

Factors Affecting Road Safety and SPER Debt Collection in Queensland, 2021



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Problem Solving with Data

INTRODUCTION

Road accident and unpaid traffic fines (SPER Debts) are significant issues in Queensland. Understanding the factors is crucial for implementing effective intervention to improve road safety and debt collection

RESEARCH QUESTIONS

1. What are the main causes of car accidents in Queensland in 2021?
2. Does the installation of speed cameras necessarily lead to decrease in the number of crashes?
3. What are the most significant factors contributing to the SPER Debt by SA4 regions?

Getting The Data

The datasets were obtained from **Open Data Portal Queensland Government**

	Crash Data	Factor of Crash	Camera Location	SPER Data
Keypoint	Crash Severity, Locations, Traffic Control, Speed Limit	Alcohol, Speed, Fatigued, Defective Vehicle	types of camera and its location	SPER by SA4 Regions, Number of Debtors, and top 10 offence
Size	Jan - Dec 2021	Jan - Dec 2021	Installed for 5 last year	Jan - Dec 2021
Data Type	Qualitative	Qualitative and Quantitative	Qualitative	Qualitative and Quantitative



1

Completeness

- No Missing Values

2

Accuracy

- Re-format crash location coordinates using decimal degrees format
- Ensure all the camera coordinate location in Queensland, Australia

3

Consistency

- Ensure that statistical area 4 (SA4) consists of 19 areas
- Year consistency

4

Data Transformation

- Converted string (Yes or No) to numeric (1 or 0) for Involvement Factor of Crash
- Converted number of debts and outstanding balance (from string to numeric)

IS THE DATA FIT FOR USE?

-27.56.34.61.44.47.67.8, 153.015.800.023.387

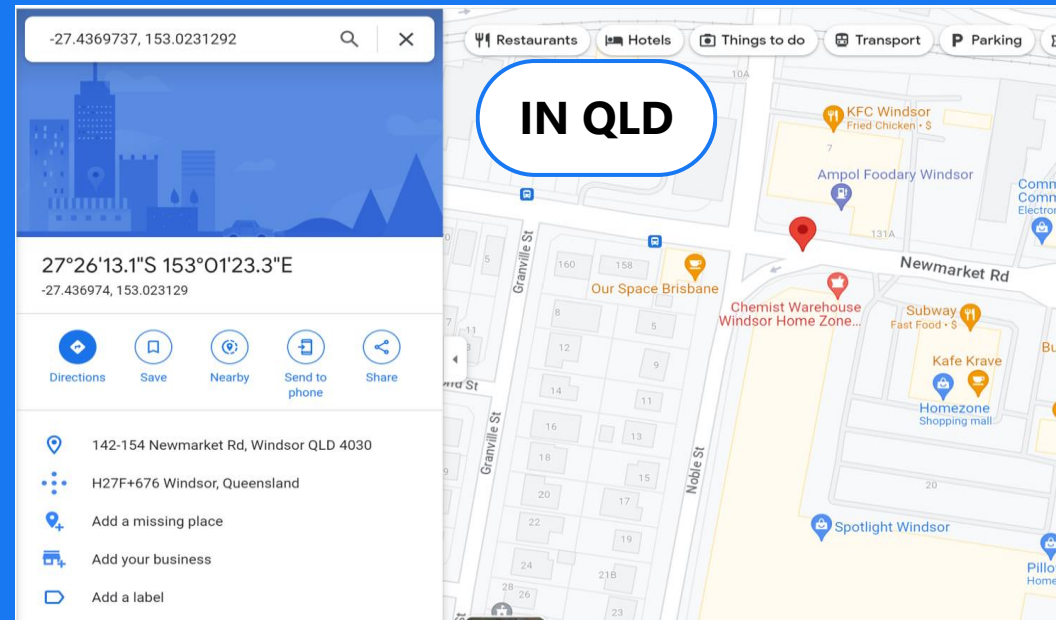
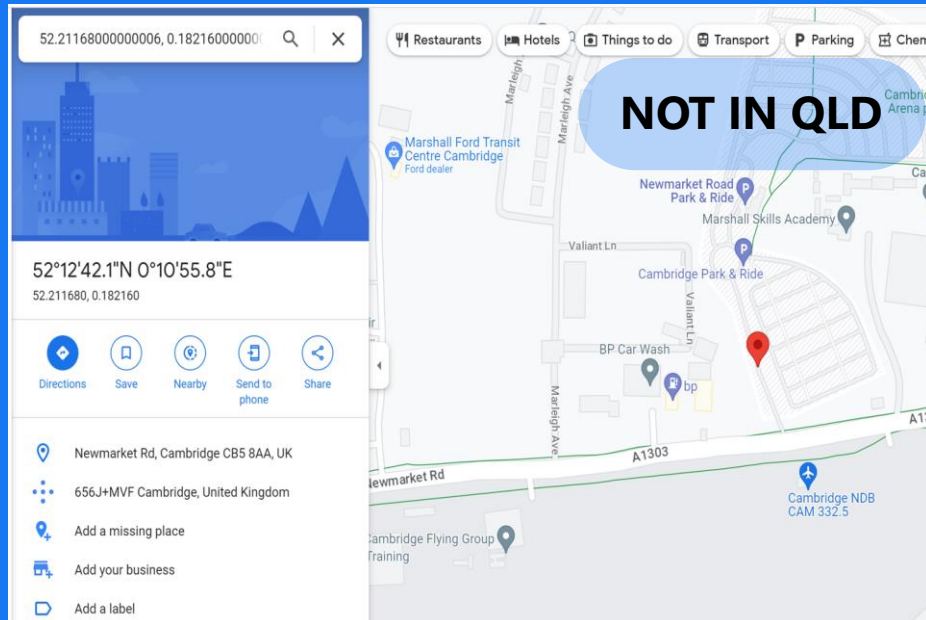
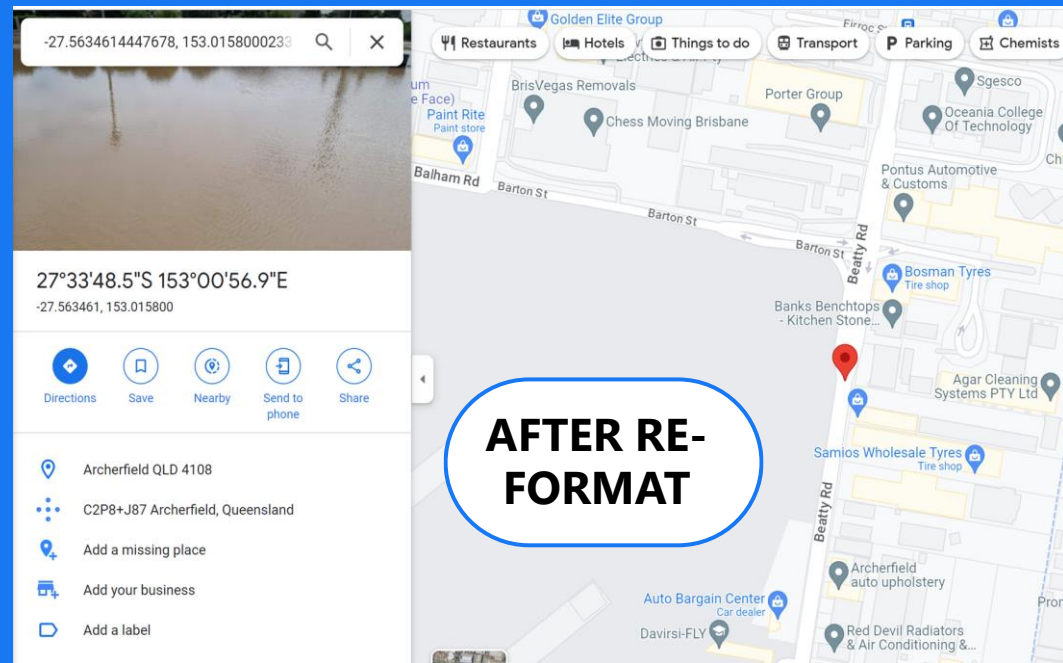
Google Maps can't find **-27.56.34.61.44.47.67.8, 153.015.800.023.387**

