

DATA ANALYST PROJECT

VEHICLE INSURANCE CLAIM FRAUD ANALYSIS

Business Request:

- Analysing insurance claims made by users for their respective vehicles.
- Who are committing insurance claim fraud.
- Suggest ways by which claim fraud might be better curtailed.

About Dataset:

Vehicle Insurance Fraud Detection

Vehicle insurance fraud involves conspiring to make false or exaggerated claims involving property damage or personal injuries following an accident. Some common examples include staged accidents where fraudsters deliberately “arrange” for accidents to occur; the use of phantom passengers where people who were not even at the scene of the accident claim to have suffered grievous injury, and make false personal injury claims where personal injuries are grossly exaggerated.

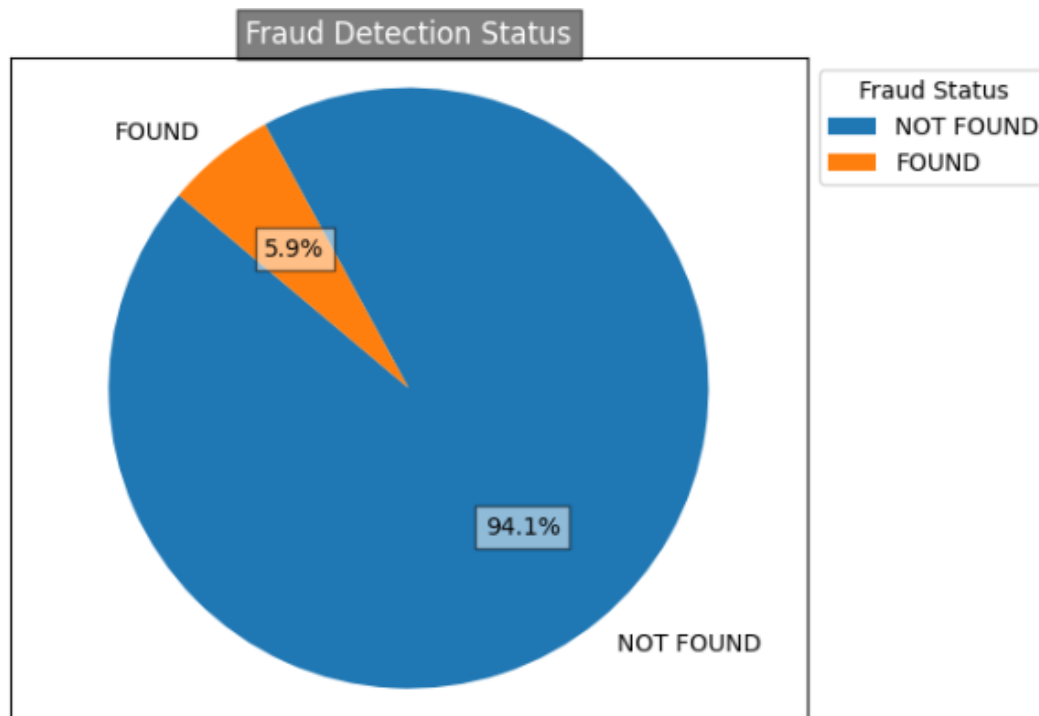
Research Hypothesis:

- Frauds are mostly committed when the cars are in their older self.
- Frauds are mostly committed through external agent.
- Frauds are mostly committed by low rated Drivers.
- People who have taken claim 1s are more likely to take more claims.
- Most frauds will be happening in Urban areas.

Dataset - <https://www.kaggle.com/datasets/shivamb/vehicle-claim-fraud-detection>

EDA Jupyter Notebook: <https://github.com/arpitg2494/Vehicle-Insurance-Claim-Analysis/blob/b42718515187757230060e7922e21c6597b62433/Vehicle%20Insurance%20Fraud%20Detection%20EDA.ipynb>

