RESEARCH ON HEALTH INSURANCE PREDICTION AND ANALYSIS USING ARTIFICIAL NEURAL NETWORK (ANN)

ABSTRACT

Health insurance prediction and analysis is a vital task for insurance companies to ensure that their clients get the coverage they require. The use of artificial neural networks (ANNs) to forecast health insurance outcomes has shown to be rather effective. The purpose of this study is to examine how well artificial neural networks (ANNs) forecast health insurance results and to examine the variables that influence insurance claims. An artificial neural network (ANN) model for future claim prediction will be developed using a dataset of health insurance claims. In order to create a model that can forecast the possibility of an insurance claim based on these parameters, the study will determine the most important elements that influence insurance claims. In addition to helping insurance firms create more precise and effective prediction models, the study will offer insightful information about the application of ANNs for health insurance analysis and prediction.

INTRODUCTION

As uninsured persons have faced huge medical expenses as a result of Covid, there was a significant demand for health insurance policies, raising awareness and the necessity for coverage. The research hopes to provide insights for healthcare stakeholders such as insurance companies, healthcare providers, and patients.

Health insurance prediction and analysis is a crucial task for insurance companies to ensure that they are providing adequate coverage to their clients. In recent years, artificial neural networks (ANNs) have emerged as a powerful tool for predicting health insurance outcomes. This research study aims to investigate the effectiveness of ANNs in predicting health insurance outcomes and to analyse the factors that contribute to insurance claims.

The study will use a dataset of health insurance claims to develop an ANN model for predicting future claims. The dataset will be pre-processed and normalized before being divided into training and testing sets. The ANN model will be trained using the training set and then evaluated using the testing set. The results will be compared to other predictive models to determine the effectiveness of ANNs in predicting health insurance outcomes.

The analysis of the factors that contribute to insurance claims will be conducted using various statistical techniques. The study will identify the most significant factors that contribute to insurance claims and develop a model that can predict the likelihood of a claim based on these factors. The findings of this study will be useful for insurance companies in developing more accurate and efficient prediction models for health insurance claims.

This research study will investigate the effectiveness of ANNs in predicting health insurance outcomes and analysing the factors that contribute to insurance claims. The study will provide valuable insights into the use of ANNs for health insurance prediction and analysis and will contribute to the development of more accurate and efficient prediction models.

LITERATURE SURVEY

Kapadiya, K., Patel, U., Gupta, R., Alshehri, M. D., Tanwar, S., Sharma, G., & Bokoro, P. N. (2022) presented a computational framework for Blockchain and AI-empowered Healthcare Insurance Fraud Detection: An Analysis, Architecture, and Future Prospects. The authors talk about how more and more people are facing health issues. They emphasize how having health insurance is crucial. At the same time, the author brings up concerns about fraud, security, and privacy issues related to health insurance. This article focuses on the bad things that happen when people cheat health insurance. It talks about why we need ways to catch these cheaters. It also looks at how we can use smart computer technology (AI) and secure digital systems (blockchain) to catch these cheaters and keep health insurance safe. Plus, the article gives a way to sort out the different problems that can happen in this process. As a research gap the article fails to give enough information about the real-life problems and how to actually use these systems in the real world. In the conclusion of the paper, they talk a lot about what the paper adds to our knowledge. They also discuss how hard it might be to actually use the method they suggest in real-life situations.

Ho, C. W. L., Ali, J., & Caals, K. (2020) proposed Ensuring trustworthy use of artificial intelligence and big data analytics in health insurance. The author initially gives a warning about using something in the wrong way. It also says that insurers, the people who make the rules, and those who have insurance should work together to keep trust and make sure things keep working well. Authors focused on the rules and ethics when using data analysis in health insurance. It also looks at important things like having a good way to manage data and a clear and responsible process for it. One area where more research is needed is to look more closely at the worries about privacy and ethics when we use AI and big data analysis in health insurance. The conclusion of the study emphasizes that big data technologies have a lot of potential for insurance companies. They can use these technologies to make their sustainability reports better, reduce losses, and design health insurance plans more effectively.

