

Chapter 11: Case Studies in Insurance Risk and Fraud Management

11.1. Introduction to Insurance Risk Management

Insurance business is fundamentally directed towards management of risk thereby the risk management is the backbone in the insurance business to knowing the risk associated with the business. Risk management in the insurance business has twofold. First, risks expected to realise must be recognised and determined according to quantitative basis and action must be taken to minimise the loss. Types of Risks in Insurance identify the risks that may arise in the insurance business. Risk Assessment in Insurance guides the users to know the factors that may cause risk and establish the methods to evaluate those factors for the selected type of insurance business. Techniques for Detection of Insurance Fraud discusses the application of present day data analytics, machine learning and investigation techniques that are essential to detect the Insurance Frauds recognised under Types of Insurance Fraud.

Insurance fraud is a predicate offence in the False Claims Act and is the third largest economic crime classified under White-Collar Crime. Insurance fraud includes any and all acts which are done with the intent to obtain an improper payment from an insurer. Generally, Insurance fraud tends to be a crime committed by individuals, with very little internal collusion, but there are still cases where the employer has been involved. The fraud aspect in the insurance business can be broadly classified as Health Insurance Fraud, Auto Insurance Fraud, Property Insurance Fraud and Life Insurance Fraud. Auto Insurance Fraud is one of the most serious problems facing Insurance Companies today resulting in billions of dollars in extra costs to the Insurance Industry and Premiumpayers. The preparation or presentation of a false or exaggerated claim to the insurer or the attempt to engage in a fraudulent claim or act is an indicant of insurance fraud in any other class of insurance.

11.1.1. Overview of Insurance Risk Management Principles

Fundamental principles guiding insurance risk management include risk identification, risk classification, risk assessment, risk quantification, and risk control, emphasizing classification and assessment in fraud control. Several studies have proposed various methods and techniques for detection and classification of insurance fraud, exploring current developments and new directions in insurance fraud detection. Insurance fraud encompasses a broad range of activities that are detrimental to all involved parties, as insurance companies try to eliminate dishonest practices and remain profitable.

The types of insurance fraud present in the market cover health, auto, property, and life insurance segments. In Insurance Risk Management, the identification of risk factors constitutes the first step, followed by their quantification. Risk assessment in insurance involves determining whether a particular insurance case is suspicious or not, with a focus on determining the risks and classifying insurance fraud. The Risk Assessment in Insurance section examines risk detection methods that employ data analytics and machine learning. The Types of Insurance Fraud section provides background information to support an understanding of the detection methods.

11.2. Understanding Fraud in Insurance

Insurance fraud should be clearly defined, and it remains that hundreds of millions of dollars are lost annually to various types of such fraudulent activities [1-3]. Due to the inherent risk of such fraudulent acts, insurance fraud detection is an essential part of insurance risk management. Insurance risk can be evaluated by assessing the type and nature of different fraudulent acts, and risk value can be assigned based on the impact on the insurance company and the probability of the occurrence of a fraud. Insurance fraud detection methods currently found in the literature include data analytics, machine learning applications, and investigative techniques; all of these play a significant role.

Looking toward a more efficient insurance fraud mitigation approach, a predictive analytics method using future fraud propensity scores is proposed for prioritizing investigation. The strengths and weaknesses of the proposed approach are discussed. In addition, the successful implementation of technologies such as blockchain, which can assist in drastically reducing insurance claims-related frauds, is described. Different types of insurance fraud, such as health, auto, property, and life insurance fraud, indicate the essential role of risk assessment prior to fraud detection.

11.2.1. Characteristics and Implications of Insurance Fraud

Fraud is a highly subjective topic, with each individual perceiving it differently. Insurance fraud generally involves knowingly submitting false claims to an insurance business, whether for injury, illness, damage, loss, or even a death claim, with the intent of receiving compensation. Such schemes result in significant losses for the insurance companies and impose an unnecessary financial burden on honest and dependable policyholders in the form of increased premiums. When fraudulent claims are approved, the responsible parties not only gain financially but also establish a negative precedent, encouraging others to create similar false claims.

