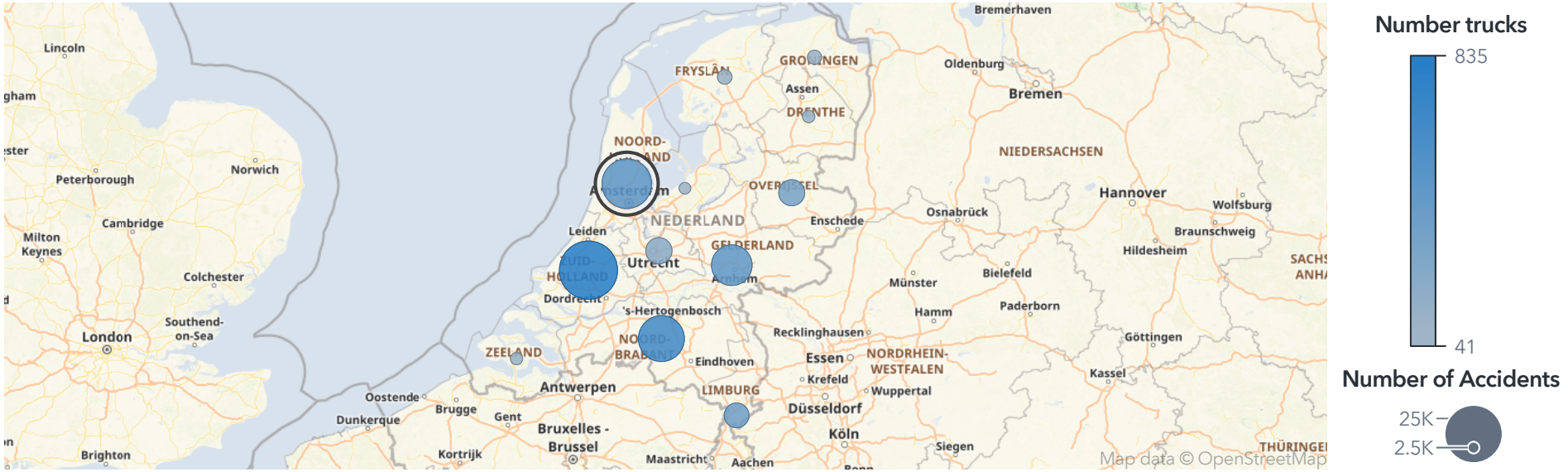


Table 3

Province name ▲	Number parties involved	Number passenger cars	Number trucks	Number vans
Drenthe	4242	2594	59	354
Flevoland	4017	2582	41	330
Friesland	5937	3542	77	517
Gelderland	22786	14632	449	1851
Groningen	6065	3403	65	461
Limburg	12703	8533	357	872
Noord-Brabant	26660	16944	651	2006
Noord-Holland	32502	18650	474	2353
Overijssel	14831	9581	299	1189
Utrecht	13041	7826	181	898

Chapter 5- Types of Accidents-

Summary

By creating a cross-table (utilizing hierarchical data), Table 4, and also a geo map linked with a supporting chart to understand the various types of accidents across the country and their impacts on lives and properties, we have determined the number of accidents for different types of roads across the country and the types of accidents on these roads. We have also linked our pie chart, Figure 21, which shows the type of accidents, with our dual bar charts indicating the number of accidents in different weather conditions.

The type of accident with the highest frequency across the country is side impacts. Furthermore, this type of accident is most prevalent on 4-way crossing roads, followed by straight roads. Head/tail accidents are the second most frequent type of accident and mostly occur on straight roads. One-sided accidents had the deadliest impact, with a lethal ratio of 0.75.

Figure 21: Pie Chart: type of Accidents

Number of Accidents

Figure 23: Geo Map: Number Of Accidents Based on Provinces

Conclusion and Recommendations

Our study has explored the distribution of accidents across the country, the times (hourly, weekly, monthly, and during holiday seasons) when these accidents occur, the types of accidents, the victims involved, and the offenders. Some of the crucial findings in our study include that North Holland experiences the most accidents, the majority of accidents take place on straight roads, the most frequent type of accident is side impacts, elderly individuals have the highest tendency of being involved in deadly accidents, and uninsured road users are the most frequent offenders across all provinces. It is imperative for the authorities to design and implement policies to reduce the number of accidents across the country, as this could not only save lives but also protect properties.

It is also imperative for road authorities to adequately train traffic officers on recording accidents and ensuring all necessary information is duly recorded. This could help researchers paint a clearer picture of the situations on the roads, and by analyzing this information, comprehensive policies can be tailored to reduce the occurrences of these accidents. With this in mind, we have suggested the following recommendations:

The authority must first undertake a study of the roads where most of these accidents occur and try to determine if there are structural deficiencies, a lack of clear road signs, etc. This could provide the authorities with firsthand experience of the situation on various roads and help them understand the challenges faced by road users.

The further installation of traffic cameras across the country could have a significant impact on the number of accidents. The presence of these cameras could serve as a deterrent for all drivers, ensuring they follow the road rules designed by the authorities, as they would be aware of being monitored.

