ANALYSIS SCRIPT

Link: <https://www.kaggle.com/datasets/akinniyiakinwande/nigerian-traffic-crashes-2020-2024>

About Dataset

Nigerian Traffic Crashes (2020-2024)

Overview:

This dataset offers a detailed examination of road traffic crashes in Nigeria, covering the period from Q4 2020 to Q1 2024. It includes quarterly data on the total number of crashes, injuries, fatalities, and vehicles involved, along with key contributing factors such as speed violations, driving under the influence, and poor weather conditions. The data is sourced from official traffic records and provides insights into the factors influencing road safety in Nigeria.

Features:

Quarter

Description: The quarter in which the data is recorded (e.g., Q4 2020, Q1 2021). This field serves as the temporal reference for the dataset.

State

Description: The Nigerian state where the traffic crashes occurred. This variable allows for regional analysis of crash data.

Total Crashes

Description: The total number of road traffic crashes reported per quarter for each state.

Number Injured

Description: The total number of individuals injured in road traffic crashes per quarter. This metric indicates the severity of the crashes.

Number Killed

Description: The total number of fatalities resulting from road traffic crashes per quarter.

Total Vehicles Involved

Description: The total number of vehicles involved in the crashes per quarter. This variable can be used to analyze traffic volume and crash rates.

Speed Violation (SPV)

Description: The number of crashes attributed to speed violations. This factor is critical in understanding the role of speeding in road traffic crashes.

Driving Under Alcohol/Drug Influence (DAD)

Description: The number of crashes where driving under the influence of alcohol or drugs was a contributing factor.

Poor Weather (PWR)

Description: The number of crashes that occurred under poor weather conditions, providing insights into weather-related risks.

Fatigue (FTQ)

Description: The number of crashes attributed to driver fatigue. This variable highlights the impact of driver alertness on road safety.

This dataset is ideal for researchers, policymakers, and traffic safety analysts interested in exploring the dynamics of road traffic crashes in Nigeria, assessing risk factors, and developing data-driven strategies for improving road safety.

**1.North Central**

Benue

Kogi

Kwara

Nasarawa

Niger

Plateau

Federal Capital Territory (FCT)

**2. North East**

Adamawa

Bauchi

Borno

Gombe

Taraba

Yobe

**3. North West**

Jigawa

Kaduna

Kano

Katsina

Kebbi

Sokoto

Zamfara

**4. South East**

Abia

Anambra

Ebonyi

Enugu

Imo

**5. South South**

Akwa Ibom

Bayelsa

Cross River

Delta

Edo

Rivers

**6. South West**

Ekiti

Lagos

Ogun

Ondo

Osun

Oyo

QUESTIONS:

1. General Analysis Questions

Which states had the highest number of crashes?

How do the total crashes and outcomes (injuries and fatalities) compare across different states?

Which state had the highest crash-to-injury ratio?

How does the fatality rate per crash compare across states?

2. Speed Violation (SPV) and Accident Severity

How does the presence of speed violations correlate with the severity of crashes (injuries and deaths)?

In states with reported speed violations, what percentage of crashes resulted in fatalities versus those without speed violations?

Are states with higher speed violations more likely to have severe crashes (in terms of injuries and fatalities)?

*3. Driving Under Alcohol (DAD)*

*Why is the "driving under alcohol" (DAD) metric at zero across most states? Could there be an underreporting issue or lack of enforcement?*

*How can future data collection improve the tracking and reporting of alcohol-related crashes?*

*4. Poor Weather (PWR)*

*What is the relationship between poor weather conditions and crash severity across different states?*

*How does the number of vehicles involved in crashes differ between crashes attributed to poor weather and other factors?*

*Which states have the most weather-related crashes, and what initiatives could be put in place to mitigate this?*

*5. Other Factors*

*What “other factors” contributed to crashes in states with high incidents (like FCT or Bauchi), and how can these factors be mitigated?*

*Which states are reporting high numbers of crashes without any specific attribution to speed violations, alcohol, or weather? What other potential causes might be involved?*

*How can further investigation into "other factors" help in reducing the frequency of crashes?*

6. Injury and Fatality Trends

Why do certain states like Bauchi and FCT have high fatality rates? Are there specific road conditions or traffic enforcement issues contributing to this?

What safety measures could be introduced in states like Bauchi and FCT to reduce the high number of fatalities?

7. Vehicle Involvement

Could certain states benefit from vehicle management strategies (e.g., traffic flow control) to reduce multi-vehicle collisions?

8. Time Period Comparisons

Are there seasonal trends affecting road safety?

Is there a pattern in the types of crashes (speed violations, weather-related, etc.) during Q4 compared to other periods?

10. Road Safety Policies and Enforcement

Which states might benefit most from increased road safety awareness campaigns or stricter traffic enforcement?

12. Insights on Policy Improvement

How can states with high crashes but low fatalities (like Benue) replicate their success in minimizing fatalities to other high-crash areas?

13. Data Quality and Reporting Issues

Why are there zero cases of driving under alcohol (DAD) in nearly all states? Could this reflect underreporting, and how can this metric be better captured in future data?

How can more detailed data on factors like seatbelt usage, vehicle type, and driver details(age) improve the analysis and policy recommendations?

RECOMMENDATIONS:

1. Stricter Enforcement of Traffic Laws

Speed Violations (SPV):

Recommendation: Implement automated speed enforcement systems, such as speed cameras, in high-risk areas. Introduce speed limiters in commercial vehicles and apply stricter penalties for speed limit breaches.

Punishment: Increase fines for speeding violations and introduce point-based driver licenses, where frequent offenders lose their driving privileges after accumulating a certain number of points.