Make sure your search is spelled correctly. Try adding a city, county or postcode.

Try Google Search instead

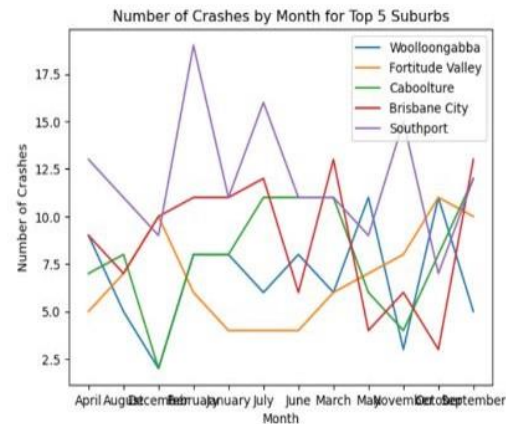
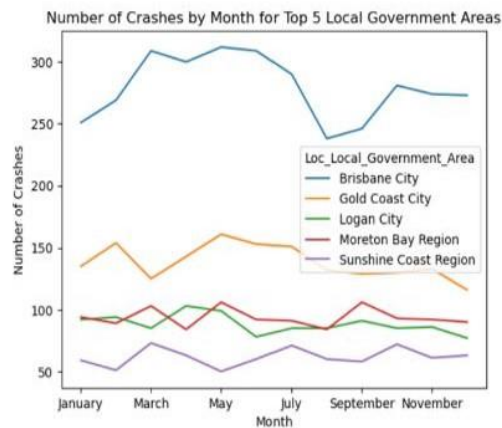
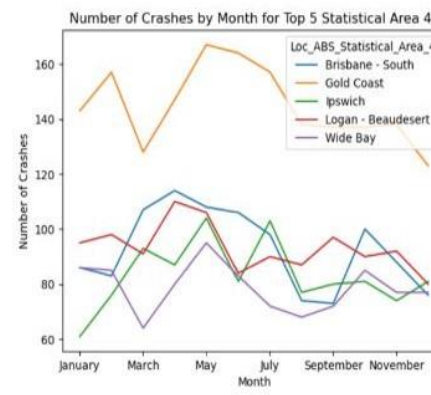
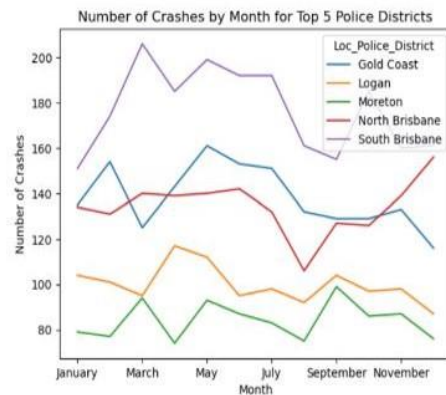
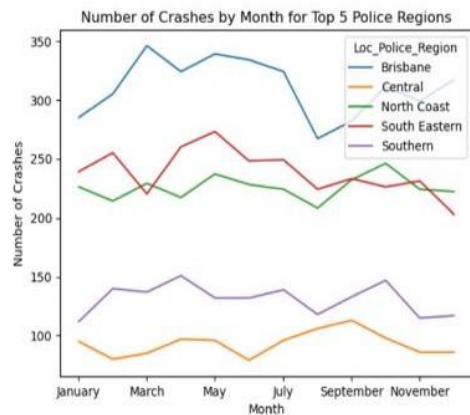
Should this place be on Google Maps?
[Add a missing place](#)

**BEFORE RE-
FORMAT**



Crash Location in The Queensland

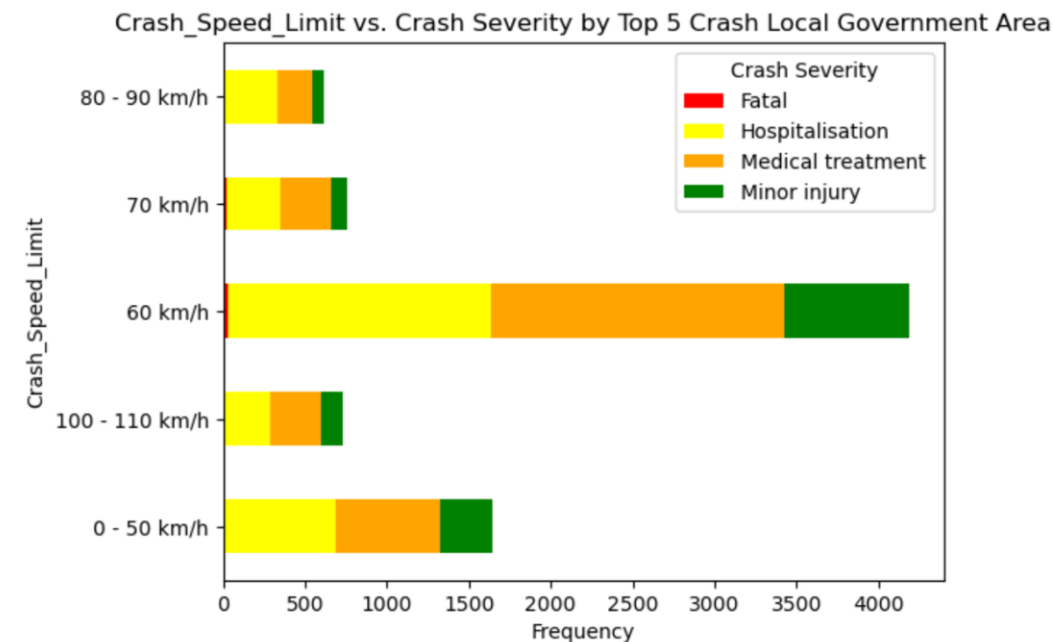
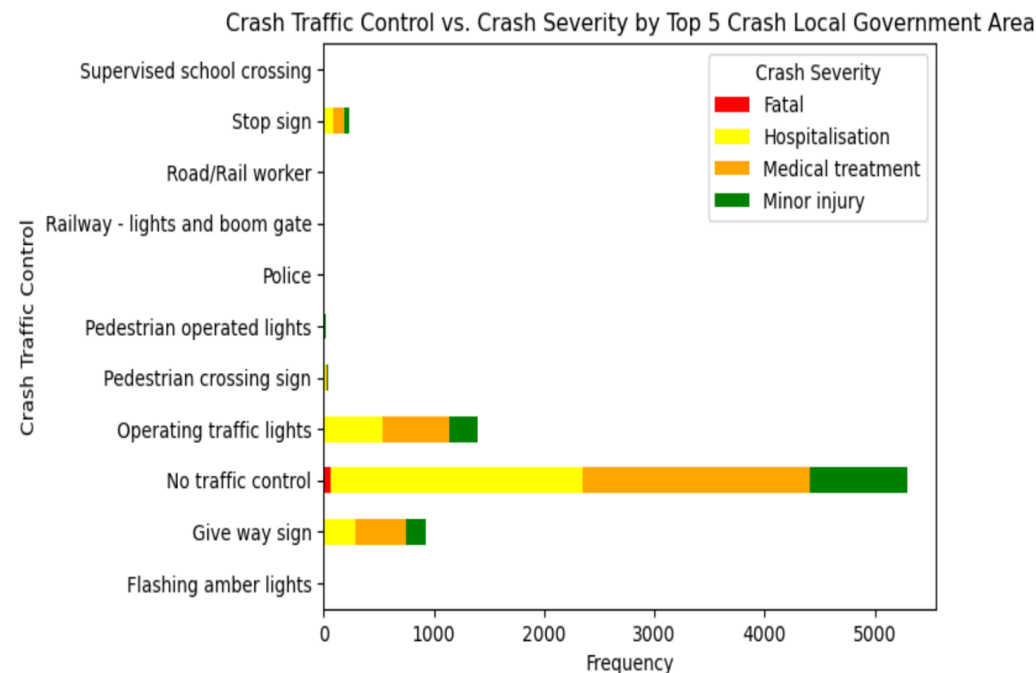
The number of crashes that occurred across all areas fluctuated significantly throughout the year 2021



