Exploring Determinants of Traffic Accident Severity Using Empirical Data

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Abstract: Traffic accidents have become a major global public safety concern, as they affect individuals and their families and hinder the development of a country's economy. This study uses empirical data from Nashville to investigate the influence of individual characteristics and external environmental factors on the severity of traffic accidents. A multiple linear regression model and a nonlinear model are employed to examine the relationships between accident severity and various factors, including periods, weather conditions, illumination, collision types, and hit-and-run behaviour. The results indicate that accidents occurring during early morning, evening, and night are more severe; weekend accidents are more serious than weekday accidents. Interestingly, severe weather such as snow and blowing snow reduces accident severity, while foggy and cloudy conditions increase it. Poor visibility conditions, such as darkness, dawn, and dusk, significantly elevate accident severity. Moreover, head-on collisions and hit-and-run behaviour are strongly associated with more severe outcomes. These findings contribute to improving traffic safety policies and provide practical implications for accident prevention. Future studies may consider incorporating more complex models and a broader range of variables to enhance predictive performance and policy relevance.

1 INTRODUCTION

Traffic accidents and safety have long been issues of great concern to people worldwide. According to data released by the World Health Organization, approximately 1.35 million people die in traffic accidents each year, and tens of millions more suffer varying degrees of injury (World Health Organization, 2021). In many countries, road traffic accidents have become the leading cause of death for young people aged 15 to 29 (World Health Organization, 2021). The occurrence of traffic accidents not only has a significant impact on individuals and families, but the property losses, damage to public facilities, and public panic they cause will, to a certain extent, hinder urbanization and national economic development. Therefore, how to effectively identify and control the key influencing factors that lead to traffic accidents, especially serious accidents, has become one of the core issues in current global traffic governance.

In the relevant research on traffic accidents, most scholars focus on accident prediction, detection, and the impact of individual variables on accidents. However, the systematic analysis of "the severity of traffic accidents" remains relatively limited. Factors affecting the severity of accidents, as potential causes of traffic accidents, hold significant reference value for developing more refined and tiered intervention policies.

Looking back at the relevant literature, scholars usually explore the causes of traffic accidents from three levels: the individual level, external environmental factors, and macro-social factors. At the individual level, variables such as gender, age, and driving experience are considered to have a significant impact on driving risk. Men are more likely to be influenced by their emotions and take irrational driving actions (Khan et al., 2020). Young drivers are more likely to view driving as a risky behaviour due to their immature mentality, which can lead to serious traffic accidents (Khan et al., 2020). But at the same time, experienced drivers can also cause accidents due to overconfidence and negligence (Gebre Meles et al., 2022). It can be seen that individual differences will affect drivers' psychology and prompt them to adopt different driving behaviours. However, existing research does not capture more dynamic and subjective factors such as the driver's psychological state and behavioural

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responses, and is unable to explain the specific role of individual differences in more detail. In addition, it is limited by data availability and privacy protection, resulting in a narrow coverage of variables. At the level of external environmental factors, weather conditions (such as rain, snow, and fog), road structure, and period (such as night or early morning) all have a certain correlation with the severity of the accident. For example, rainy days make traffic accidents more likely but less severe (Edwards, 1998). In the early hours of the morning, drivers are prone to drowsiness and a lack of concentration, and accidents may be more serious (Iqbal et al., 2020). It can be seen that external environmental factors not only affect the probability of accidents but also have complex effects on the outcomes of accidents. However, current research focuses more on the linear impact of a single variable and rarely reveals the interactive relationship between environmental variables. In addition, at a more macro level, stock market fluctuations, epidemics, and autonomous driving technology will all affect drivers' emotions or social behavior, thereby indirectly affecting traffic safety. For example, volatility in stock market returns is statistically significantly correlated with traffic accidents, which may be related to the fact that investor mood swings (such as excitement or depression) affect driving behavior (Giulietti et al., 2020). On the other hand, as a technological hotspot in recent years, autonomous driving technology has shown great potential in improving road safety, but it is also accompanied by problems such as perception limitations and ethical conflicts. Relevant research mostly stays at the correlation level. It rarely explores the mode of influence, making it difficult to accurately explain how macro factors affect the outcome of accidents by influencing driver behavior. In summary, although the above studies have their emphases, they mostly focus on the impact of a single influencing variable on accidents, but fail to achieve integrated modeling, ignore the interaction of multiple variables, and have certain limitations.