The authorities must ensure that they embark on outreach programs targeted at various road users. These programs should inform them of the dangers of driving in strong windy conditions and emphasize the importance of following road rules, as this could save lives and properties for all parties involved.

Authorities must also design tougher punishments for offenders, ensuring that the penalties for driving under the influence of alcohol, driving uninsured, driving above the speed limits, etc., are significant enough to discourage potential offenders from engaging in such activities.

The authorities must also design a tool that allows traffic officers to conduct random stops and examine road users (drivers, motorcyclists, etc.). For this to succeed, it is imperative that this tool is designed in such a manner that no single group of people is disproportionately affected, as this could have negative social repercussions. With this tool, potential offenders will be deterred, as there will be a perceived risk of being stopped by traffic officers at any time.

Finally, authorities must study and analyze the various road map applications (Google Maps, Waze, etc.) being used by road users to determine whether these apps are providing accurate and updated information. If any deficiencies are discovered, they should collaborate with the app developers to fix the problems.

By implementing all or most of these recommendations, the long-term outcome will likely be positive. Indeed, implementing some of these policies could be costly in the short term. However, by addressing the challenges faced by road users and enforcing deterrent measures, this could have a positive outcome as lives and properties will be saved, which could translate to more funds being available for other sectors in the economy in the long term.

Accident Infographic for Netherlands

Total Accident and Result

Total Accidents

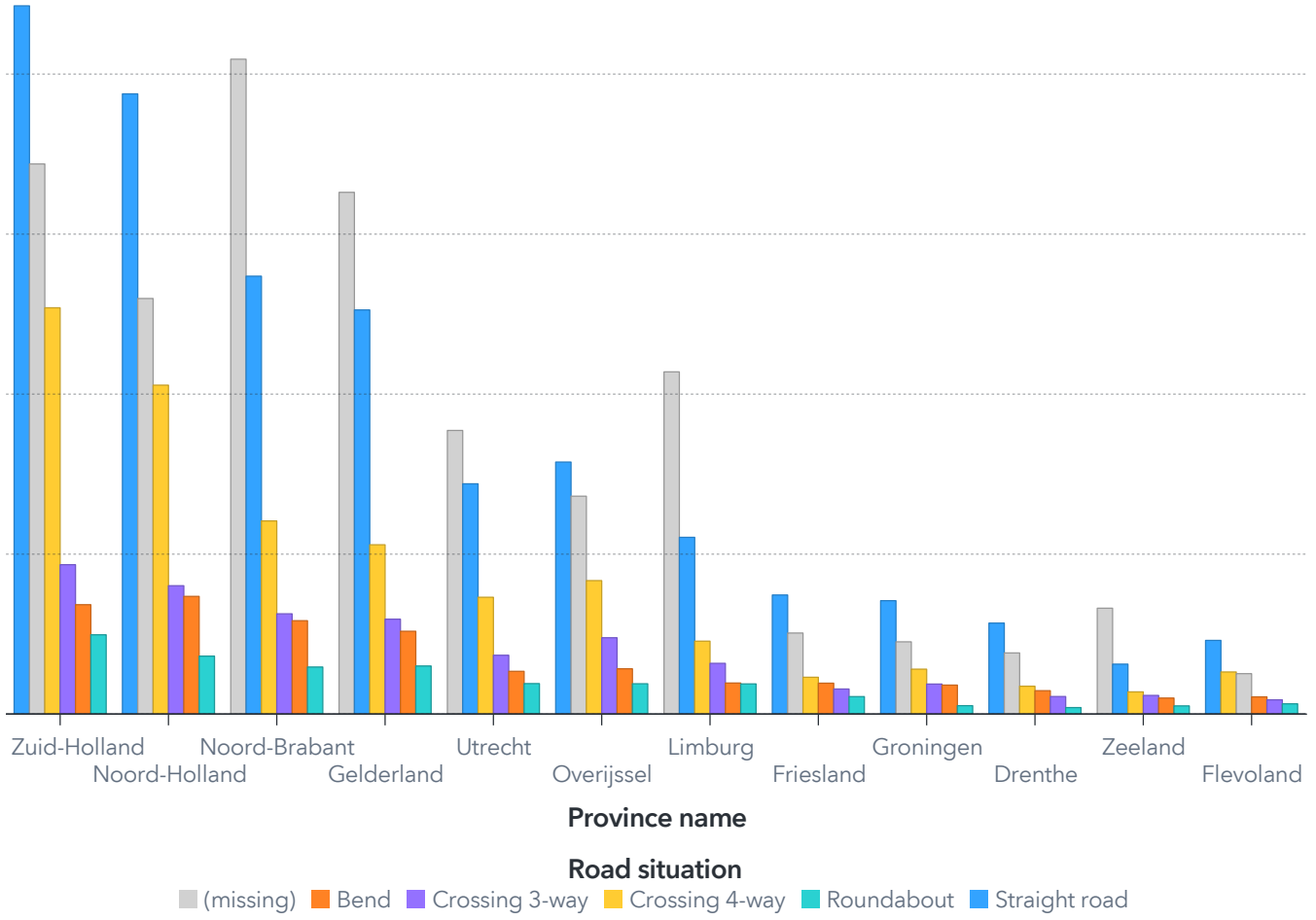
Accident ending

A3.1

Urban/built-up area (Total Accidents)

