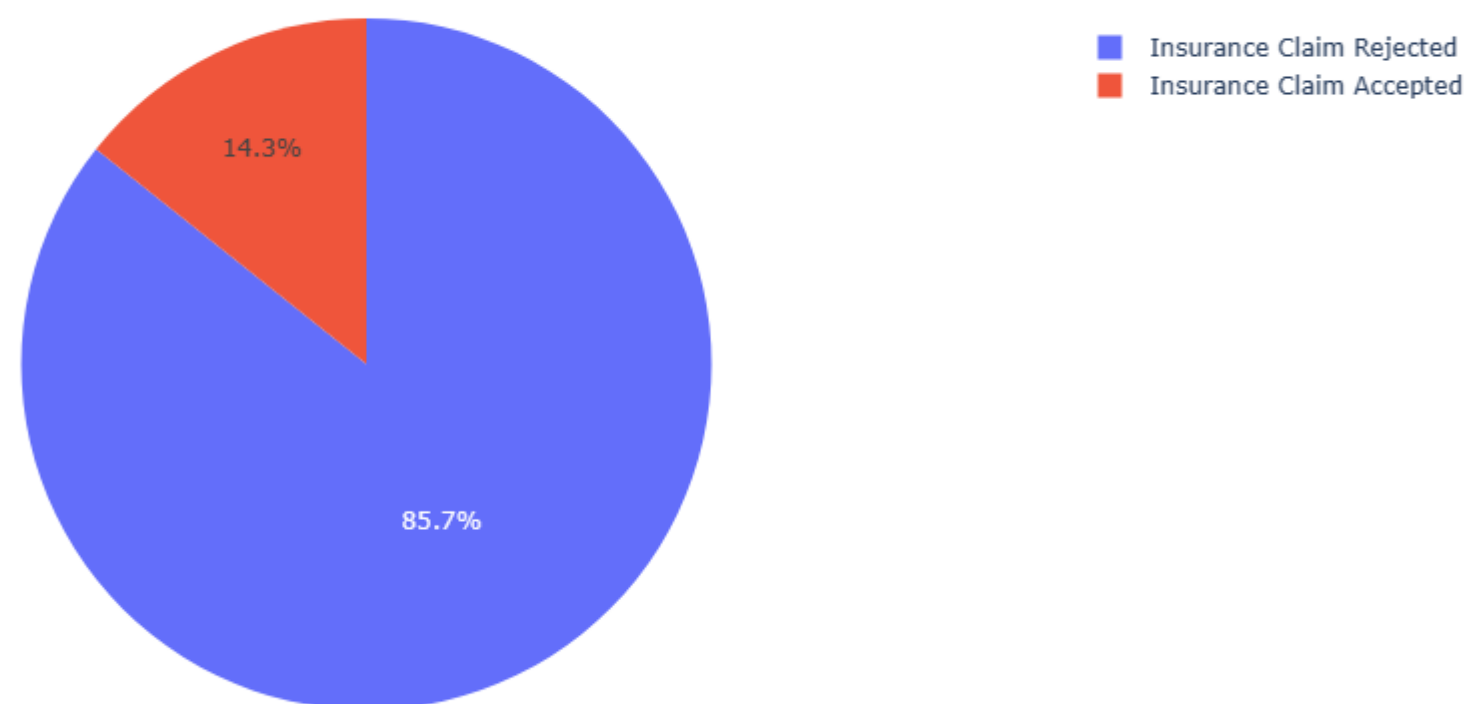


Insurance AI-ML Case Study

The auto-insurance industry plays a significant role in managing risks associated with automobile accidents. Accidents can result in huge losses and financial burden for both insurance companies and individuals involved. Therefore, accurate and timely claim assessment is crucial for the sustainability of the insurance industry. Manual claim assessment is often time-consuming and prone to errors, leading to delays in payment and dissatisfaction among customers. In this context, Auto-ML models can be useful in automating the claim assessment process, improving the speed and accuracy of claim settlement.