Based on the above background, this study will systematically analyze the factors that affect the severity of traffic accidents, comprehensively consider multiple external environmental conditions that affect driving behavior, and use actual traffic accident data in Nashville for empirical modelling analysis. This paper conducts data cleaning and variable construction to generate a continuous variable "Severity Score" to measure the severity of the accident, and removes missing or outliers. This paper will use the multivariate linear regression model (OLS) to identify the direction, significance, and relative influence of each variable, and at the same time, attempt to curve fit the possible nonlinear effects to enhance the explanatory power of the model.

This study hopes to clarify the specific impact of external environmental variables on the severity of traffic accidents, explore the order of influence of different high-risk conditions on accident severity, and provide data support for traffic safety policy making.

2 LITERATURE REVIEW

Traffic accidents can cause serious consequences around the world, including property damage and casualties. According to the World Health Organization, approximately 1.35 million people lose their lives in traffic accidents each year. (World Health Organization, 2021). The occurrence of traffic accidents is caused by the combined effects of individual characteristics, driving behavior, external environmental conditions, and macro factors. In recent years, scholars have been conducting more and more research on traffic accidents. Studies have discovered that human factors are the main cause of accidents, followed by vehicle failures and environmental factors (Iqbal et al., 2020).

2.1 The Impact of Individual Characteristics on Traffic Accidents

Individual characteristics, as an important factor affecting the severity of traffic accidents, reflect the differences in drivers' perception, judgment level, and reaction speed when facing emergencies. Variables such as the driver's gender, age, and driving experience determine their driving behavior patterns and sensitivity to risks to a certain extent, thus affecting the process and outcome of accidents.

Gender differences can affect how male and female drivers respond to traffic accidents. A study on driver-injury severities analyzes Florida crash data and discovers that men and women have different crash severity levels when they are under-adjusted for speed, and that the influencing factors are time-unstable (Islam & Mannering, 2021). Another study investigates that male drivers are more susceptible to negative emotions and adopt risky driving behaviors, while female drivers are better able to regulate their emotions and drive rationally (Khan et al., 2020). Gender differences have a certain impact on drivers'

psychology and cognition, which will affect their judgment when encountering traffic accidents and lead to differences in the severity of traffic accidents.

Studies have shown that the age of the driver also has a significant impact on the severity of traffic accidents (Haleem & Gan, 2013). The Mixed Logit Model analysis shows that different age groups show differences in accident types and impact directions (Haleem & Gan, 2013). Middle-aged drivers are most likely to be seriously injured from impacts from the back, left, and right, while young drivers have a higher risk of causing serious traffic accidents (Haleem & Gan, 2013). Young drivers are more likely to view dangerous driving as a challenge rather than a risk, and this risk-taking tendency leads to an increase in the severity of traffic accidents (Khan et al., 2020).

Conventional wisdom holds that the more experience a driver has, the lower their accident risk, but some studies have found that experience does not protect drivers. A study based on ordered logistic regression of traffic accidents detects that experienced drivers are more likely to cause serious traffic accidents due to their lack of attention to rules and overconfidence (Gebre Meles et al., 2022). Variables such as private vehicles and drivers being vehicle owners can reduce accident severity (Gebre Meles et al., 2022).

2.2 The Impact of External Environmental Conditions on Traffic Accidents

Among the many factors that affect the severity of traffic accidents, external environmental conditions are a crucial variable, including weather conditions, road lighting conditions, time, and more. These factors will directly affect the driver's field of vision and driving behavior. Although there are certain correlations between these environmental variables, for example, driving at night is often accompanied by insufficient lighting, and bad weather may lead to reduced visibility, they also have independent effects on the severity of accidents through their respective mechanisms.

Different weather conditions also have different effects on the severity of traffic accidents. Taking the UK as an example, an empirical study based on police accident reports in England and Wales shows that the frequency of traffic accidents increases on rainy days, but the severity decreases (Edwards, 1998). There are geographical differences in the severity of traffic accidents in foggy weather, and the severity is reduced in some areas, which may be related to the "learning adaptation effect" of drivers to reduced visibility (Edwards, 1998). Strong winds have no significant impact on traffic accidents (Edwards, 1998). It can be seen that the weather will have different effects on drivers' psychology, thus affecting their driving.