Most Crashes Happened in Local Government Areas:

1. Brisbane City
2. Gold Coast City
3. Logan City
4. Moreton Bay
5. Sunshine Coast

Contributed Factors to The Severity of Crashes

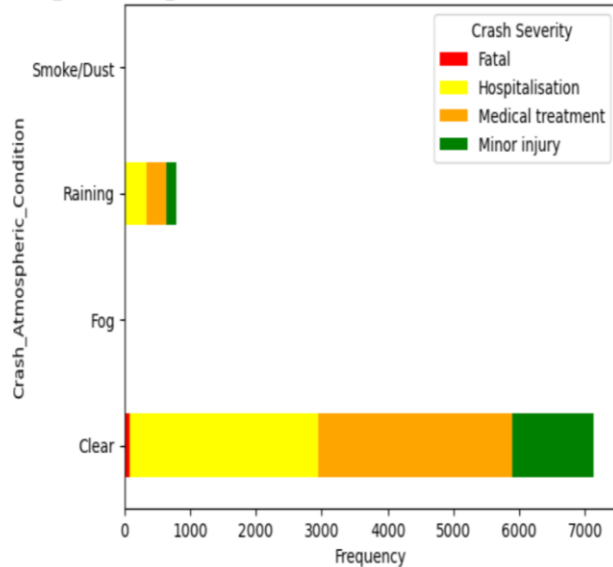


Three primary causes of crashes: no traffic control, operating traffic lights, and give way signs

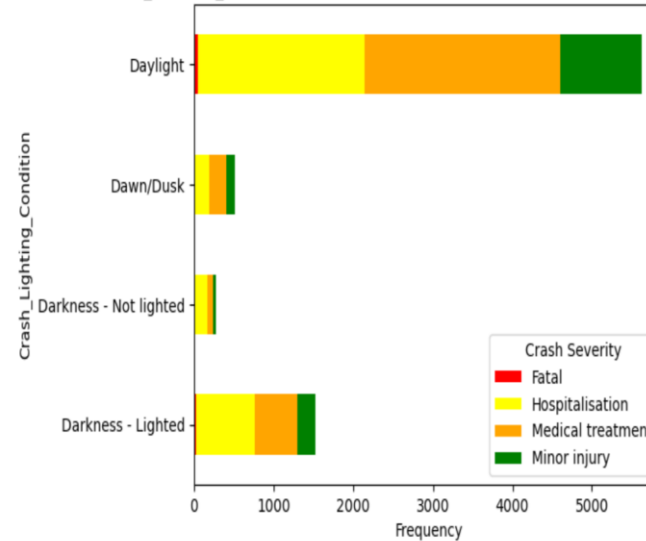
The highest number of crashes occurred at 60 km per hour, rather than at speeds 100-110 km per hour

(Cont) Contributed Factors to The Severity of Crashes

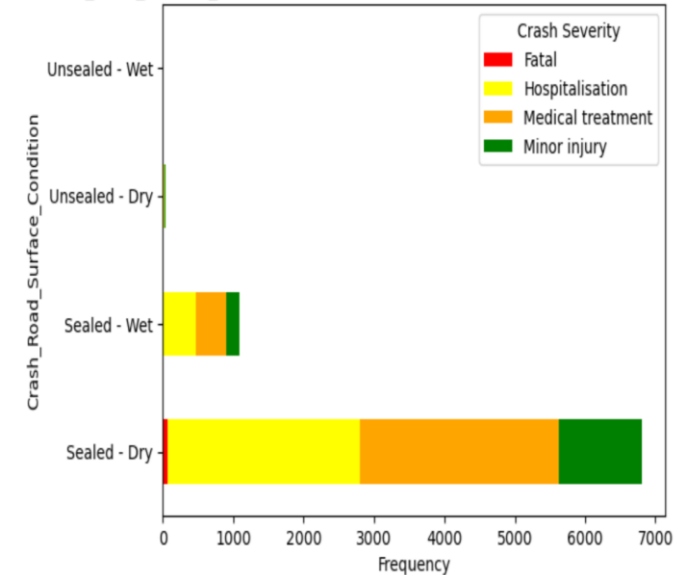
Crash_Atmospheric_Condition vs. Crash Severity by Top 5 Crash Local Government Area



Crash_Lighting_Condition vs. Crash Severity by Top 5 Crash Local Government Area



Crash_Road_Surface_Condition vs. Crash Severity by Top 5 Crash Local Government Area



The highest number of crashes occurred during clear atmospheric and daylight lighting condition. Also, it most occurred under the road surface conditions of sealed-dry.