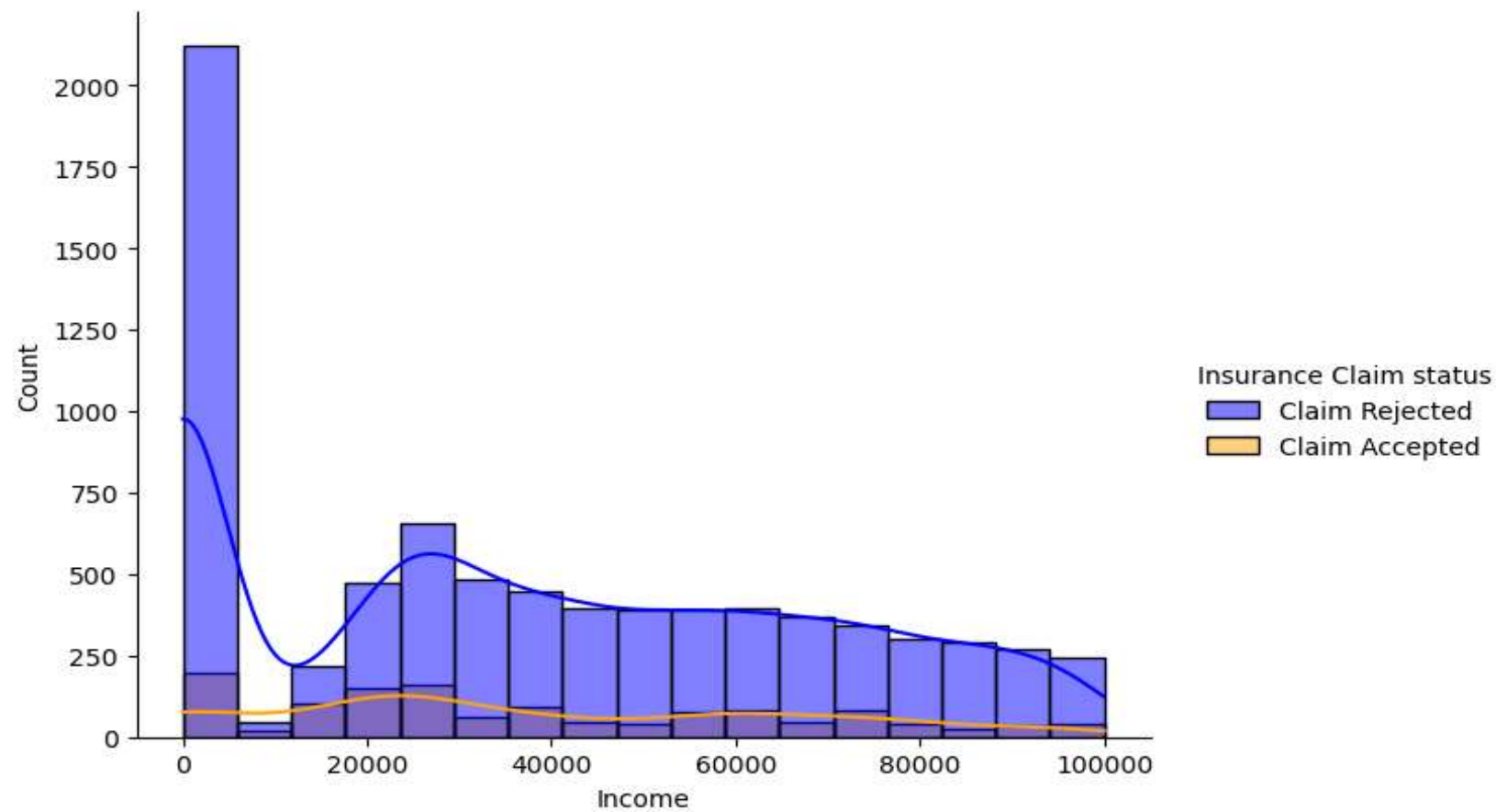
The Auto-ML classification model can also help insurance companies to determine the appropriate premiums for their policies. By analyzing the factors that affect the likelihood of a claim being accepted or rejected, insurance companies can make better-informed decisions about setting premiums.