Common forms of insurance fraud include deliberately fabricated or exaggerated claims. While all these examples involve intentional deception, they can be broadly classified into two groups: hard fraud and soft fraud. Hard fraud involves deliberately staging incidents such as accidents or setting fire to property with the primary goal of filing an insurance claim. In contrast, soft fraud arises from policyholders misrepresenting information when purchasing an insurance policy or subtly manipulating a genuine claim to secure a larger compensation.



Fig 11 . 1 : The Two Faces of Insurance Fraud

11.3. Types of Insurance Fraud

Categorizing insurance fraud as health, auto, property, and life insurance helps illustrate specific examples and reveals the different opportunities for wrongdoing in each segment. Background information on risk management principles and insurance fraud explains why every industry stakeholder matters and how an institution must manage all phases. The fraud concept circles back to risk assessment and detection.

Understanding the sources and prerequisites of insurance fraud opens the way for future innovation. Predictive analytics and blockchain technology create an exciting vision for development throughout insurance databases, inside individual organizations and at the national level. A gradual transition from reactive controls to preventive strategies, risk assessment and detection enhances the industry's ability to protect customers, employees and partners against injury and financial loss.

11.3.1. Health Insurance Fraud

Health insurance fraud is a growing concern for many countries, as it leads to substantial financial losses for governments, insurance companies and their business clients and to increased customer premiums. Such fraud is mainly committed by individuals but may also involve collusion of related parties in an organised fashion. These frauds are generally differentiated according to the activity on which they are based. The more frequent types of fraud in the insurance sector as a whole are faked sickness, false claims and false estimates of damages.

In the case of health insurance, claim submission is normally done to cover the loss observed during illness to restore the present as well as future income that might be lost due to illness. Claimant behaviour is such that they usually try to make a claim for more than the actual expenditure. They also make claims for non-expenditure during illness. Risk factors related to claimant behaviour, medical conditions and medical procedures as well as exceptions can be used to identify abnormal behaviour of claimants either at pre- or post-settlement stages.

11.3.2. Auto Insurance Fraud

In the context of auto insurance, fraudulently induced payments generate losses estimated at \$8 billion annually in the United States alone, with the amount of staged accidents in a given state usually corresponding roughly with the amount of economic deprivation in the state. Even though insurance fraud amounts to only a fraction of the total size of the industry, where annual premiums of \$165 billion are paid in the United States, and losses of \$26 billion are paid out, fraud represents a significant risk

management challenge. Governmental responses have involved the use of the RUC model, which examines the reasons for fraud from the perspective of Rationality, Urgency, and Capability [2,4,5]. Cases from the major insurance types of health, auto, property, and life illustrate the relevance of these drivers in the design of controls to minimize the risks of these fraudulent practices.

Risk assessment is a crucial element in insurance risk management as it enables insurers to evaluate the threats and apply appropriate internal controls. In the case of insurance fraud, the assessment involves identifying its drivers through data analytics and machine learning, and ascertaining the potential presence of fraud through investigation or forensic accounting. Techniques such as text mining can help identify the risk factors of the perpetrator, the claim, and the insurance company. Insurance fraud types—whether health, auto, property, or life—can also be detected by applying data analytics to highlight claim or policy features that indicate the presence of fraud. The importance of these fraud detection methods to risk assessment in insurance is elaborated in the discussion on Risk Assessment in Insurance.

11.3.3. Property Insurance Fraud

Types of Insurance Fraud categorized into health, auto, property and life insurance fraud. Insurance fraud in property insurance includes any tactics used to deceive an insurance



Fig 11 . 2 : Insurance Fraud: Types, Risks, and Detection

company into issuing payments for property claims. Such deceptive tactics can be either perpetrated by the policyholder or by third parties like officials, professionals and vendors who manipulate the claims adjusting process. Property insurance fraud can include exaggerating the extent of any actual property damage or vehicle damage when filing an insurance claim, intentionally damaging one's own property, inventing injuries while committing arson on the property, and deliberately staging a car accident.