Analysis & Findings



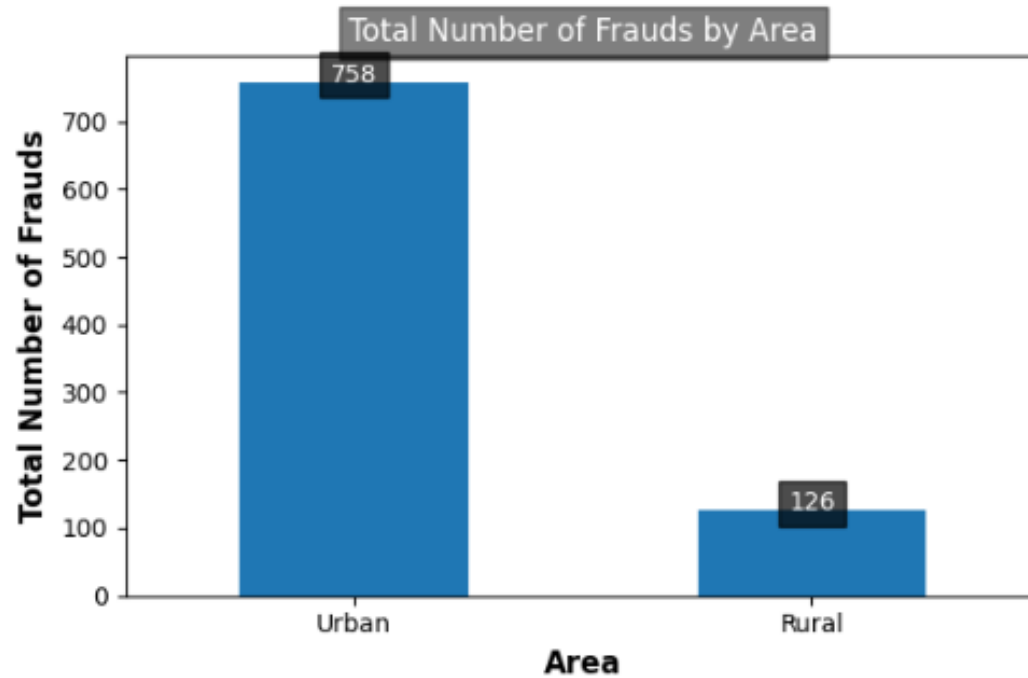
Upon plotting a pie chart, we get to see that only 6% of the claims filed are classified into Fraud.

Although it is a small fraction yet much can be done to reduce such frauds.

Takeaway

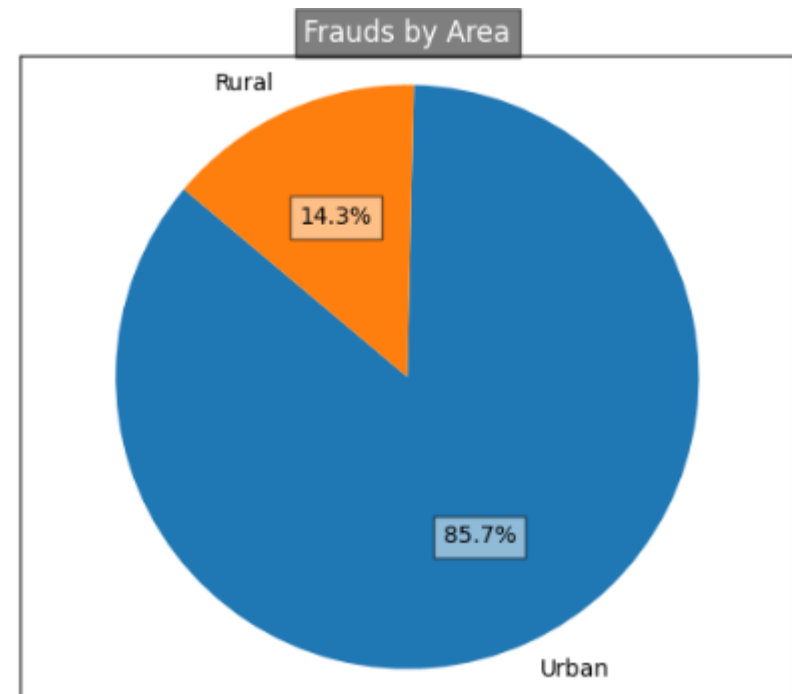
Around 6% of all claims are fraudulent.

Column chart and Pie chart for Frauds by Area



Percentage for the same are 85.7% for Urban area and 14.3% for rural area.