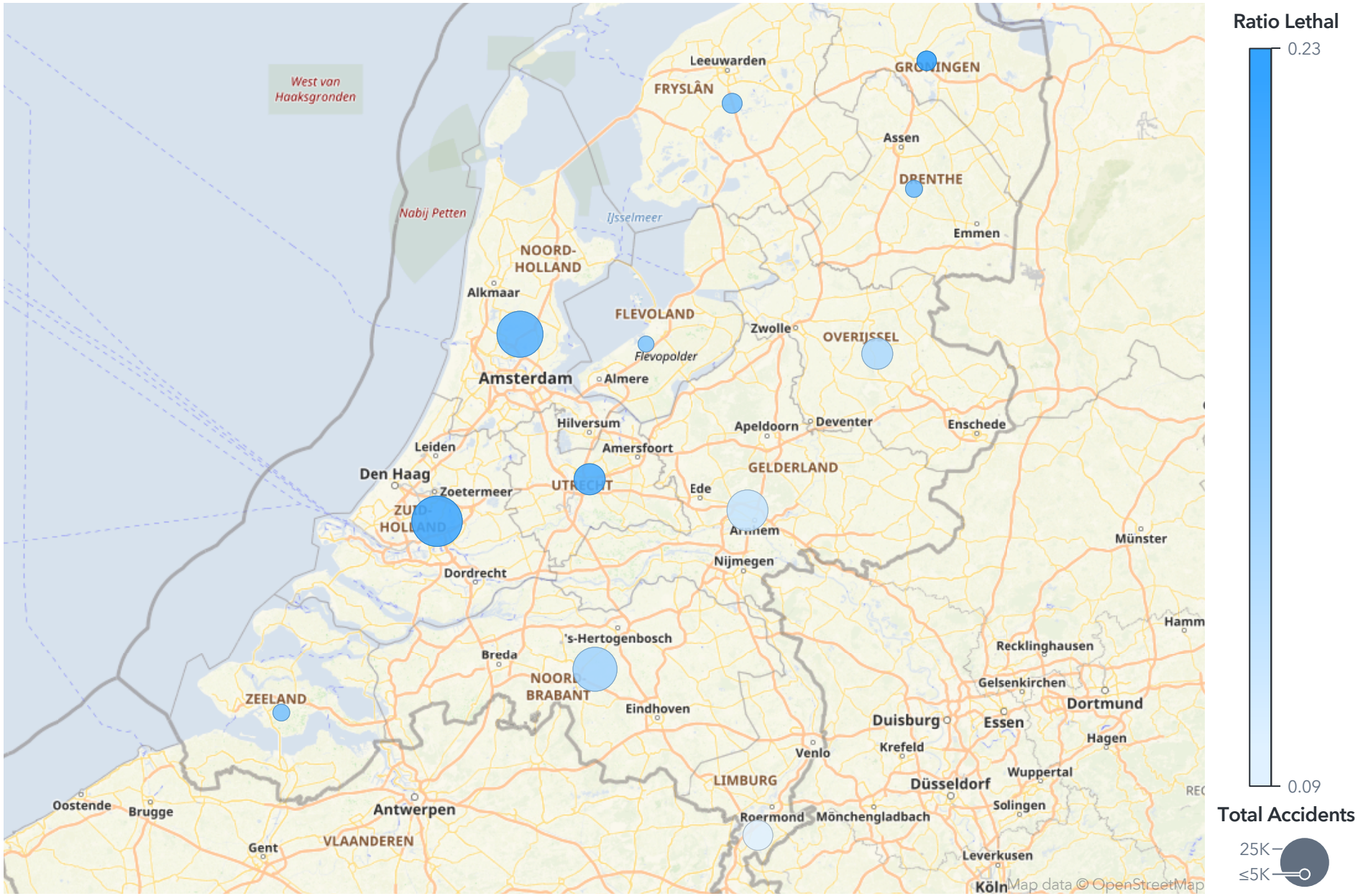
(missing)	40,118
BI	54,245
BU	30,629

Number of Accidents of Province name grouped by Road situation



Total Accidents of Urban/built-up area grouped by Accidents_Weekly

Graph 1: Geo Map



Appendix

A1.1 Figure 2: Bar Charts: Types of Accidents On Road Type

Filters: NOT(Road situation = '(missing)')

A2.1 Figure 5: Time Series Graph: Monthly Total Accidents and Casualties

Filters: 2016/01/01 ≤ Date accident ≤ 2016/12/31

A2.2 Figure 6: Bar Chart: Number of Accidents and Ratio Lethal Based on Weather Conditions

Filters: 2016/01/01 ≤ Date accident ≤ 2016/12/31

A3.1 Total Accident and Result

Alternative text: Total Accident and Result