2021

Involvement factors to crash severity

hospitalization is the most prevalent crash severity resulting from:

Drink Driving

71

Cases

Driver Speed

64

Cases

Fatigued Driver

40

Cases

Defective Vehicle

40

Cases



Association Strength Between Factors of Crash to Severity

using cramer's V to measure association strength between factor of crash to crash severity

● factor of crash (X) : traffic control, speed limit, road surface, atmospheric condition, and lighting condition

“the strength of the associations is not particularly strong to the crash severity”



the cramer's value range from 0.01 to 0.06

● involvement factors (X): drink driving, driver speed, fatigued driver, defective vehicle

“Involving defective vehicles and drink driving are the two most strength predictors to the crash severity”



the cramer's value range from 0.07 to 0.08

Number of Debtors in ABS SA4

who have not pay the fines and penalties

- Toowomba

12%



- Darling Downs

11%



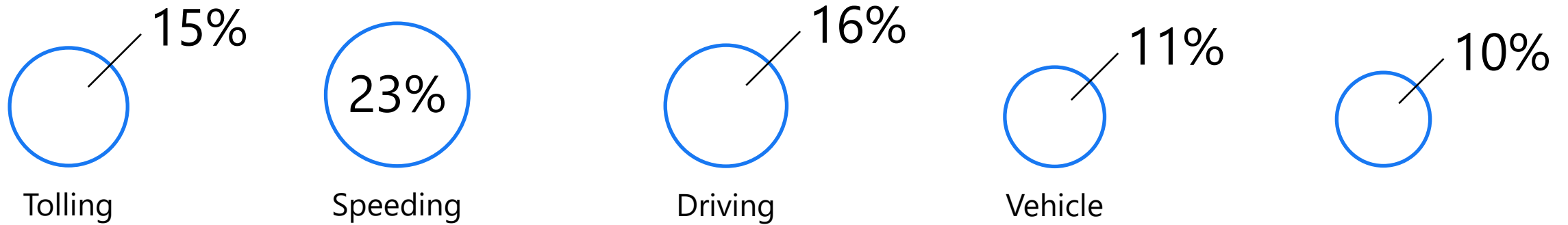
- Brisbane-east

7%



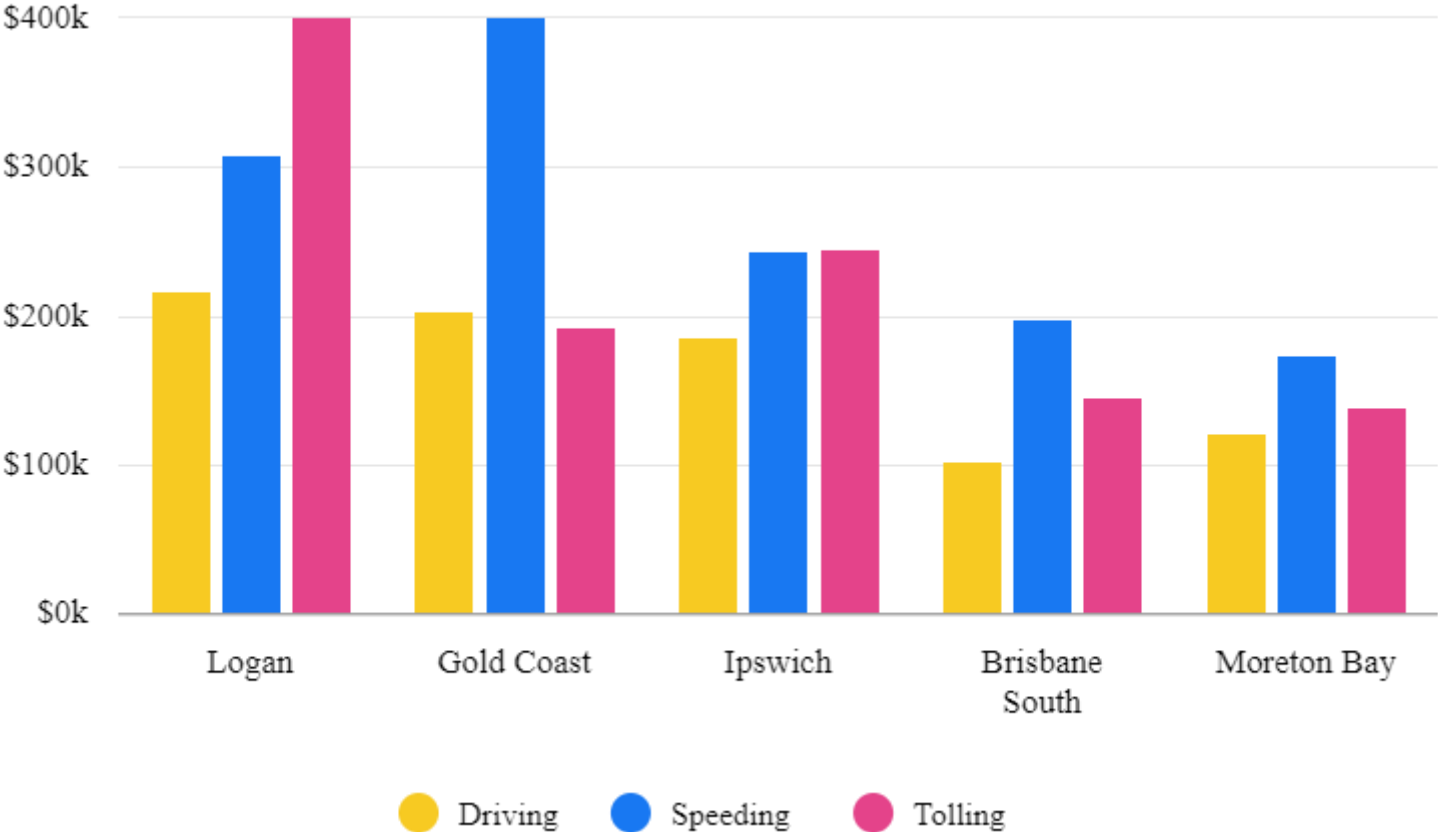
The regions with the highest number of debts are Toowoomba, Darling Downs, and Brisbane East

Offence Groups Contributed to Outstanding Balance



Speeding, Driving, and Tolling are the top three offenses that contribute the most to the outstanding balance