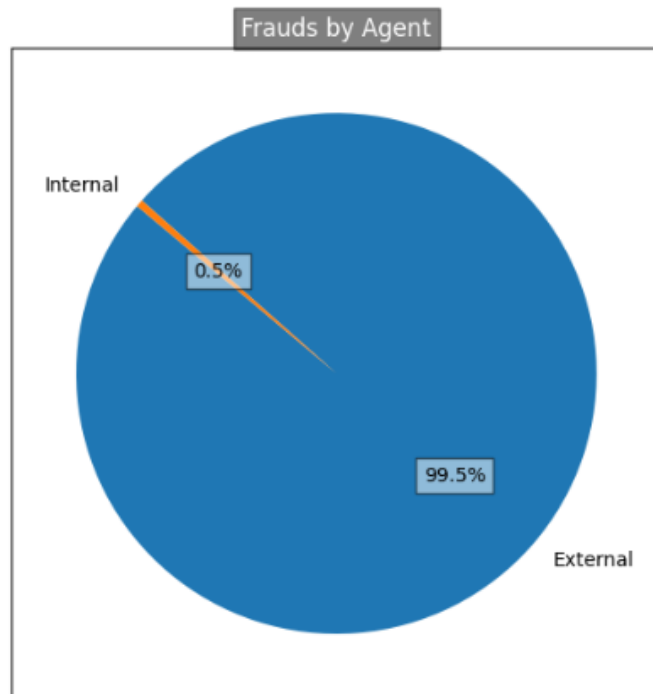
Most of the frauds happen in Urban area and that number stands at 758. Which is substantially large as compared to frauds in rural area @ 126.



Takeaway

People in Urban area is committing more frauds than Rural area.

Pie chart for Frauds by Agent type and Driver rating

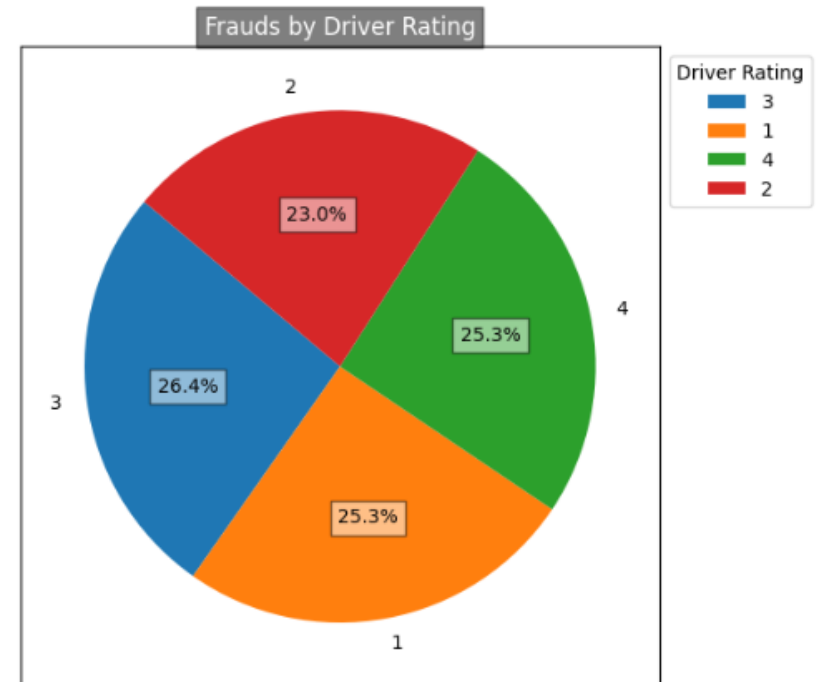


99.5% of external agents are helping people commit insurance fraud, as compared to meagre 0.5% of Internal agents.