Insurance Claim status

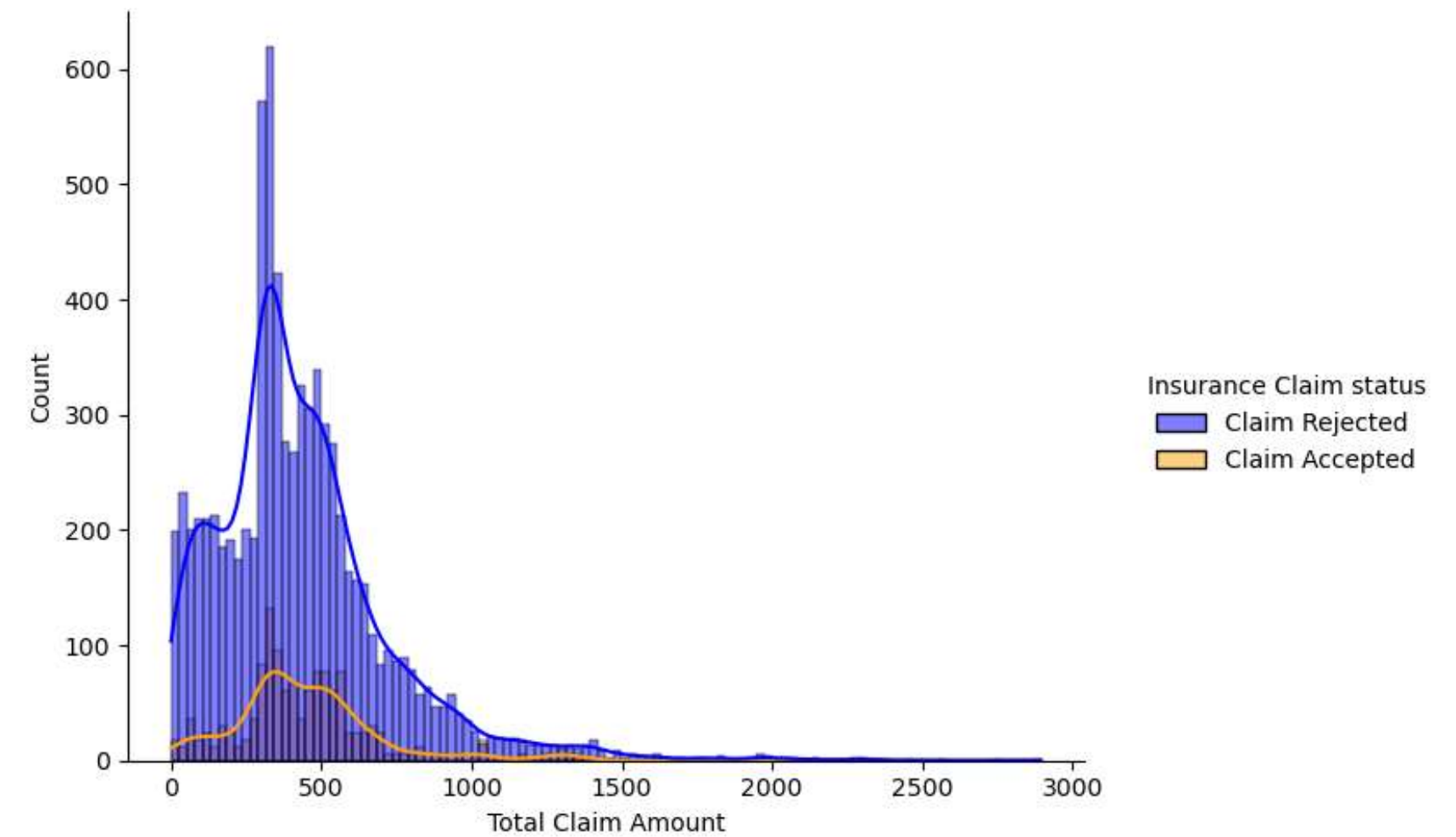


Insurance Claim Status	Count
Claim Rejected	7826
Claim Accepted	1308

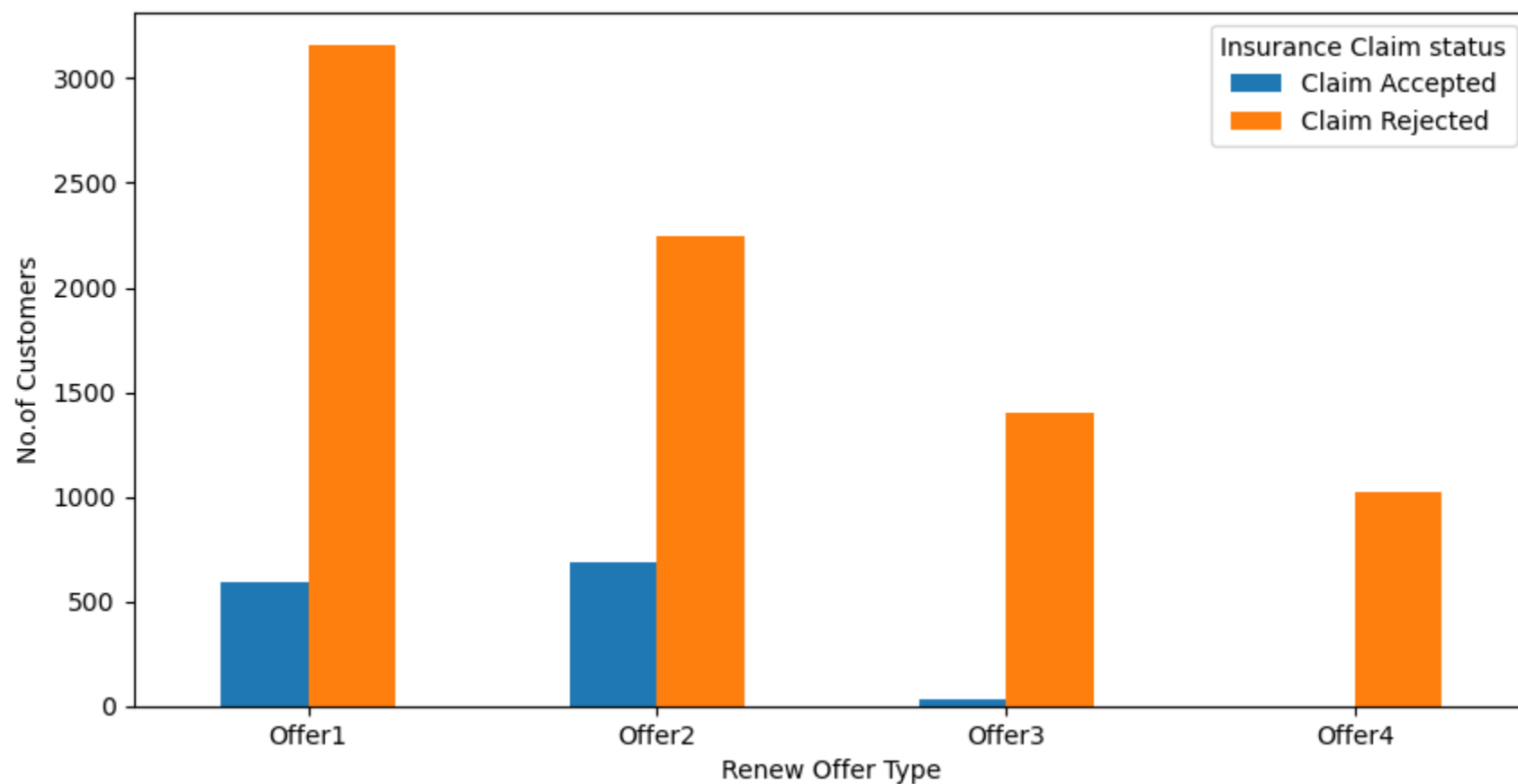
Features Responsible



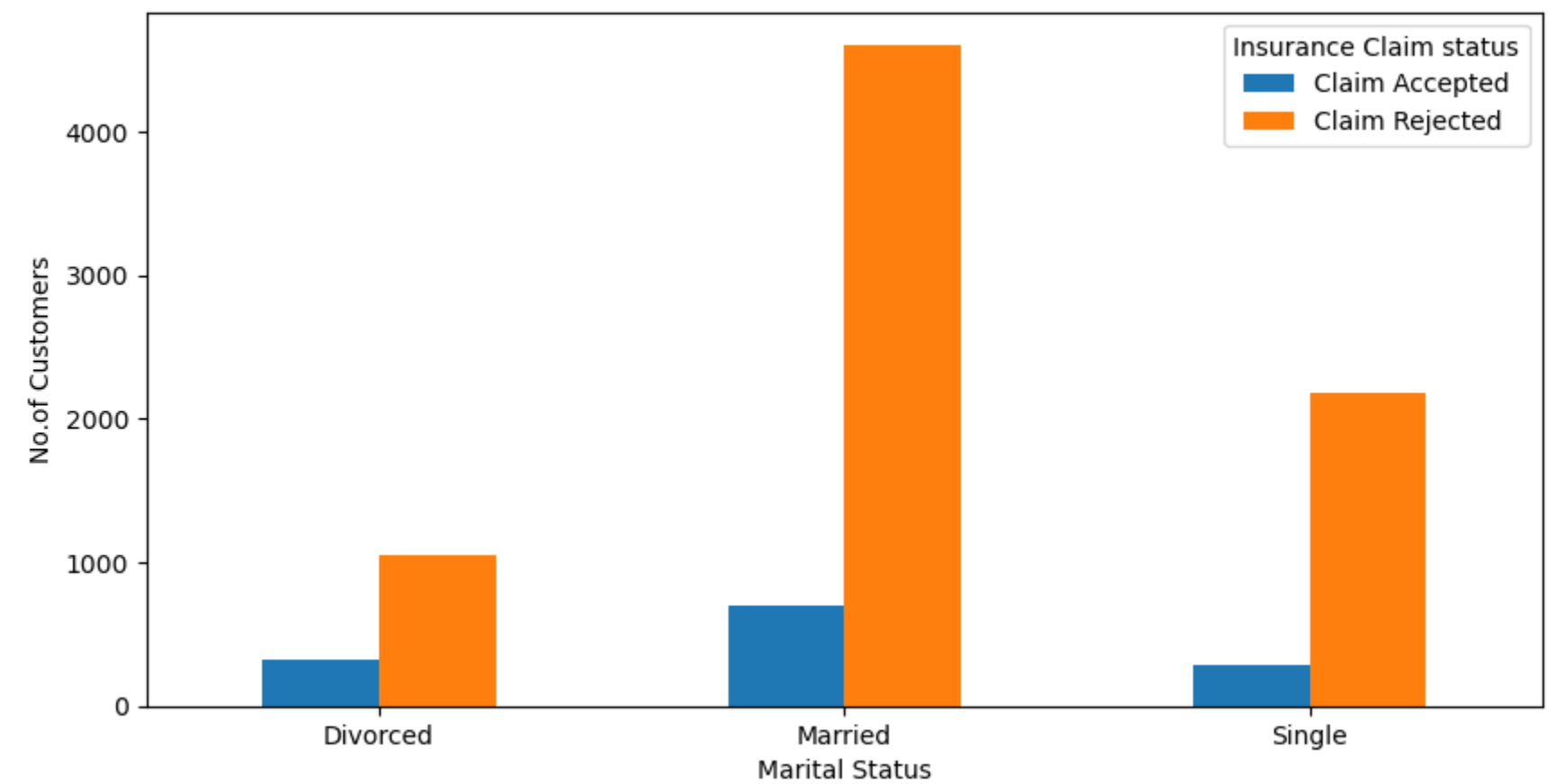
Income may be taken into account when determining fault in an accident. For example, if a driver with a higher income is involved in an accident with a driver who has a lower income, the driver with the higher income may be more likely to be found at fault, as they may be perceived as having more resources to pay for damages