Risk management is the identification, evaluation and prioritization of risks involved in any activity or process followed by necessary application of resources to control or minimize its impact on the organization. Risk assessment in insurance involves identifying different attributes, situations or actions which may raise suspicion and establish a relation between them and known fraud cases. Once such risk factors are identified, they need to be quantified. Types of Insurance Fraud shows different insurance fraud types and their detection techniques. Property Insurance Fraud highlights present-day data analytics, machine learning applications and investigative techniques that aid in detecting property insurance fraud.

11.3.4. Life Insurance Fraud

Life insurance fraud involves any attempt to exploit the life insurance system for an illegal or unethical financial gain. The insurance company assesses the risk it covers in the same manner as it assesses the risk for other insurance products.

One of the oldest and most common methods for cheating life insurance companies is through a false claim of death [1,3-5]. To the life insurance company the missing insured is dead and the next of kin wishes to make a claim. In some cases, where there is reasonable doubt, the insurance company may allow an annulment of the policy with the return of paid premiums only. One of the more innovative methods in the past was to purchase a life insurance contract on the life of a stranger, usually by mail or by some foreign source that is difficult to investigate. The insurance company may only get information about the insured after the policy has been issued and a few premiums paid. The stranger is contacted by a third party and threatened to cooperate in the murder of the insured. In such cases, insurance companies expect life to be insured only by close relatives, friends, or business partners, or when the life insurance is related to a loan or mortgage.

11.4. Risk Assessment in Insurance

Risk Assessment in Insurance Insurance fraud is identified as deliberate fraud by policyholders or claimants against an insurance company or agent. From the perspective

of insurance risk management, the primary interest lies in the detection of such frauds. Some of the popular detection techniques link insurance fraud with criminal or abnormal activities, or record similarity and deviation. Risk assessment in insurance begins with the identification of risk factors. These factors pertain to both the insured interest and the subject matter of insurance. Risk evaluation involves quantifying the risk, which is expressed by the probability of the occurrence of an event or concern.

Risk Assessment The insurance industry is highly vulnerable to criminal fraud, such as health insurance fraud, auto insurance fraud, property insurance fraud, and life insurance fraud. The above categories of insurance fraud highlight the modus operandi of the entire insurance sector. Additionally, fraud is classified according to specific areas of investigation, including claim or underwriting fraud, internal fraud or system fraud, intermediary fraud, and agent/broker fraud. Similarly, risk assessment in insurance can be approached by identifying and categorizing fraudulent activities. Risk management serves as a foundation for understanding the intricate relationship between insurance risk and fraud. Practical applications of fraud detection can be further explored in the case study titled "Types of Insurance Fraud."

11.4.1. Identifying Risk Factors

Insurance risk management involves the identification, evaluation, and prioritization of risks. All types of insurance—including health, auto, property, and life—are susceptible to fraudulent activities that endanger policyholders and insurers. Risk management necessitates a thorough examination of relevant risk factors, prevention strategies, and mitigation measures. Despite these controls, new threats and risks inevitably surface.

Risk management principles are designed to recognize and neutralize threats before they materialize. Fraud in insurance constitutes an intentional deception aimed at securing unlawful financial gains. Best described as deliberate misrepresentation, insurance fraud embodies calculated deceit. Detecting fraud entails specialized techniques tailored to insurance. The classification of fraud into health, auto, property, and life categories aids in formulating effective interpretations. Comprehensive fraud detection strategies—especially those employing data analytics and machine learning—are integral to all insurance segments. For a detailed analysis of these methods, refer to the section on Risk Assessment in Insurance.

11.4.2. Quantifying Risks

Before describing present-day techniques for detecting fraudulent claims, it is necessary to understand insurance risk management. Insurance fraud also constitutes an insurance risk and reducing insurance fraud reduces insurance risk.

Insurance risk management is associated with determining the risk involved in insuring an individual or organization. The overall risk of insurance fraud and risks associated with every claim can be assessed by identifying the factors that increase the overall risk and risk associated with every claim and by quantifying these factors. Detailed descriptions of present-day techniques for detecting insurance fraud—including data analytics, machine learning, and investigative practice—are given in the article “Risk Assessment in Insurance,” which also provides cross-references to different types of insurance fraud.