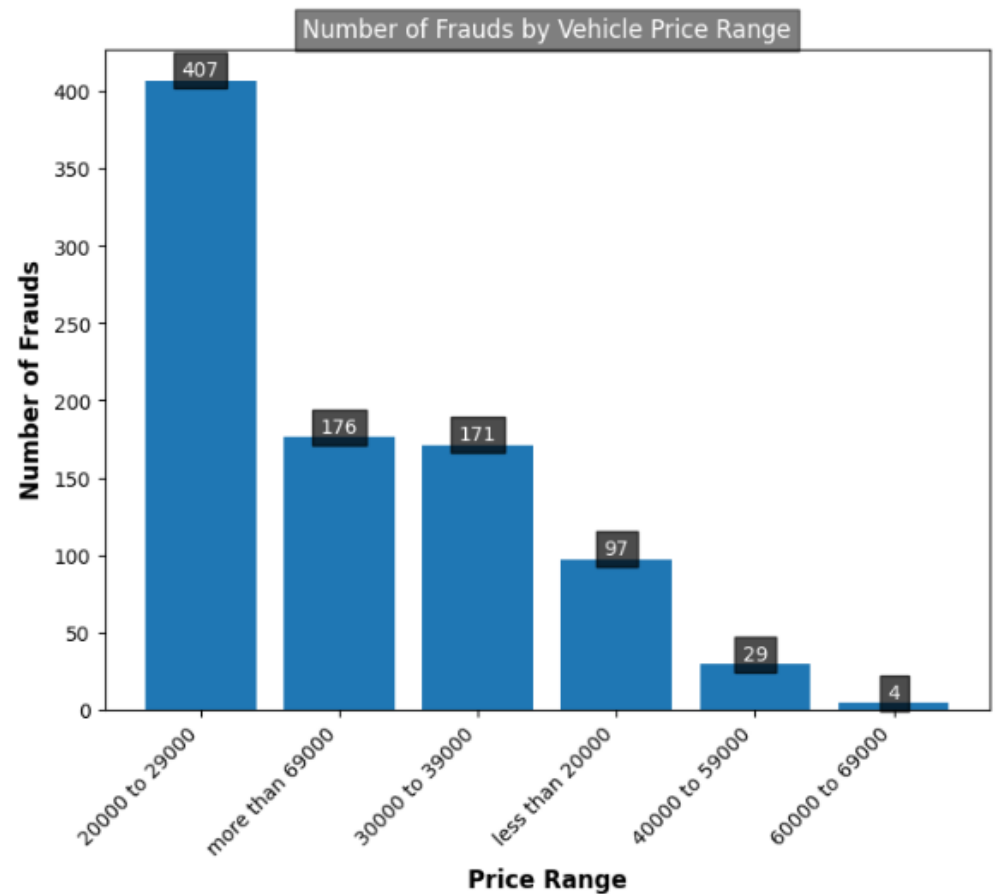
Driver rating graph doesn't help us figure the profiling the frauds.

Takeaway

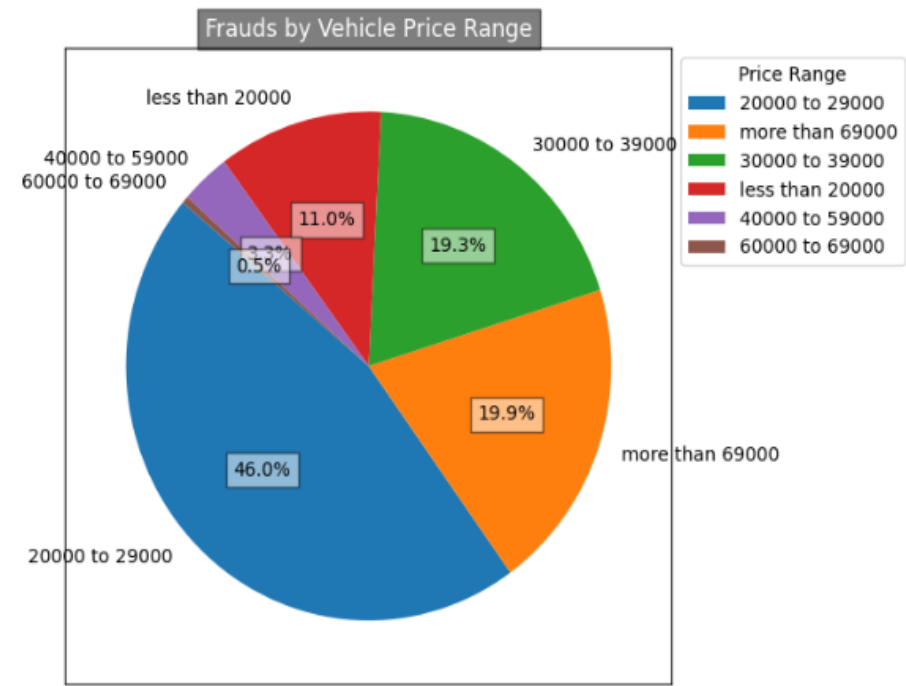
As hypothesised more External Agents are helping people commit frauds than Internal agents.