A study in Fukuoka, Japan, discovers that road structure also affects the type and severity of traffic accidents (Dong et al., 2021). Car-car collision accidents often occur at intersections, while car-bicycle accidents are more concentrated at T-intersections, especially when the stop line is set improperly, such as moving back (Dong et al., 2021). Whether there are traffic lights at the intersection and whether there are vehicle direction restrictions, such as left/right limits, also affect the probability and severity of accidents (Dong et al., 2021).

An analysis of accidents on Pakistan's M-2 highway reveals that the deadliest accidents occurred at night, in the early morning, in dry weather, and on straight sections (Iqbal et al., 2020). Especially in the early morning hours, accidents are frequent and serious due to dozing problems (Iqbal et al., 2020). Accident severity also fluctuates by season and time of week, with more accidents in July and on Sundays (Iqbal et al., 2020).

2.3 Impact of Macro Factors on Traffic Accidents

In addition to individual differences and environmental conditions, some macro factors also affect traffic accidents. A study based on fatal traffic accident data in the United States observes that for every one standard deviation drop in stock market returns, there is an increase of about 0.6% in fatal car accidents after the stock market opens (Giulietti et al., 2020). Drivers' emotional reactions to stock market changes can affect their driving behavior, leading to high-risk driving (Giulietti et al., 2020). When the stock market rises sharply, investors tend to become excited, leading to distraction while driving; when the stock market plummets, anxiety and stress may trigger behavioral reactions such as impulsive driving and decreased attention, thereby increasing the probability of serious traffic accidents. Another study verifies that although the overall traffic volume (VMT) and total number of accidents decrease significantly after the "stay-at-home order" is issued, the single-vehicle accident rate and single-vehicle fatal accident rate increase by 2.29 times and 4.10 times, respectively. (Doucette et al., 2021)。

With the development of science and technology, autonomous driving technology has gradually

become popular in the automotive field. Research shows that autonomous driving technology is still not fully adaptable to situations such as bad weather, hacker attacks, or communication interruptions (Chougule et al., 2024). After an accident, due to unclear division of responsibilities, drivers often find it difficult to quickly take over the vehicle or respond correctly at critical moments, which may aggravate the severity of the accident (Chougule et al., 2024). The government should be clearer about the accident responsibility allocation mechanism, improve the regulatory framework, and perfect the ethical algorithm to effectively reduce the consequences of traffic accidents.

3 RESEARCH HYPOTHESIS

To further explore the factors that affect the severity of traffic accidents, this article utilizes Nashville Accident data for research and analysis based on past research results and logic, and makes the following assumptions:

Hypothesis 1 (Time). Traffic accidents at night and in the early morning are more serious than those during the day. Traffic accidents on weekends are more serious than those on weekdays.

Hypothesis 2 (Illumination). The worse the lighting conditions, the more serious the traffic accidents.

Hypothesis 3 (Weather). The worse the weather conditions, the less severe the traffic accidents.

Hypothesis 4 (Collision Type). Different types of collisions have an impact on the severity of traffic accidents. Hit-and-run behavior increases the severity of accidents.

4 METHODOLOGY

4.1 Data Description

The data contains information on many dimensions, including the time and location of the accident, weather conditions, collision type, number of casualties, accident vehicles, lighting conditions, etc. After splitting the "Date and Time" column and encoding the categorical variables such as "Weather" and "Collision Type", this article selected the following columns for analysis:

Severity_Score:

This variable is a comprehensive indicator constructed to quantify the severity of traffic accidents. Its definition is as follows:

$$Severity\_Score = 2 \times Number\ of\ Fatalities + 1 \times Number\ of\ Injuries + 0.5 \times Property\ Damage \quad (1)$$

Since death is the most serious consequence of a traffic accident, it is given the highest weight. Injury is the second most serious consequence and is weighted 1. Although property loss is important, it has a lower weight than personal safety and is weighted at 0.5.