Bhardwaj, N., & Anand, R. (2020) the authors performed a review on different machine learning models for the research on Health insurance amount prediction and through which it can assist people in figuring out how much money they need for their health-related

expenses. The study looked at three different models to do this: one was Multiple Linear Regression, another called Decision Tree Regression, and a third one called Gradient Boosting Decision Tree Regression. They compared these models to see which one worked the best. This study is all about helping individuals understand how much money they need for their health needs. It doesn't rely on the terms and conditions of insurance companies. Instead, it looks at your health to figure this out. However, it doesn't use advanced machine learning techniques for the predictions. The authors concluded that a person's lifestyle like smoking and age has great impact on the predictions made by all the methods we used. Among the different methods, the Gradient Boosting Regression model, which uses decision trees, turned out to be the best at making predictions.

Goundar, S., Prakash, S., Sadal, P., & Bhardwaj, A. (2020) illustrated Health Insurance Claim Prediction Using Artificial Neural Networks. The author in this study presents machine learning model, artificial neural network for predicting how much money a company will spend on medical claims each year. After creating the model, the author worked on making it better by adjusting some settings like how many times the model learns (epochs), how quickly it learns (learning rate), and how many parts it uses to think (neurons) in different layers. In the conclusion, the author found that the machine learning model, the ANN, did a better job than the predictions made by people, which are currently being used. The ANN reduced the error rate by approximately 11.5%. The research focused on a specific company for its health insurance claim prediction, but the author didn't specify the particular factors or parameters considered in this prediction process. Additionally, it was noted that the training dataset used in the research was quite large. This extensive training data may have caused the model to overfit, meaning it became too specialized in understanding the training data but had difficulty applying that knowledge to new data, potentially affecting the accuracy of predictions on the test dataset. As a result, there might be a need for more detail regarding the variables influencing the health insurance claim predictions and further exploration of model training to address overfitting and enhance the model's generalization to new data.

Christina X Ji, A. M. (2023, June) presented research on Large-Scale Study of Temporal Shift in Health Insurance Claims. This initiative involves creating an algorithm, designed to detect changes over time in health insurance claims. The algorithm can examine these shifts either across an entire group of people (the population level) or within a specific subgroup that it identifies. By using this algorithm, researchers and insurers can gain insights into how health insurance needs and patterns change with time. This information is valuable for adapting insurance policies and services to better meet evolving healthcare requirements.

With the use of this algorithm, the author was able to conduct a thorough examination of how healthcare changes over time, marking what appears to be the first extensive evaluation of its kind. The algorithm includes several components: Hypothesis Testing, which involves testing ideas or hypotheses about these changes; Discovering Sub-populations with Shifts, where the algorithm identifies specific groups that show significant changes over time; an Algorithm to Test for Temporal Shift, which assesses these shifts; and a Meta-Algorithm to Scan for Temporal Shift, a broader tool for detecting and monitoring these changes across different datasets or scenarios. Together, these algorithms enable a comprehensive assessment of how

healthcare evolves with time, offering valuable insights for healthcare decision-makers and researchers. The study highlights that changes over time are quite common in healthcare settings. It suggests that in the future, more research should focus on methods for identifying specific groups that are affected by these changes and on updating models to minimize their impact on patient care. This would help ensure that healthcare remains effective and responsive as circumstances change.

Kaushik, K., Bhardwaj, A., Dwivedi, A. D., & Singh, R. explored Machine Learning-Based Regression Framework to Predict Health Insurance Premiums. The authors made predictions about how much an individual's health insurance would cost based on certain characteristics or features related to that individual. In other words, they used information about people, such as their age, gender, medical history, and other relevant factors, to estimate how much money they would likely spend on health insurance. This approach allows insurance companies and healthcare providers to make more accurate financial assessments and offer appropriate insurance plans or services tailored to each individual's needs. An artificial neural network model was created and tested using a variety of factors, including a person's age, gender, body mass index (BMI), the number of children they have, whether they smoke, and where they are located. The model was trained to learn from this information and then evaluated to see how well it could make predictions or assessments based on these parameters. This kind of analysis helps in making more informed decisions or predictions related to health, insurance, or other relevant areas by considering these key factors. The findings of this research indicate that the use of machine learning in health insurance can lead to time and cost savings for both the people who have insurance policies (policyholders) and the insurance companies themselves (insurers). Machine learning helps make processes more efficient, reducing the time and resources needed for various tasks related to insurance, which can ultimately benefit everyone involved. This study focuses on investigating approaches to make sure that private and sensitive health data is used in a responsible and secure manner during the process of predictive modelling. It takes into account the importance of preserving individuals' privacy and ensuring that ethical standards are upheld when handling this sensitive information.