Column chart and Pie chart for Frauds by Vehicle Price Range



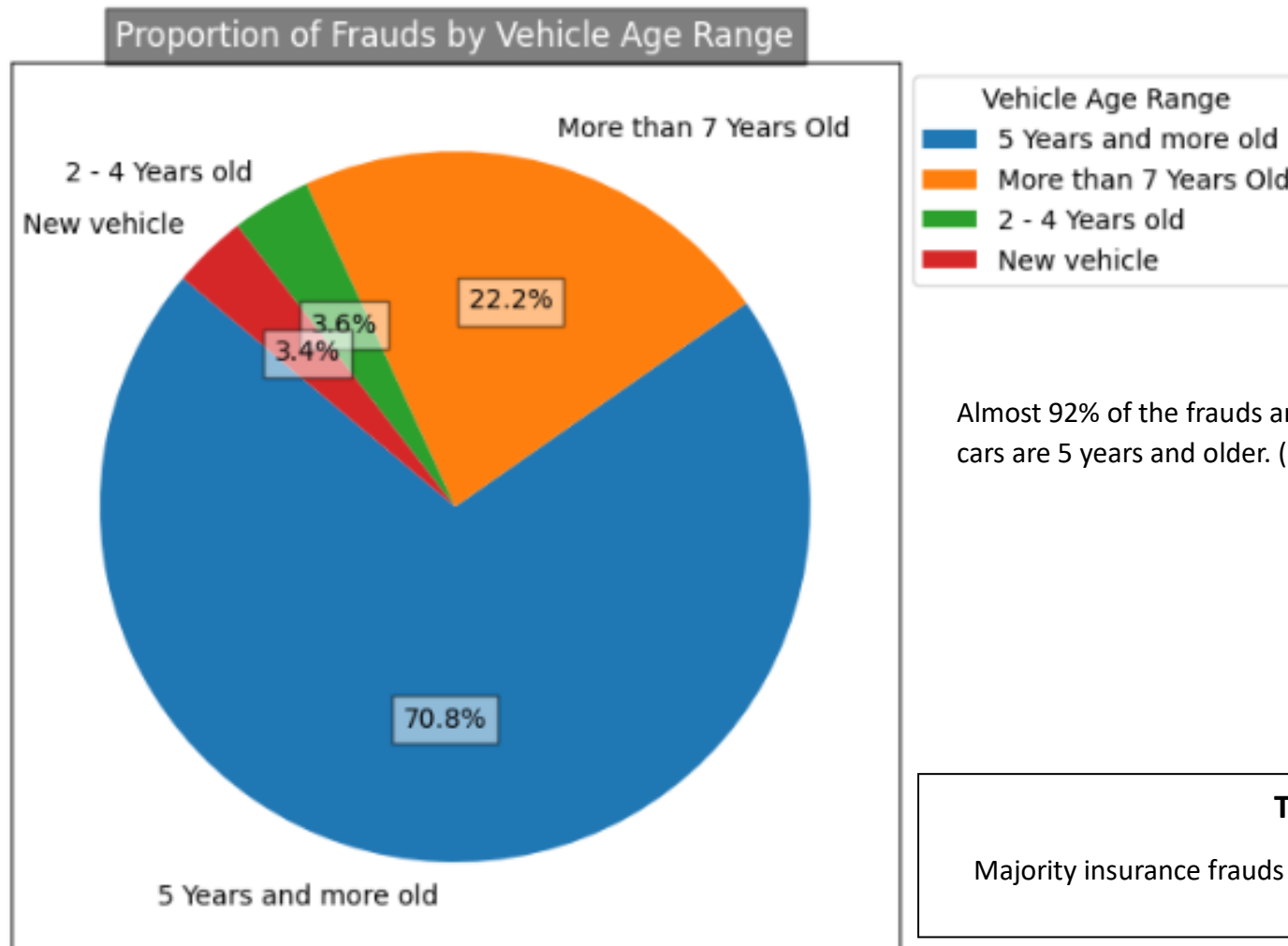
Almost 46%, in number of 407 Vehicles are in the price range of 20,000 to 29,000 USD which are causing most frauds.