Explanatory Variables: All explanatory variables are shown in Table 1. In this study, missing values are handled by filling in or deleting them. After the above processing steps, 216,103 records are retained for analysis in this study. The data covers the period from January 2018 to April 2025, and is consistent and very timely.

Table 1: Variable description

Name	Definition
Hour	hour of the day at which the accident occurred
Is_Weekend	binary variable indicating whether the accident occurred on a weekend
Weekday	the day of the week on which the accident occurred
Time_Period	categorical variable indicating the time-of-day segment in which the accident occurred (morning, daytime, evening, late night)
Zip code	ZIP code of the accident location
Weather	weather condition at the time of the accident
IlluACCIDEmination	lighting condition at the time of the accident
Collision Type	type of collision involved in the accident
Number of Motor Vehicles.	number of motor vehicles involved in the accident
Hit and Run	binary variable indicating whether the accident was a hit-and-run

4.2 Model Specification

4.2.1 Ordinary Least Squares (OLS)

To explore the impact of numerous variables on the severity of traffic accidents, this study first utilizes OLS as the basic framework to analyse the approximate linear relationship between variables. The model has a clear inference mechanism and strong interpretative results, and is widely used in empirical research fields such as social sciences and traffic safety. The OLS model can directly measure the impact of each explanatory variable on Severity_Score, thereby drawing preliminary conclusions. Before modelling, all variables were processed for missing values to enhance the reliability of the model.

To ensure the validity and robustness of the estimation results of the regression model, this paper conducts a Multicollinearity test on the selected explanatory variables. Multicollinearity is a common problem in regression analysis. When there is a high correlation between independent variables, it will lead to instability of the regression coefficient and even distort statistical significance judgment, thus affecting the interpretation of the actual effect of the variable. Therefore, in the variable processing stage, this paper uses the Variance Inflation Factor (VIF) to systematically test all explanatory variables. The VIF value generally reflects the degree of linear correlation between a variable and other variable, and a VIF greater than 10 is usually considered a warning sign of severe multicollinearity. In this study, except for the constant term, the VIF values of the variables IlluACCIDEmination_1.0 (VIF=10.91), IlluACCIDEmination_3.0 (VIF=8.56), and Weather_21.0 (VIF=6.02) are relatively high, and there is a risk of collinearity, so they are eliminated in this paper. The VIF values of the remaining variables are all within a reasonable range (VIF < 5) and could be included in the regression analysis.

The model follows the formula:

$$Severity\_Score_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_{10} X_{10i} + \varepsilon_i \quad (2)$$

Among them:

X_{1i}~X_{10i} : Respectively represent Hour, Is_Weekend, Weekday, Time_Period, Zip code, Weather, IlluACCIDEmination, Collision Type, Number of Motor Vehicles, Hit and Run.

ε_i: the error term

4.2.2 Nonlinear Model

Considering that there may be a nonlinear relationship between the severity of the accident and some variables, for example, the time of the accident, lighting conditions, and casualties are often asymmetric, the linear model has limitations in this regard. Therefore, this paper further utilizes Random Forest Regression for supplementary analysis. The model can automatically fit complex nonlinear structures and can reveal the implicit relationship between variables through feature importance analysis, thus making up for the shortcomings of traditional linear methods. To reveal the marginal effect and relative importance of each variable, this paper uses the SHapley Additive exPlanations (SHAP) method to interpret the model. As a powerful visualization tool, the SHAP method can help understand the output of the model and show the impact of each feature on the prediction results.

5 RESULT ANALYSIS

5.1 Descriptive Statistical Analysis

Grouped descriptive statistics are performed on several core variables under the three categorical variables of Is_Weekend, Hit and Run, and Time_Period. The results are shown in Table 2. In terms of whether it is the weekend, the average Severity Score on weekends is 0.52, which is higher than the 0.44 on non-weekends, and the standard deviation is larger, indicating that the severity of weekend accidents fluctuates greatly. Hour, Weekday, and Number of Motor Vehicles also have different performances on weekends and non-weekends. On the dimension of hit and run, the average severity of hit-and-run cases was only 0.28, which was significantly lower than the 0.52 of non-hit-and-run cases, which may reflect that hit-and-run is more common in minor accidents. However, its standard deviation is relatively small, indicating that the severity of this type of accident is more concentrated. In terms of the time of the accident, the severity is relatively higher at night and early morning, which are 0.49 and 0.48, respectively, while the severity is relatively lowest at daytime, which is only 0.42. This may reflect that accidents are more likely to cause more serious consequences at night and in the early morning due to factors such as poor visibility or driver fatigue. The average value of the accident time is consistent with the time division logic. For example, the average time of "Evening" is 18.61. In terms of the number of vehicles, the average