Insurance companies use the **total claim amount** to determine the financial risk associated with each claim, which can affect the likelihood of a claim being approved or denied.



Renew offer type is the type of offer given to a customer when it's time to renew their insurance policy. There are different types of offers such as no offer, low offer, medium offer, and high offer. The renew offer type can influence the customer's decision to renew their policy or switch to another insurer.



Marital Status: Married individuals tend to have a lower risk of accidents and claims compared to single individuals. This is because married individuals tend to be more settled and responsible, and they may also have a more stable lifestyle, such as a regular work schedule and less risky hobbies.

Auto-ML Methodology Results

Case	Percentile	No of Features	Decision Tree	Random Forest	XGBoost	MLP	RNN	Avg. Accuracy
Case 1	25	6	96.64	99.27	99.83	99.08	85.07	96.17
Case 2	50	11	96.49	99.78	99.56	99.56	85.07	96.01
Case 3	75	17	95.29	99.59	99.63	99.63	80.07	95.78
Case 4	90	20	96.27	99.45	99.45	99.45	85.07	96.27

- Based on our observation, XGBoost was the best performing algorithm with 99.83% accuracy in 25th percentile.
- 90th percentile is the best percentile with an average accuracy of 96.27%.

Conclusion

In conclusion, predicting auto-insurance claim status using Auto-ML algorithms can be a valuable tool for the insurance industry. With accurate predictions, insurance companies can more efficiently manage their resources, provide better customer service, and ultimately improve their profitability. The dataset has 9134 records with 8 Categorical Features and 16 Numerical Features. 85.7% of the dataset shows auto-insurance claim status was rejected.

For classification, models were created with algorithms using Auto-ML techniques like Decision Tree, Recurrent Neural Network, Multilayer Perceptron, Random forest and XGBoost . With these models, performance measurement values were obtained for feature sets of 6, 11, 17 and 20. The Auto-ML algorithms were able to predict whether an auto-insurance claim status is accepted or rejected with an average accuracy between 95% - 98% and helped to identify factors that determine auto-insurance claim status . The major factors include Income, Total claim amount, Renew Offer type and Marital status. When the results are examined, it is observed that with the addition of each new feature, the success of classification decreased and then increased at 90th percentile. Based on the performance measurement values obtained, it is possible to say that the study achieved success in classifying whether an auto-insurance claim status is accepted or rejected.

Overall, the use of Auto-ML algorithms for predicting auto-insurance claim status offers great potential for the insurance industry. By leveraging the insights provided by these models, insurance companies can improve their risk management strategies, enhance their customer service, and ultimately increase their profitability.