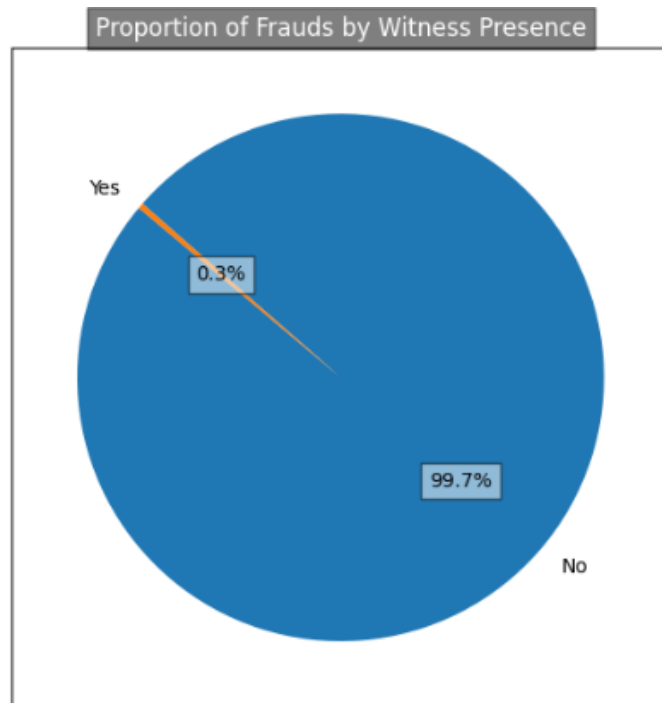
Takeaway

Mid range vehicle owners are doing more vehicle insurance frauds.

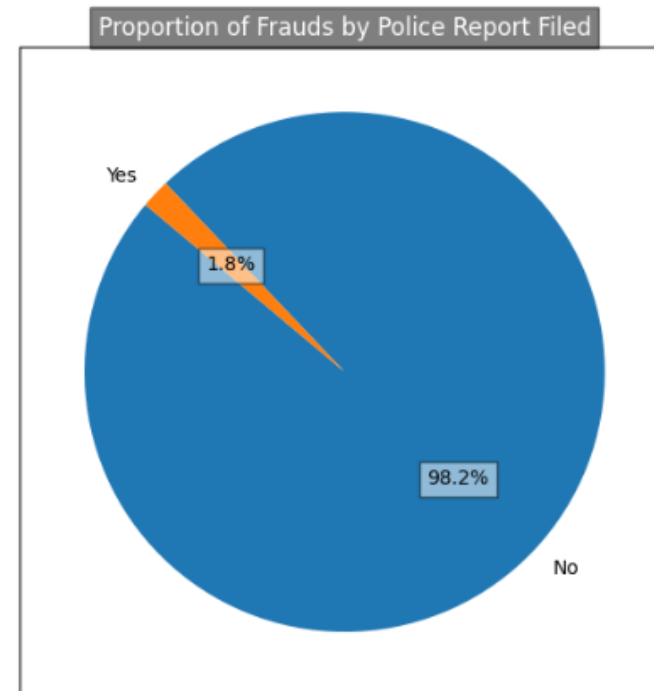
Pie chart for Frauds by Age of Vehicle



Pie chart for Witnesses Presence In Fraud & Police Report Filed In Fraud



Appalling minority of 0.3% false cases had Witness present at the spot.

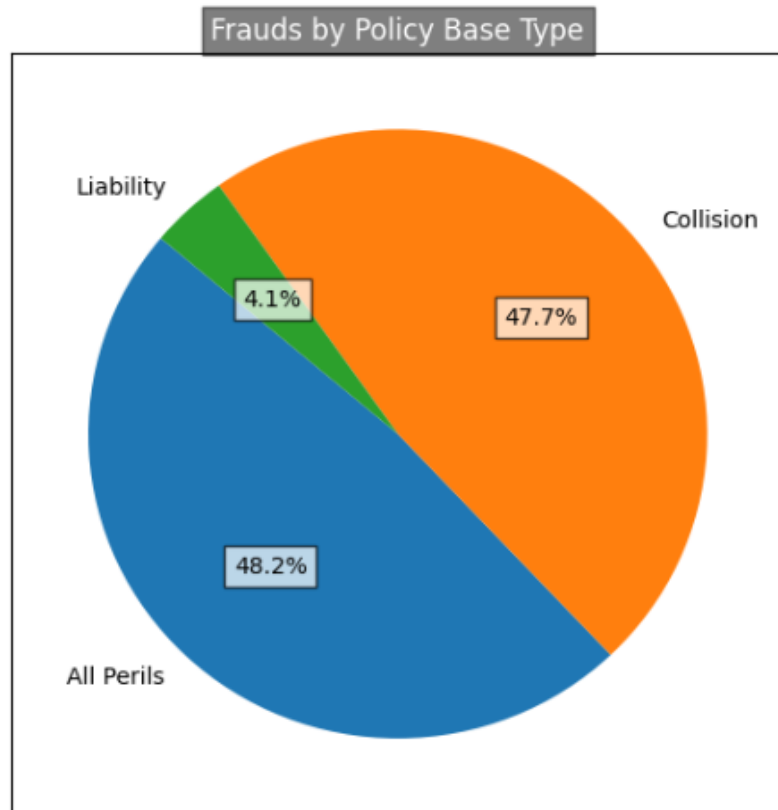


Same is the condition for Police report filed as out of all false cases, only 1.8% of them has police reports filed.