number is the highest in the evening (1.78 vehicles) and the lowest in the early morning (1.50 vehicles), indicating that early morning accidents may be more concentrated in single-vehicle accidents.

Table 2: Summary statistics

		Is_Weekend		Hit and Run		Time_Period			
		Yes	No	Yes	No	Daytime	Early Morning	Evening	Night
Severity_Score	Mean	0.52	0.44	0.28	0.52	0.42	0.48	0.45	0.49
	SD	0.87	0.77	0.58	0.86	0.76	0.79	0.79	0.83
Hour	Mean	11.44	14.02	11.76	13.93	13.30	5.78	18.61	12.91
	SD	7.70	7.16	7.72	7.18	1.93	0.96	1.13	10.16
Weekday	Mean	5.48	2.06	3.12	2.86	2.62	3.52	2.88	2.96
	SD	0.50	1.41	2.01	1.91	1.84	2.05	1.91	1.94
Number of Motor Vehicles	Mean	1.65	1.74	1.72	1.71	1.73	1.50	1.78	1.74
	SD	0.85	0.82	0.84	0.82	0.83	0.85	0.79	0.82

5.2 Regression and Machine Learning Model Analysis

5.2.1 Time

According to the results in Table 3, Time has a significant impact on the severity of traffic accidents. This article uses Daytime as the benchmark group. The data in the table shows that compared with daytime, early morning, evening, and night all have a significant positive impact on Severity_Score, and the corresponding t values are all over 6.8, and the p values are all less than 0.001, which are highly significant. This shows that traffic accidents occurring in the early morning, evening, and night are more serious, and traffic accidents occurring at night are the most serious. This may be caused by fatigue, and may also be related to night lighting and visibility.

The results in Table 3 also verify that whether it is a weekend or not also has an impact on the severity of the accident. The Severity_Score for accidents occurring on weekends increased by an average of 0.07 ($t = 12.14$, $p < 0.001$). This may be related to behavioral factors such as the main purpose of driving on weekends being leisure and entertainment, and the driver's reduced risk perception. According to the results in Figure 1, whether it is the weekend or not has a greater impact on the severity than the specific time of day. Therefore, Hypothesis 1 is established.

5.2.2 Illumination

The results in Table 3 show that lighting conditions can also significantly affect the severity of traffic accidents. The data show that the coefficients for the three lighting conditions of dark (not lighted), dawn, and dusk are all positive and statistically significant ($p < 0.001$). The coefficients of Dark (not lighted), dawn, and dusk are 0.63, 0.66, and 0.62, respectively, and the t values are 49.08, 33.6, and 37.27. This may be due to the delay in the driver's visual field adaptation during light transition periods (dawn/dusk) and darkness, coupled with increased errors in environmental judgment, leading to higher accident severity. According to Figure 1, the impact of darkness (not lighted) on accidents is greater than that of dawn and dusk. Therefore, Hypothesis 2 is established.

5.2.3 Weather

The impact of weather on accident severity in the model is relatively complex, and some variables are significant. Snow, blowing snow, sleet, and hail all harm accident severity, which means that the accident severity is lower in this weather. The accident severity is higher in foggy and cloudy weather. These results indicate that when visibility is poor or the weather changes suddenly, drivers may be slow to react or fail to brake in time, which can aggravate the consequences of an accident. However, when weather conditions are more severe, such as snow, the severity of the accident may be reduced due to the driver's increased concentration. However, according to the coefficients in Figure 1 and Table 3, compared with other factors, weather has a smaller impact on accidents.

Therefore, Hypothesis 3 is not true. The severity of the accident shows different reactions under different weather conditions.