Outstanding Balance by Group of Offence



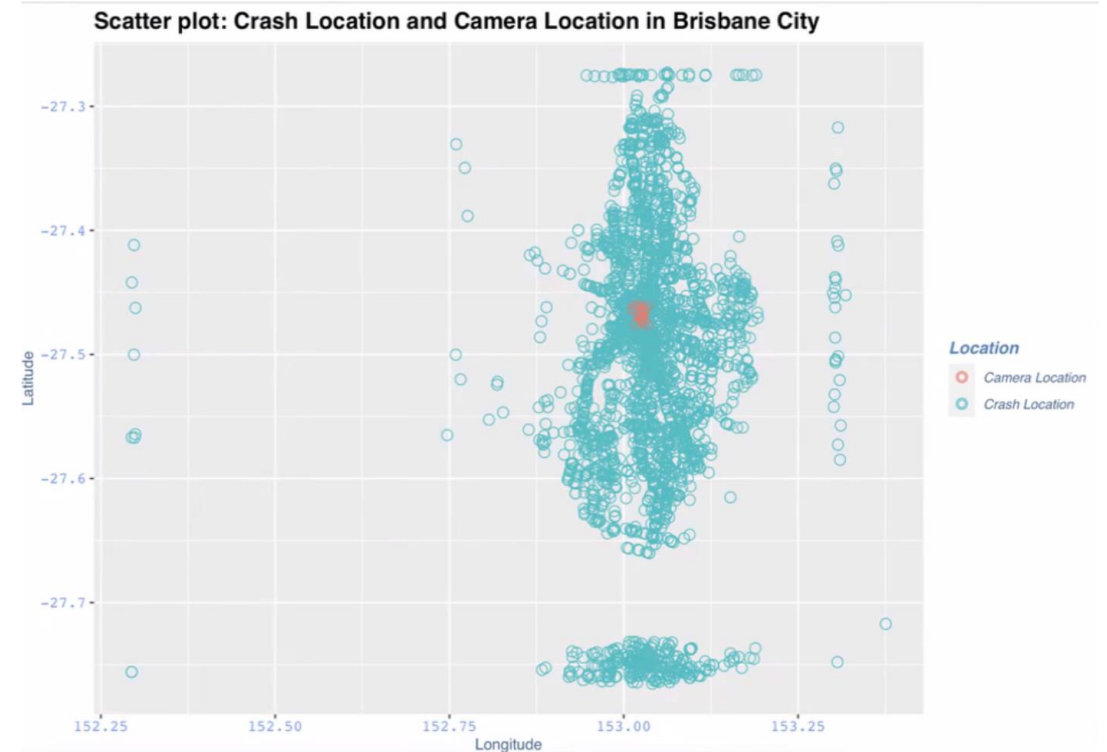
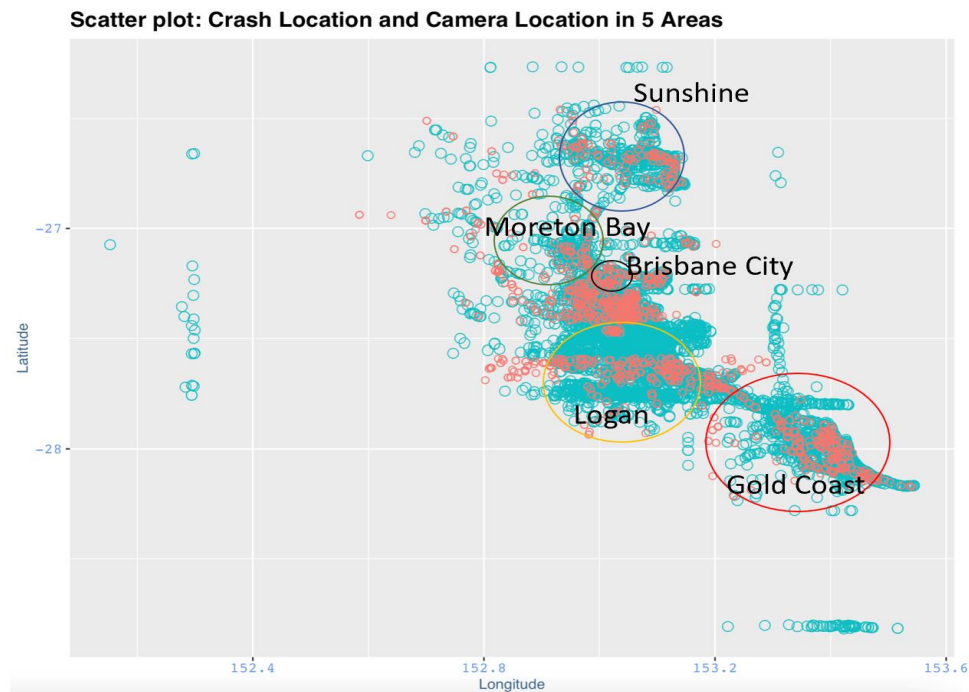
\$6.673.647.000

total outstanding balance in Location SA4

Speed Camera and Crash Location Mapping in Local Area Government

In Brisbane City, the number of cameras is insufficient in comparison to the number of crashes that occur. There are a significant number of accidents that happen in areas where cameras are not present.

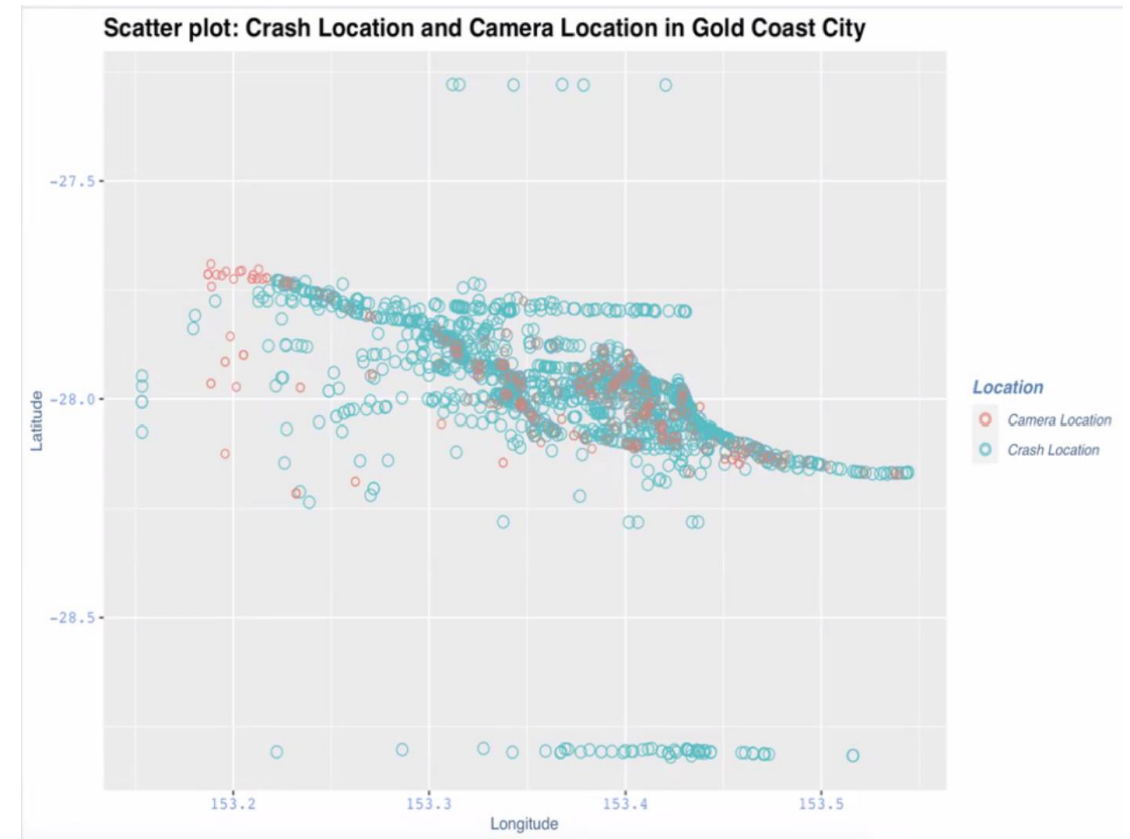
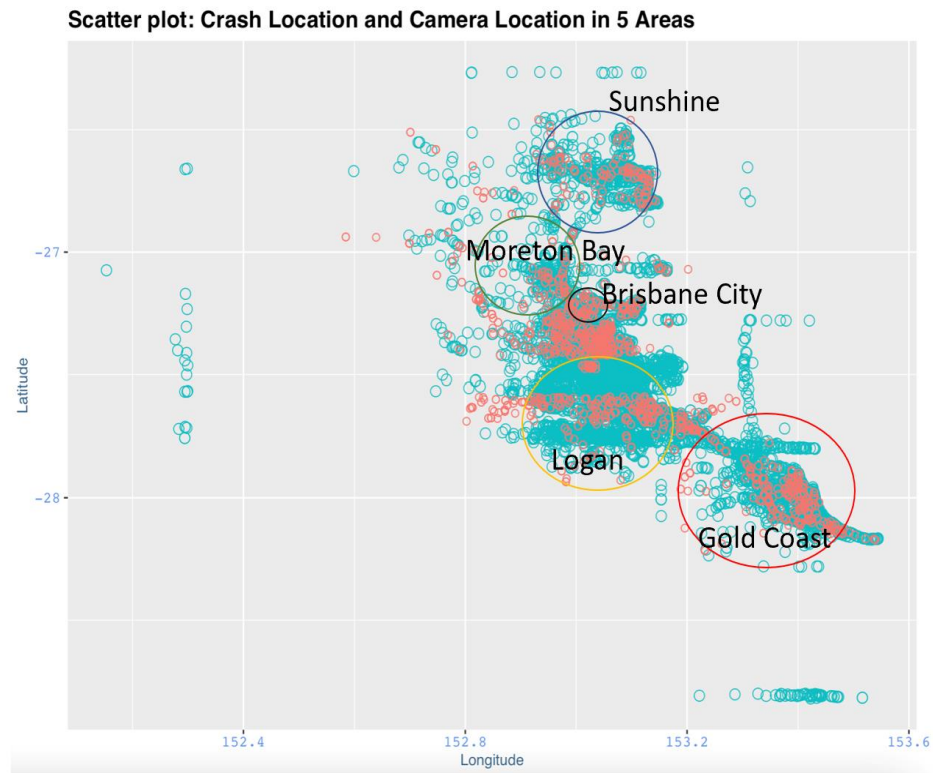
Brisbane: N: -27.460001, 153.014973 E: -27.463589, 153.035599 S: -27.480858, 153.029871 W: -27.467248, 153.010503