METHODOLOGY

TYPE OF RESEARCH

The study is of mainly in five types that are Qualitative, Descriptive, Analytical, Applied and Quantitative

Descriptive research: Research employs a variety of approaches, each adapted to a certain goal. Descriptive Research, which focuses on providing an in-depth representation of healthcare and policy-related phenomena, is a common research genre in the field of health

insurance. This method comprises gathering, organising, and presenting quantitative and qualitative data in order to shed light on the issue under consideration. To grasp and clarify healthcare dynamics without changing factors, researchers depend on surveys, analysis of content, observations, and case studies. While descriptive research does not show causal linkages, it is extremely useful in producing insights, creating hypotheses, and providing as the foundation for advanced research initiatives in the health policy area. It is an essential tool for academics in health the field of economics health policy, and actuarial science to have, allowing them to get a full understanding of complicated healthcare.

Quantitative Research: In the field of health insurance, quantitative research is a methodical approach to research that mainly depends on quantitative data and statistical analysis. This sort of study seeks measurable information on health insurance policy, claims, and results. To get organised and quantifiable data, researchers use standardised data collecting methods such as surveys or data extraction. Quantitative research seeks to identify patterns, correlations, and causal elements within health insurance networks, allowing for a thorough assessment of issues such as policy efficacy, expense analysis, and claim prediction. This method is critical for giving data-driven insights to both insurers and clients, allowing for informed choices in the complicated world of health insurance. It is critical in determining the influence of various factors on health insurance.

Qualitative Research: Qualitative research is a kind of inquiry that dives into the depths and intricacies of a subject, concentrating on understanding individuals' underlying motives, beliefs, and experiences. Instead than depending on statistics, this sort of research collects rich, non-numerical data using methods such as focus groups, interviews, findings, or content analysis. Qualitative research tries to investigate the intricacies and circumstances around a phenomena in order to have a better understanding of the subject's matter. This strategy is used by researchers to reveal personal insights, cultural impacts, or why and how of human behaviours. It is especially useful in domains such as sociology, psychology, and healthcare, where collecting people's experiences and views is crucial in influencing policies, interventions, and gaining a more complete knowledge of health-related issues.

Applied Research: Applied research refers to a sort of study that focuses on practical challenges and real-world difficulties. Applied research, as opposed to pure or theoretical study, which attempts to grow knowledge for the sake of expanding knowledge, is motivated by the desire to identify practical answers and applications. Applied researchers apply existing ideas and concepts to actual problems. This sort of study is extremely important in industries like health care, technology, and the company, where the major objective is to enhance operations, innovations, and systems. Applied research is critical in the development of fresh goods, regulations, and strategies that benefit industries, organisations, and the community as a whole.

Analytical Research: Analytical research is a thorough and rigorous investigative methodology that entails critical study of existing facts, hypotheses, or information in order to reach well-founded findings and obtain a greater grasp of a certain issue. This sort of study seeks to analyse, assess, and analyse data or phenomena in order to uncover patterns, correlations, and trends. To dissect and appraise complicated material, scientists rely on

analytic tools and approaches, which are frequently based on mathematical or statistical methods. Analytical research is useful in a variety of domains, such as the field of economics statistics, and policy evaluation, where the focus is on gaining relevant insights and answers from existing data. Based on a methodical review of existing information, it aims to improve decision-making, guide plans, and provide important recommendations.

Formulation of Hypotheses

Making hypotheses is like building the basis for our study in the realm of applying artificial neural networks, or ANNs, to forecast and analyse health insurance. These hypotheses are informed assumptions or concepts that assist us in asking particular questions and making predictions regarding how effectively ANNs can assist with health insurance. We want to know how ANNs impact health insurance projections and claims and if they are effective. These assumptions provide a framework for investigating the interaction between technologies and healthcare. We want to learn about the benefits and drawbacks of employing ANNs in health coverage. So, by generating hypotheses, we begin our adventure to discover the mysteries of health care prediction using ANNs.