Table 3: Linear relationships between severity score and different variables

		Coef.	T-value	P-value
	Is_Weekend	0.07	12.14	0.000***
	Weekday	0.00	-1.26	0.207
	Hit and Run	-0.25	-63.30	0.000***
Weather	Sleet, Hail	-0.13	-2.35	0.019*
	Snow	-0.10	-4.12	0.000***
	Fog	0.09	2.27	0.023*
	Cloudy	0.06	6.85	0.000***
	Blowing Snow	-0.21	-2.48	0.013*
Illumination	Dark (Not Lighted)	0.63	49.08	0.000***
	Dawn	0.66	33.60	0.000***
	Dusk	0.62	37.27	0.000***
Collision Type	Rear End	-1.02	-1.14	0.253
	Head-on	0.37	32.21	0.000***
	Rear to Rear	-0.45	-17.96	0.000***
	Angle	-0.09	-16.29	0.000***
	Sidewipe (Same Direction)	-0.43	-65.88	0.000***
	Sidewipe (Opposite Direction)	-0.26	-20.93	0.000***
	Front to Rear	-0.20	-34.99	0.000***
	Rear to Side	-0.50	-21.68	0.000***
Time Period	Early Morning	0.04	6.83	0.000***
	Evening	0.05	9.29	0.000***
	Night	0.06	9.29	0.000***

5.2.4 Collision Type

The regression results show in detail the impact of different collision types on traffic accidents. Except for head-on collision, which has a positive impact on accident severity, other collision types, such as rear-to-rear, angle, sideswipe, front-to-rear, and rear-to-side, all harm accident severity. In addition, hit and run also hurts accident severity, with a coefficient of -0.25, a t value as high as -63.30, and a significance level of 0.001. This result shows that after controlling factors such as collision type, time, and lighting conditions, the severity of a traffic accident will be significantly reduced if there is a hit-and-run incident. This conclusion may seem counterintuitive at first glance, as it is generally believed that escaping behavior means that the driver is more responsible and may lead to more serious consequences. However, combined with the actual background analysis, this result is likely because hit-and-run often occurs after a minor collision, with the perpetrator attempting to evade financial compensation or legal liability, rather than fleeing after causing major casualties. Therefore, fleeing behavior is statistically more strongly associated with less serious accidents. The data in Figure 1 shows that hit and run, sideswipe (same direction), and angle are the three variables that have the greatest impact on Severity_Score.

Therefore, Hypothesis 4 does not hold. When a hit-and-run occurs, the severity of the traffic accident will decrease.