Speed Camera and Crash Location Mapping in Local Area Government

In Gold Coast, although some cameras are present in locations where crashes occur, there are still incidents of crashes that happen without any camera coverage.

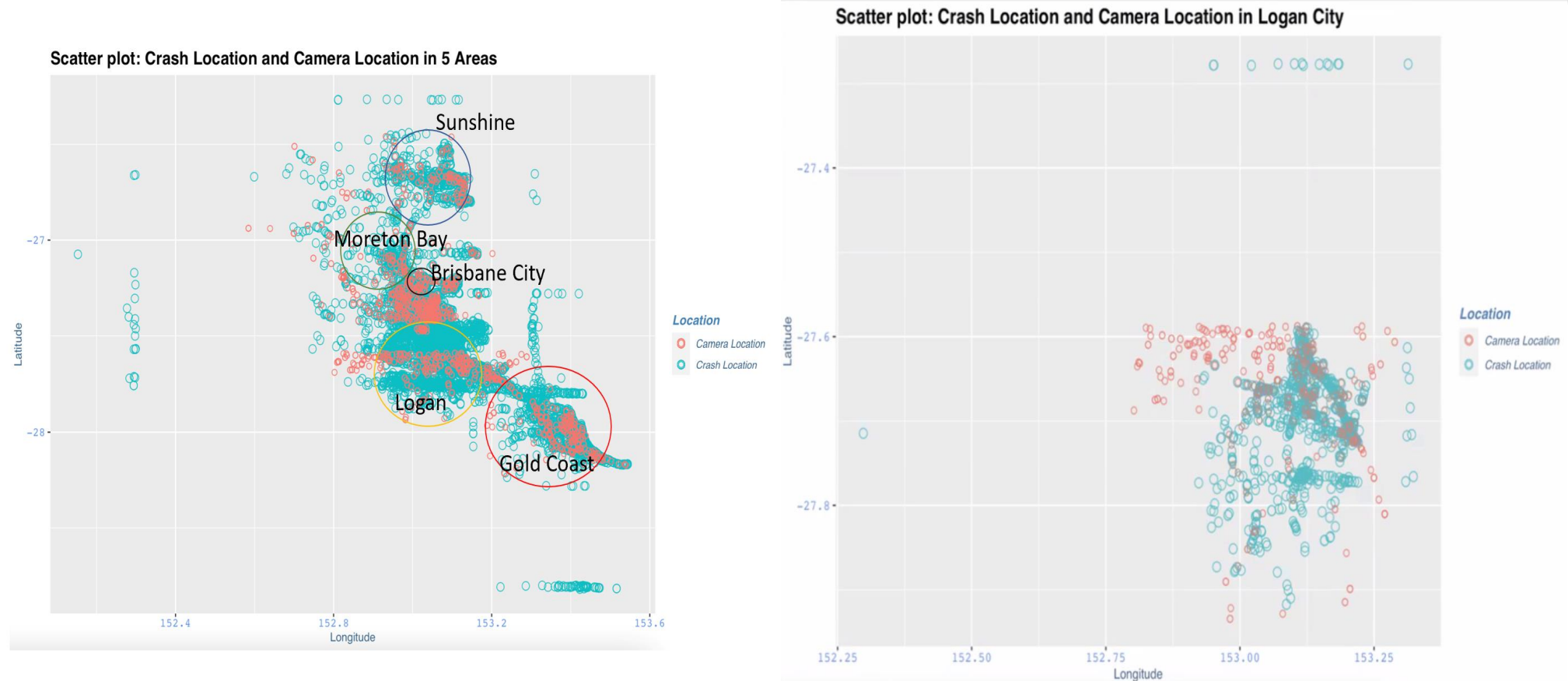
Gold coast: N: -27.690399, 153.255689 E: -28.164439, 153.551850 S: -28.265145, 153.232789 W: -28.192909, 153.184329



Speed Camera and Crash Location Mapping in Local Area Government

In Logan City, also show that some cameras are present in locations where crashes occur, and there are still incidents of crashes that happen without any camera coverage.

