Comparative Analysis of Motor Insurance Claims using Machine Learning

Authors : Francis Kwame Bukari, Maclean Acheampong Yeboah

Abstract : From collective hunting to contemporary financial markets, the concept of risk sharing in insurance has evolved significantly. In today's insurance landscape, statistical analysis plays a pivotal role in determining premiums and assessing the likelihood of insurance claims. Accurately estimating motor insurance claims remains a challenge, allowing insurance companies to pull much of their money to cover claims, which in the long run will affect their reserves and impact their profitability. Advanced machine learning algorithms can enhance accuracy and profitability. The primary objectives of this study encompassed the prediction of motor insurance claims through the utilization of Artificial Neural Networks (ANN) and Random Forest (RF). Additionally, a comparative analysis was conducted to assess the performance of these two models in the domain of claim prediction. The study drew upon secondary data derived from motor insurance claims, employing a range of techniques, including data preprocessing, model training, and model evaluation. To mitigate potential biases, a random over-sampler was used to balance the target variable within the preprocessed dataset. The Random Forest model outperformed the ANN model, achieving an accuracy rate of 90.33% compared to the ANN model's accuracy of 86.33%. This study highlights the importance of modern data-driven approaches in enhancing accuracy and profitability in the insurance industry.
Keywords : risk, insurance claims, artificial neural network, random forest, over-sampler, profitability
Conference Title : ICFBI 2025 : International Conference on Finance, Banking and Insurance
Conference Location : Sydney, Australia
Conference Dates : October 18-19, 2025