This study investigates the influence of Artificial Intelligence (AI) on the processing of health insurance claims in a larger perspective. It is based on two key hypotheses. The Null Hypothesis (H0) proposes that AI does not significantly improve the accuracy of health insurance projections when compared to traditional approaches. On the other hand, the Alternative Hypothesis (Ha) claims that AI does, in fact, increase the precision of health insurance projections when compared to traditional methodologies. The researchers are currently working to determine which of these assumptions is validated by their data, basically determining if AI can play a transformational role in health insurance prediction.

"Enhancing Disease Risk Prediction with ANNs," examines the usefulness of Artificial Neural Networks (ANNs) in boosting illness risk prediction. The central hypotheses under consideration are the Null Hypothesis (H0), which contends that ANNs will perform worse than traditional risk evaluation models in terms of specificity and sensitivity when estimating disease threats, as well as the alternative hypothesis (Ha), that contends that ANNs may surpass traditional models in these areas. The study seeks to give vital insights into ANNs' capabilities in health risk prediction, shining a spotlight on whether these sophisticated algorithms have the ability to considerably increase disease risk prediction accuracy when compared to current methodologies.

“Impact of Lifestyle Factors In Claim Prediction focuses on two essential hypotheses. The Null Hypothesis (H0) suggests that lifestyle variables including as smoking, exercise, and diet influence the nature and expense of health coverage claims. The Alternate Hypothesis (Ha) contends that these lifestyle factors do, in fact, influence the types and prices of health-care claims. The goal of this study is to determine whether there is a discernible link between people's lifestyles and their health insurance claims, and also to provide insights into the larger implications of lifestyle choices on medical services prices and guarantee kinds.

Within the scope of "Geographic Varieties in Medical Care Expenses," this investigation focuses on evaluating two primary hypotheses. The null and void Hypothesis (H0) proposes that there's are no significant differences in medical care prices between geographic areas. In contrast, the Alternative Hypothesis (Ha) suggests that medical care expenses vary greatly across the country. The purpose of this study is to determine if the location has a significant role in shaping medical care costs by providing insight into the projected influence of geological on medical care transparency, asset designation, and disparities in medical services expenditure.

" Demographics and Health Outcomes," two centre speculations become the overwhelming focus. The Invalid Speculation (H0) recommends that there are no varieties in wellbeing results among various segment gatherings, like age, orientation, and nationality, as shown by their medical coverage claims. In actuality, the Elective Speculation (Ha) suggests that there are to be sure aberrations in wellbeing results inside these segment classifications, in view of the proof introduced in health care coverage claims. This exploration is equipped towards uncovering whether segment factors altogether influence wellbeing results, offering bits of knowledge into potential wellbeing imbalances and inconsistencies that might exist among different segment gatherings. The discoveries of this study are ready to add to a more extensive perception of the mind-boggling connection among socioeconomics and wellbeing results, at last directing more educated and even-handed medical care strategies and practices. Thorough comprehension of the unpredictable transaction between geographic elements and medical care costs.

Research Design

Research design is the strategic plan or framework that guides a research study from its inception to the final analysis and interpretation of results. It serves as a blueprint for conducting research, outlining the structure and methodology to ensure that the research objectives are met. A well-constructed research design defines the research questions, data collection methods, and analysis techniques to be used. There are various types of research designs, including descriptive, exploratory, correlational, experimental, and mixed-methods designs, each suited to different research goals. The research design also considers ethical considerations, data validity, and reliability. It is a crucial aspect of any research project, as it determines how data will be collected, analysed, and interpreted, ultimately shaping the quality and validity of the study's findings. A robust research design is essential for producing credible and meaningful research results.