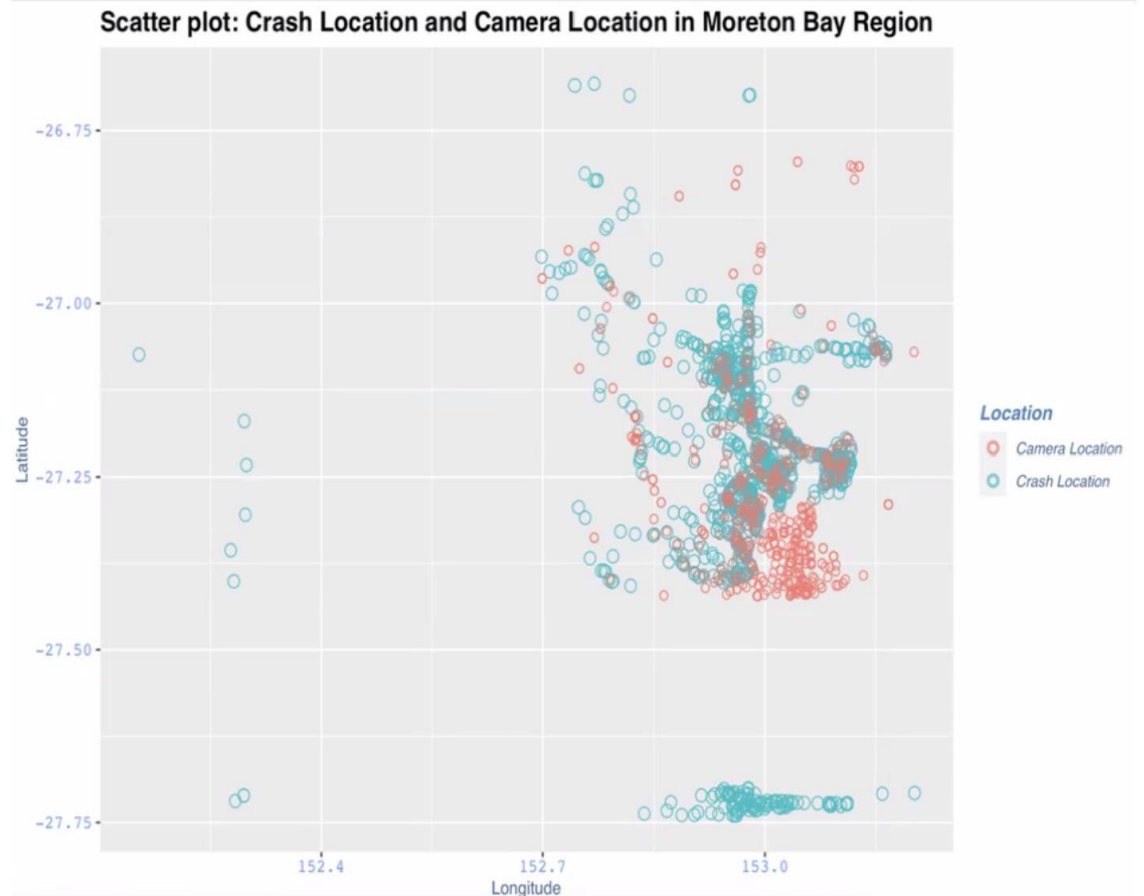
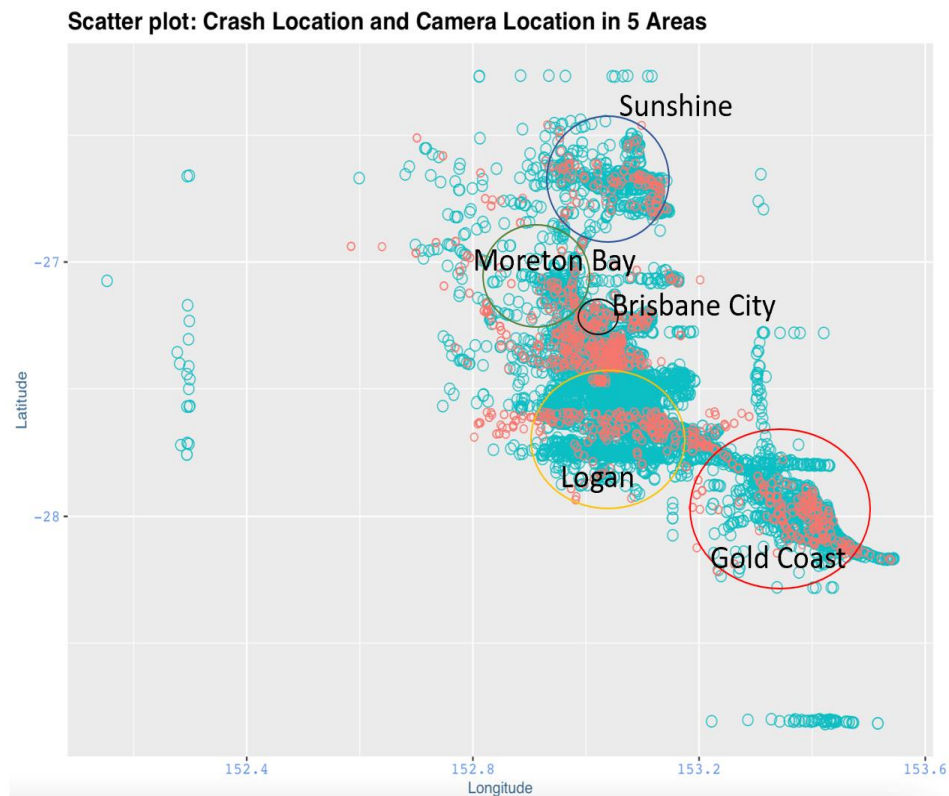
Logan city: N: -27.587315, 153.123311 E: -27.688190, 153.290340 S: -27.938566, 153.069691 W: -27.839125, 152.799330



Speed Camera and Crash Location Mapping in Local Area Government

In the Moreton Bay Region, it is apparent that cameras are present in some locations where crashes occur, yet many incidents of crashes still transpire without any camera coverage. On the other hand, there are areas where cameras exist, but no accidents have been recorded.

Moreton bay region: N: -26.792279, 152.761080 E: -27.081725, 153.207221 S: -27.422384, 152.861159 W: -26.955319, 152.651273