Driving Under Alcohol (DAD):

Recommendation: Introduce random breathalyzer tests at key checkpoints, especially during holidays and weekends. Engage local communities to raise awareness about the dangers of drunk driving.

Punishment: Enforce mandatory jail time for serious offenders, especially those involved in crashes with injuries or fatalities. Repeat offenders should face license suspension or revocation.

Distracted Driving:

Recommendation: Ban the use of mobile phones while driving, except for hands-free devices. Increase the number of patrol officers focusing on distracted driving offenses.

Punishment: Hefty fines and mandatory road safety classes for offenders. Repeated violations should lead to license suspension.

2. Improving Road Infrastructure

Recommendation:

Expand and Improve Road Networks: Upgrade road conditions in areas with high crashes, such as in states like Bauchi, FCT, and Delta. Ensure proper road signage, lane markings, and lighting to guide drivers, especially in rural areas.

Speed Bumps and Traffic Calming Devices: Install speed bumps, rumble strips, and other traffic-calming devices near accident-prone areas, especially near schools, markets, and residential zones.

Punishment: Authorities should monitor and impose penalties on contractors responsible for substandard road construction, which may contribute to accidents. Fines for municipalities that fail to maintain safe road conditions could also be considered.

3. Educational Campaigns and Public Awareness

Recommendation:

Road Safety Awareness: Launch nationwide educational campaigns to raise awareness about safe driving practices, the consequences of violating traffic laws, and the dangers of driving under alcohol and drugs. Focus on states with high crash rates such as Bauchi, FCT, and Delta.

Driver Training Programs: Make it mandatory for drivers to undergo regular training and retesting on defensive driving, focusing on young drivers and commercial vehicle drivers.

Community Engagement: Encourage local communities to participate in reporting dangerous driving behavior or road hazards. Community policing programs that involve local residents can increase the visibility of road safety enforcement.

Punishment: Offenders who contribute to crashes could be required to attend mandatory road safety classes or undergo additional driving tests. Violators could also be involved in community service focused on road safety education.

4. Advanced Crash Monitoring and Reporting Systems

Recommendation:

Use of Data and Technology: Implement crash monitoring systems using GPS, telematics, and AI-driven data analytics to detect high-risk driving behaviors like speeding, aggressive driving, and sudden braking.

Real-Time Reporting: Enable real-time reporting and analysis of road crashes to allow quicker response times from emergency services, as well as timely data collection for enforcement agencies.

Predictive Analytics: Utilize predictive analytics to identify accident hotspots and deploy preventive measures, such as increased patrols, signage, or better road lighting.

Punishment: Establish a real-time tracking system for habitual offenders and impose driving bans for those who exceed a predetermined threshold of risky driving events.

5. Enhancing Vehicle Safety Regulations

Recommendation:

Regular Vehicle Inspections: Mandate annual or semi-annual vehicle inspections to ensure roadworthiness, particularly for commercial vehicles. Focus on states with high crash rates involving multiple vehicles like Bauchi and Delta.

Enforce Safety Equipment Standards: Ensure that all vehicles have functioning airbags, anti-lock braking systems (ABS), seat belts, and other safety features. In commercial vehicles, introduce tachographs that record driver behavior to track speeding and driver hours.

Punishment: Heavy fines for vehicle owners or operators who fail to meet safety standards. Vehicles found to be in violation should be impounded or removed from circulation until they meet compliance standards.

6. Stronger Penalties for Serious Offenses

Recommendation:

Reckless Driving: Impose stricter penalties for reckless driving, such as street racing, tailgating, and other dangerous behaviors. Punishments could include extended jail time and mandatory suspension of driving licenses.

Repeat Offenders: Implement a three-strike rule, where repeat offenders lose their driving privileges permanently after three severe infractions (e.g., driving under alcohol, speeding, causing fatal crashes).

Punishment: Introduce progressive fines where penalties increase with each subsequent violation. Repeat offenders could also face longer license suspensions, vehicle impoundment, or mandatory installation of monitoring devices (e.g., alcohol ignition interlocks for DUI offenses).

7. Enforcing Accountability for Poor Weather Crashes (PWR)

Recommendation:

Weather Forecast Integration: Integrate weather forecast warnings into traffic management systems to notify drivers of poor weather conditions in real-time, especially in states where poor weather is a significant factor.

Defensive Driving in Poor Weather: Mandate defensive driving courses that include specific training for handling poor weather conditions like rain or fog.

Punishment: Drivers found driving recklessly during adverse weather conditions should face increased fines or penalties, with serious crashes in poor weather conditions leading to higher accountability (e.g., longer jail sentences).

8. Introduce Graduated Penalties and Reward System

Recommendation:

Graduated Penalties: Implement a tiered punishment system where penalties increase with the severity and frequency of traffic violations. Drivers with clean records for a certain period should receive rewards, such as reduced insurance premiums or license fee discounts.

Reward System for Safe Driving: Introduce incentives for commercial drivers and frequent road users who maintain accident-free records. This could include public recognition, reduced fines for minor infractions, or monetary bonuses.

9. Stronger Governance and Policy Making

Recommendation:

Standardize Reporting and Data Collection: Improve the standardization of accident reporting across states to accurately capture the causes of accidents. This will ensure comprehensive policy formation that targets specific issues (e.g., speed, alcohol, weather).

Public Accountability: Ensure that government agencies responsible for road safety and infrastructure are held accountable for enforcing traffic laws and maintaining safe roads. Set clear targets for crash reduction in high-risk areas like Bauchi, FCT, and Delta.

Punishment: Government officials and agencies that fail to meet road safety goals or maintain adequate infrastructure could face internal sanctions, loss of funding, or public scrutiny.