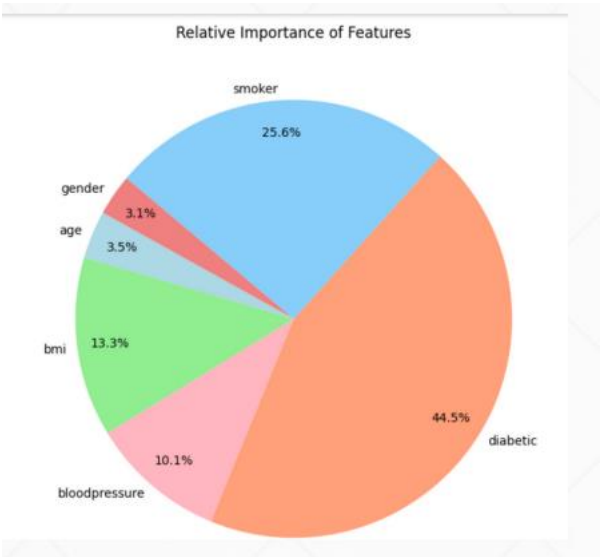
Finding a representative subset of data from a larger population of health insurance claims is the objective of this study's sampling design. This was accomplished by using a stratified sample strategy, which involves grouping the population into discrete strata according to certain attributes such as age, gender, and geography. 40 people with a variety of health insurance claims provided data for the study, guaranteeing that a wide range of experiences and situations were taken into account. A more thorough examination of the interaction between health insurance and demographic variables is made possible by this careful

sample approach, which enhances the comprehensiveness and accuracy of the study topic analysis.

Research using an observational approach provides a window into actual behaviours and events, making it possible to identify trends and patterns. Its goal in this case is to apply Artificial Neural Networks (ANN) to a dataset so that health insurance claims may be analysed and predicted. Thematic content analysis is also employed as a useful method to uncover hidden themes and patterns influencing these assertions. It improves prediction model precision in this way. In addition to offering insightful knowledge on the health insurance industry, this observational method enables researchers to make significant connections that may result in more precise forecasts and better decision-making.

DATA ANALYSIS

Carefully selected sample data from a wide range of people, that extend all types of policy makers, was acquired for the pilot survey. Age, which reflects the range of ages among respondents; gender, which influences the receipt of claims; lifestyle, given that diseases like diabetes have a substantial impact on an individual's health; the number of children, which provides information about the extent of dependents; the type of health insurance claim, which illuminates the various insurance preferences of individuals; location, which seeks to comprehend regional variations in claims; and finally, the success of using artificial intelligence (AI) to health insurance prediction, which made it possible to investigate people's perspectives on the application of cutting-edge technology in the health insurance sector. This methodical approach to data collecting allowed for a thorough analysis of the variables affecting health insurance claims from several angles.



Thematic Content Analysis:

Thematic Content Analysis is an effective and methodical qualitative research technique. It entails a thorough analysis of text or visual data, including documents, surveys, and interviews, in order to find and evaluate recurrent themes, patterns, and hidden meanings in the text. When it comes to identifying the obscure elements and insights that impact health insurance claims, thematic content analysis is very helpful. It improves the depth and accuracy of prediction models by enabling researchers to sort through massive databases and retrieve pertinent data. This approach offers a methodical framework for pinpointing important themes, developing a sophisticated comprehension of the intricacies of insurance for health, and eventually enhancing the precision of forecasts by accounting for the nuances and variances found in the data.

The "Role of AI In Analysis of Insurance Claims Based on Health" reveals various important subjects in the field of health insurance. First off, AI technologies greatly improve the speed and precision of claim processing, resulting in less mistakes throughout the review process and speedier answers. Second, AI plays a critical role in identifying and stopping fraudulent insurance claims, protecting the financial stability of insurers and the confidence of policyholders. Moreover, the predictive modelling skills of AI are crucial in evaluating health-related risks, which in turn affects premium prices according to personal risk profiles. Finally, artificial intelligence (AI) automates the crucial phase of claim verification, streamlining the process and minimising mistakes while ensuring accuracy. These related topics highlight how AI is revolutionising the health insurance industry by promoting fraud prevention, accurate risk assessment, efficient claims processing, and operational efficiency that benefits both insurance companies and policyholders.

Several important topics emerge from the research on "Enhancing Disease Risk Prediction with ANNs." First, using multi-dimensional data, Artificial Neural Networks (ANNs) significantly increase the accuracy of illness risk prediction. It emphasises how difficult it is to incorporate many data sources into ANN models, which is both essential and extremely difficult to do in order to provide reliable predictions. It highlights the importance of feature selection in improving ANN models, stressing the necessity of selecting relevant variables and features to maximise performance. It also explores the fine balance that exists between interpretability and model correctness, recognising that interpretability can go down with increased accuracy and vice versa. The interconnectedness of these topics highlights how complex illness risk is prediction utilising artificial neural networks (ANNs), taking into account the difficulties in integrating data, the significance of feature selection, and the trade-off between interpretability and accuracy in the creation of models.