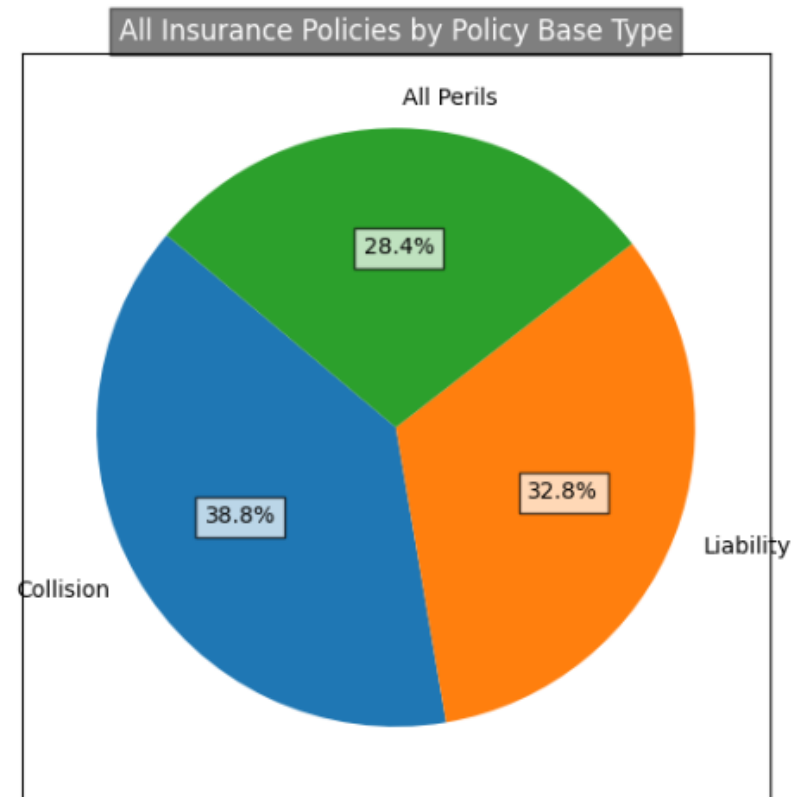
Takeaway

Majority false cases has no Witness presence and they have no police report filed.

Pie Chart comparing Fraud Policy type and all Insurance policy by Policy type



When we compare Pie chart for Fraud policy type and All policy type, we see that fraud claims had lowest Liability Policy base type, where as in all policies, Liability stands at 2nd place in terms of all the policy type.



Takeaway

Fraud insurance claims have least **liability claims** as compared to All peril(comprehensive) and Collision where as they are outliers when compared to All Insurance policy claims.

Suggestions:

Risk Management and Prevention Measures

1. Although there is a huge market for insurance buyers in tier 3 cities and rural areas, Urban areas should be focused on to avoid/catch any insurance frauds.
2. Insurance claim filed by External agents who are not directly associated to the company should be go through an extra layer of check and balances as 99% of the frauds are committed by external agents.
3. Companies should look into insurance premiums for older vehicle. As almost 90% of the frauds are committed by 5 years and older vehicle. Companies should provide incentive to the users for filing premium for older vehicle on top of just reducing premium. Most users see unclaimed insurance as money wasted.
4. More than 90% of the fraud claims did not have any witness present and any police report filed. Although its an amicable decision to not file a police report for a minor collision as more FIRs would burden the Police system, but still companies should probe more carefully when it comes to Insurance claims with no reports filed.

Customer Satisfaction and Business Strategy

1. Companies should give monetary incentive or equivalent to users who don't file claim for their policies.
2. Insurance companies should drastically reduce insurance premium in later years of vehicle life as user finds non usage of insurance claim as a wasteful hence commit more fraud.
3. Companies should give cash-back for buying insurance policies from them for consecutive years.
4. Company should get into the market for 2nd hand cars and give the policy holder a market place to sell their vehicles.
5. Companies should give huge monetary benefits to users who were loyal to them and didn't claim insurance for buying their new vehicle.