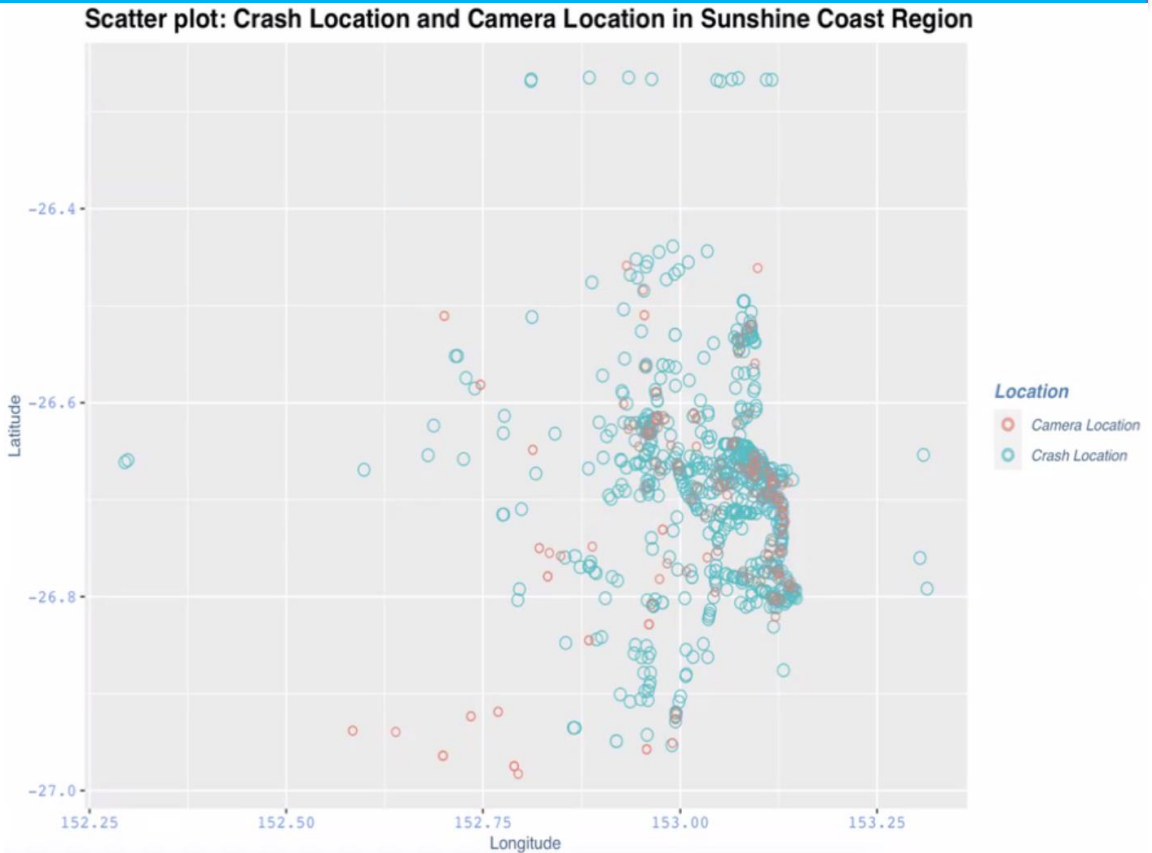
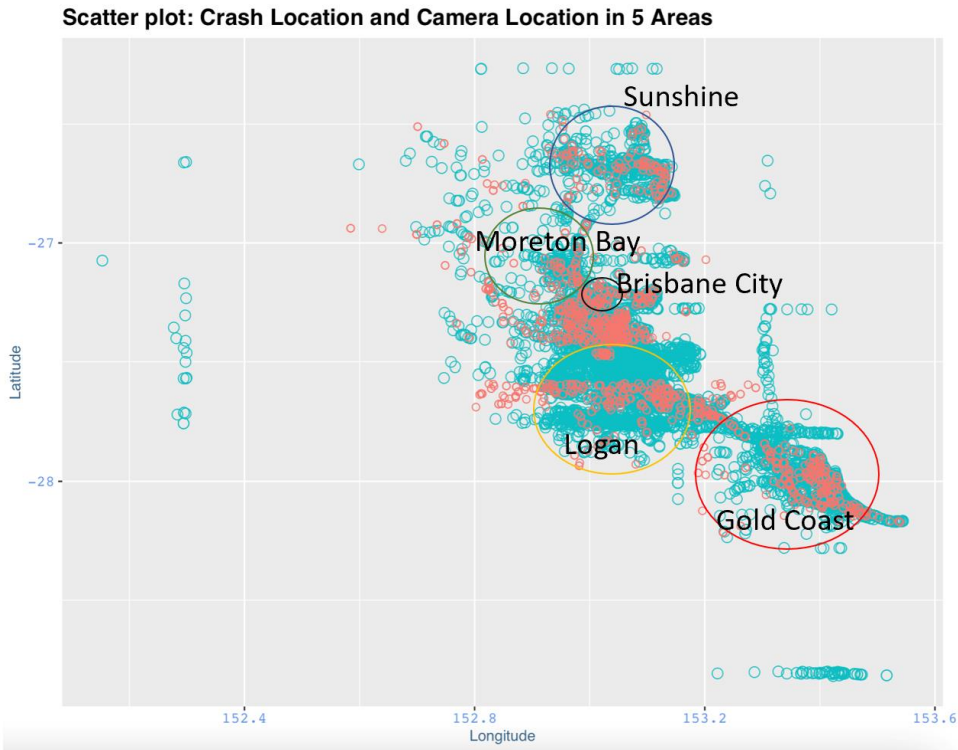


Speed Camera and Crash Location Mapping

in Local Area Government

In the Sunshine Coast Region, it is apparent that cameras are present in some locations where crashes occur, yet many incidents of crashes still transpire without any camera coverage. On the other hand, there are areas where cameras exist, but no accidents have been recorded.

Sunshine coast region: N: -26.432195, 152.966377 E: -26.801726, 153.150790 S: -26.984769, 152.985184 W: -26.703135, 152.551100



Regression Analysis

Calculate regression to identify which offense categories have the strongest relationship with outstanding balance

- Speeding, Tolling, and Driving
 - significantly related to the **outstanding balance**, with p-value (0,0006; 0,0083; 0,0222) respectively.
- Tolling, Speeding, Parking
 - significantly related to the **number of debts**, with p-value (0,0008; 0,0054; 0,0483) respectively
- only 31,86% contribution of all the offenses can explain the outstanding balance and 38,02% to the number of debts
- adding more offenses to the model did not improve the model's explanatory power

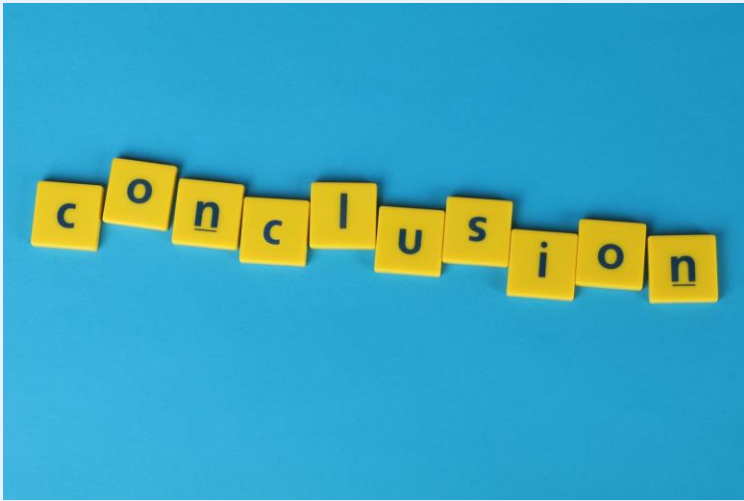


using poisson regression

Results

Drinking driving, driver speed, fatigued driver, and defective vehicle are **significant factors of the car accidents**





1. The main causes of car accidents in Queensland in 2021 are Speeding, Tolling, and Driving

2. The installation of speed cameras may not necessarily lead to a decrease in the number of crash accidents in certain regions.

simply installing speed cameras may not be a comprehensive solution to reducing the number of accidents, and other factors must be considered.

3. The most significant factors contributing to the SPER Debt in SA4 regions are

Speeding, Tolling, and Driving

Suggestions



Government



Public



Traffic Police



Drivers



Insurance Company

Government

- Invest in improving road conditions.
- Implement stricter laws and regulations to ensure that drivers adhere to traffic rules.
- Encourage the adoption of new technologies such as automated vehicles.

Public

- Report incidents of reckless driving, defective vehicles, and road hazards.
- Educate on the importance of safe driving practices.

Traffic Police

- Increase random breath tests and roadside checks to curb drink-driving.
- Enforce speed limits and ensure that drivers adhere to traffic rules.

Drivers

- Adhere to traffic rules.
- Avoid driving after alcohol or drugs.
- Ensure vehicles are in good condition.
- Take regular breaks during long drives to prevent fatigue.

Insurance Company

- Offer discounts to drivers who adhere to traffic rules and have a good driving record.
- Incentivize regular vehicle servicing to promote safe

Thoughts? **Questions?**

Open the floor to feedback and discussion.