Several important issues emerge in the context of "Impact of Lifestyle Factors In Claim Prediction." First, it should be noted that lifestyle variables play a crucial part in determining the risk that insurance policyholders face, and that these factors have a substantial impact on the insurance market. The relationship between lifestyle decisions and premium computation is emphasised, demonstrating how these decisions are taken into consideration by insurance firms when calculating policy prices. It also explores the link between individual decisions and the frequency of particular insurance claims by examining how lifestyle

variables influence this relationship. It concludes by recognising the difficulties insurers encounter in acquiring and applying lifestyle-related data and emphasising the complexities of integrating such information into the insurance decision-making process. Together, these intricately linked themes illuminate the nuanced relationship between lifestyle choices and insurance claims, shedding light on the many different aspects that insurers take into account when determining risk and how much to charge for policies.

Upon investigating "Geographic Variations in Healthcare Costs," a number of key topics become apparent. First and foremost, supply and demand dynamics are more important since these differences in healthcare prices are closely related to the disparities in the availability and demand for healthcare services in various geographic areas. The second subject explores the infrastructure and distribution of healthcare resources, highlighting the fact that access to healthcare facilities and resources varies by place, which has a direct impact on related expenses. The third topic, which is the last one, emphasises the importance of population demography and health needs. It does this by showing how regional variations in these aspects affect healthcare use and, eventually, affect healthcare costs. Together, these related issues highlight the complex and interwoven dynamics of supply and demand, resource allocation, and population demography that all play a role in the regional variations in healthcare costs.

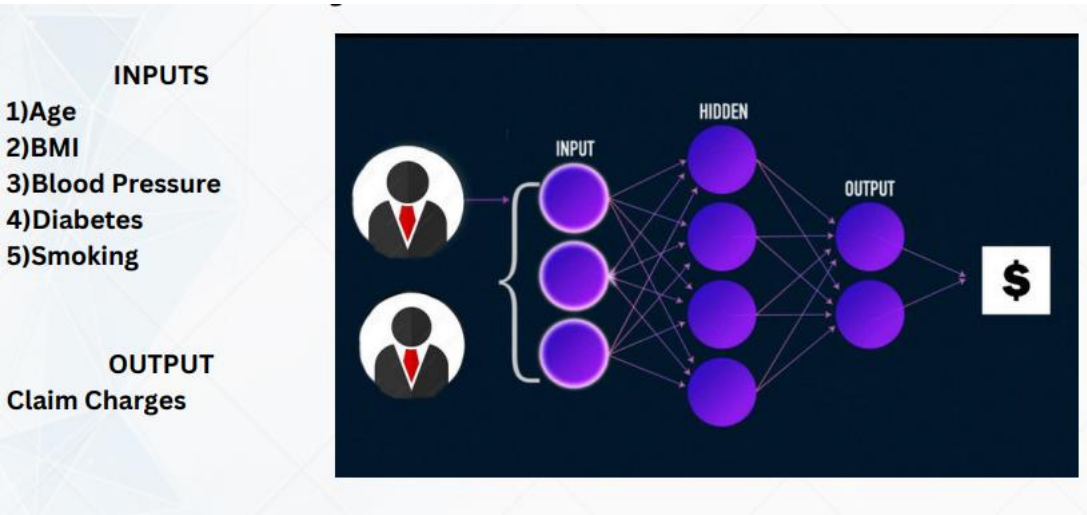
Implementation of ANN

In order to use cutting-edge technology for more precise and effective forecasts, the application of Artificial Neural Networks (ANNs) in the field of health insurance prediction represents a revolutionary step. ANNs provide an advanced method of evaluating intricate health insurance data since they are modelled after the neural network architecture of the human brain. The goal of this implementation is to use ANNs to increase forecast accuracy and streamline the decision-making process in the health insurance sector.