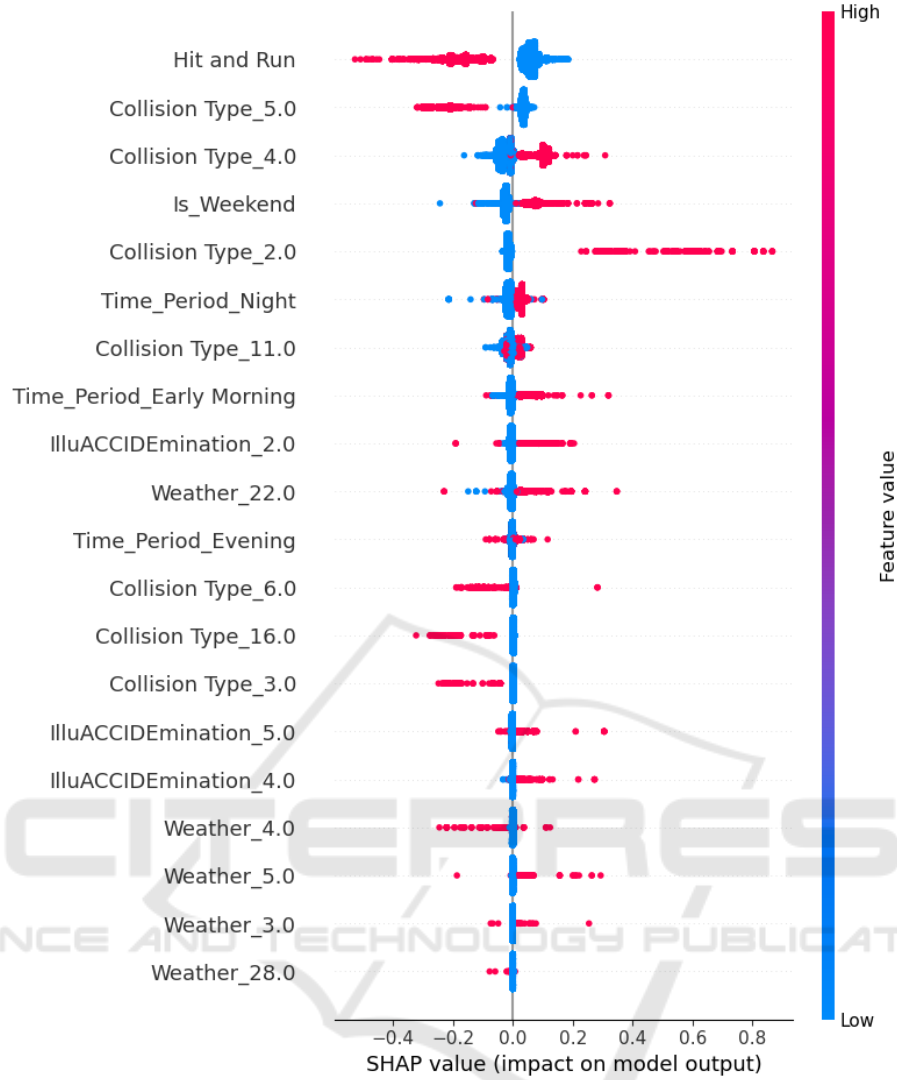

Figure 1: Nonlinear relationships between severity score and different variables (Picture credit : Original).

In the regression results of this study, the coefficient values of multiple independent variables are relatively small, but this does not mean that these variables have no practical significance for the severity of the accident. On the one hand, as a dependent variable, the Severity Score has a limited distribution range of its values. Therefore, even if the regression coefficient is not large, as long as it is statistically significant, it still shows that the marginal impact of the variable is real. On the other hand, the severity of an accident is often affected by multiple factors. The marginal effect of a single variable is limited, but its role in the overall model cannot be ignored. This is also an important value of multivariate regression analysis, which can integrate multiple influences and reveal complex models.

6 CONCLUSION

This study systematically analyzed the impact of time factors, weather conditions, lighting conditions, and collision types on the severity of traffic accidents. Through empirical analysis, this paper identifies that early morning, evening, and night are the periods that lead to more serious traffic accidents, while weekends are more likely to have serious accidents than weekdays. Weather conditions such as snow, blowing snow and sleet, and hail will significantly reduce the risk of accidents, while fog and cloudy weather will aggravate the consequences of accidents. Lighting conditions such as dark (not lighted), dawn, and dusk significantly increase the severity of accidents.

Moreover, head-on collisions will lead to increased severity of accidents, while hit-and-run behaviour will reduce accident severity. If all environmental variables are considered together, the impact of behavioural factors such as hit-and-run behaviour and collision type on the severity of traffic accidents is usually greater than that of environmental factors such as weather and lighting. This is because the type of collision directly determines the degree of physical damage, while hit-and-run is related to the psychology of the perpetrator, which often occurs when the perpetrator wants to evade responsibility for a minor accident. This has a more direct impact on the consequences of the accident.

This study verified the significant relationship between multiple environmental and behavioural variables and accident severity through quantitative analysis of actual traffic data, filling the gap of insufficient comprehensiveness in previous studies. This not only provides empirical support for traffic safety researchers but also provides data-based reference for urban traffic managers when formulating precise strategies. Managers should strengthen road inspections during specific weather conditions or times and optimize infrastructure construction, such as lighting equipment. However, behavioural guidance, law enforcement supervision, and traffic safety education are key strategic directions to reduce the severity of traffic accidents. The government can strengthen the publicity of traffic rules and enhance legal publicity and education for high-risk collision types.

Although this study conducts a comprehensive quantitative analysis of environmental and individual behavioural variables, it still fails to consider some individual variables and macro factors more comprehensively, and does not conduct a detailed discussion and verification of the improvement methods. In the future, studies can further consider how traffic accidents will change under the combined effects of macro variables (such as the epidemic) and individual factors (such as gender and age), and verify the specific feasibility of improvement measures such as legal education.

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