An efficient data preparation procedure is essential for the successful implementation of ANNs. A wide range of datasets, including health insurance claims, demographic data, lifestyle characteristics, and more, are gathered for the study. Cleaning, normalisation, and feature selection are examples of data preparation techniques used to make sure the input data is appropriate for the ANN model. Feeding the prepared data to the artificial neural network (ANN) allows it to learn and recognise patterns, correlations, and trends on its own. This process is known as model training. To optimise the ANN's performance in health insurance prediction, optimisation methods, cross-validation, and hyperparameter tweaking are used.

An important step after training an ANN is validating and assessing it. To make sure the model is reliable in forecasting health insurance results, its predictive skills are thoroughly evaluated using a variety of performance measures, including accuracy, precision, recall, and F1 score. Validation datasets and cross-validation strategies are used to evaluate the model's generalizability and predictive accuracy on unobserved data. In order to help stakeholders in the health insurance industry comprehend how ANNs impact decision-making and improve

prediction accuracy, the implementation also include the interpretation of outcomes. This will ultimately lead to better informed and data-driven health insurance practises.



CONCLUSION

Artificial Neural Networks (ANNs) have demonstrated their ability to reveal complex correlations and patterns in large and complicated datasets, which has enabled surprisingly accurate claim result predictions. Artificial neural networks (ANNs) can process and analyse large amounts of insurance or claims data by processing and modelling the linked structure of the human brain. This allows ANNs to find hidden dependencies and subtle correlations that may be difficult for standard statistical approaches to find. This capability eventually improves insurance firms' capacity to manage risk and make wise decisions by enabling them to make more precise evaluations of claim likelihood, severity, and other important aspects.

Artificial intelligence (AI) has the potential to greatly improve the accuracy of health insurance prediction, especially machine learning and data-driven algorithms. Artificial intelligence (AI) models may recognise intricate patterns and connections that may be difficult for conventional approaches to recognise by using enormous volumes of healthcare data, including patient records, medical histories, diagnostic information, and more. This makes it possible to evaluate a person's health risks more precisely, which benefits insurance firms by improving underwriting, allowing them to set rates and forecast the likelihood of claims. AI can aid in the identification of fraud by spotting anomalies and dubious statements. Finally, better risk management, more specialised insurance products, and

maybe more reasonably priced coverage for consumers can result from AI's enhanced accuracy in health insurance prediction.

It is true that alcohol and smoking use may have a big influence on a policyholder's health and, in turn, the possible amount of an insurance claim. A variety of health hazards and ailments, including as cancer, heart disease, lung difficulties, and liver disorders, are linked to these behaviours. Policyholders are frequently evaluated by insurance firms on the basis of their lifestyle choices; those who smoke or drink excessively may be subject to increased rates or have certain health problems excluded from their plans. The terms and conditions mentioned in the policy, which may take these risk factors into consideration, may have an impact on the amount of a claim pertaining to health problems made worse by smoking or binge drinking. Insurance firms analyse and price policies based on individual risk profiles using actuarial data and underwriting procedures; these practises are taken into account when evaluating health-related risks.

Geographical location undoubtedly affects healthcare expenditures. The cost of living, the state of the local healthcare system, the demand for medical services, and local laws are just a few of the variables that might differ greatly between places. Due to greater operating costs for hospitals and healthcare providers, healthcare services are often more expensive in urban areas and higher-cost locations. The demand for medical services can also be impacted by differences in healthcare access and the frequency of specific health issues, which can raise expenses. Moreover, variations in insurance markets and governmental healthcare policy may also affect how much treatment costs. Because of this, the cost of the same medical operation or treatment can vary greatly depending on where it is sought, underscoring the complex interplay between location and health care cost

Indeed, depending on a variety of demographic factors, including age and gender, health insurance claims might range greatly from one another. These differences are explained by the distinct requirements and health profiles of each group's members. For instance, older people may make more claims for age-related diseases since they often use healthcare services more frequently. Variations can also result from gender differences, as males are more likely to suffer from certain medical diseases and women are more likely to seek healthcare services linked to reproductive health. For insurance firms to appropriately assess risk, establish rates, and provide specialised insurance plans that satisfy the various healthcare needs of their customers, they must have a thorough understanding of these demographic variances.

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