11.5. Fraud Detection Techniques

Modern insurance fraud controls encompass data analytics, machine learning applications, and investigative techniques, utilising claims data, external data, and unstructured data.



Fig 11 . 3 : Modern Techniques for Insurance Fraud Detection and Categories

Detection methods based on the data analytics of insurance claims identify key risk indicators to classify suspicious claims. Machine learning—a branch of artificial intelligence in which computer algorithms learn from data and experiences—has conquered the insurance fraud detection domain because of its classification and prediction tasks. Different machine learning methods preserve and convert the historical information and knowledge within the data and are utilised to detect patterns and trends of fraudulent behaviours by either performing classification or prediction. Investigative strategies—those in which fraud investigators examine the documentations and proof—help the insurer recognize the common traits and warning signs of fraud behaviour.

Types of insurance fraud vary but are generally categorized as follows. Health insurance fraud is committed for financial or other benefits by falsifying claims related to medical treatments and costly medications [6-8]. Auto insurance fraud involves deliberate traffic accidents, false injury claims, and the use of a car without the owner's consent. Property insurance fraud covers fire, natural disasters, and theft, employing actions purposely designed to profit from property insurance policies. Life insurance fraud is carried out through concealment or misrepresentation during the application stage, with the submission of fraudulent documents upon maturity or claim.

The definition and approach to detecting fraud within the insurance industry can be found in the overview of risk factors and techniques drawn from the assessment of types and levels of risk present in insurance portfolios.

11.5.1. Data Analytics

In recent years, analytics have been increasingly applied to risk assessment and fraud detection. General problems of insurance fraud detection are discussed along with the particular case of health insurance fraud. Types of fraud include risk or moral hazard, partial theft or arson, and full theft or arson. Risk factors of fraud are enumerated and data analytic methods for detecting fraud are classified. Advantages and limitations of applying modern analytics to fraud detection in the insurance business are briefly outlined, illustrating the potential value of new technology for addressing fraud. The appropriateness of present-day methodologies to detect fraud in building and related insurance schemes is briefly analyzed. With the growth of insurance business in India, sophisticated techniques of fraud detection are becoming essential. Use of data mining, machine learning, and data analytics techniques for fraud detection are summarized. The distinct types of insurance fraud and related risk factors are described. To provide guidance, emerging trends and new frontiers, such as predictive analytics and blockchain technology, are examined from the standpoint of their likely contribution to insurance fraud management.

Insurance risk management involves the identification, measurement, and management of risk in an insurance portfolio. It is, therefore, a dedicated activity for measuring and controlling the enterprise's exposure to risk. With its exposure to foreseeable and unforeseen calamities, the insurance industry faces a unique challenge in recovering outstanding claim payments. As with other industries, the insurance sector is not immune to the level of deceit and underlying unethical practices committed to acquiring illegal benefits. Such activities, typically referred to as insurance or insurance-related fraud, happen at different stages of the insurance contract and affect all stakeholders. In its simplest form, fraud entails fabricating a loss or injury or otherwise exaggerating the amount of a legitimate claim with the intent of obtaining insurance proceeds to which one is not entitled.

11.5.2. Machine Learning Applications

Machine learning enables systems to perform tasks automatically, allowing computers to detect patterns automatically from large data sets. It encompasses computer learning theory, pattern recognition, computational statistics, and data mining. Statistical models for fraud evaluation include linear regression, logistic regression, discriminant analysis, decision trees, and other related statistical techniques.

In insurance fraud control, the goal is to identify potentially fraudulent claims. In claim records, fraud cases are usually a minority, resulting in a highly imbalanced classification problem and a biased class distribution. Researchers have applied anomaly-detection capability of SOM neural network to assess the risk level of employees in an insurance company. Identification of proppant risk and determination of the scatter pattern have also been accomplished through self-organizing feature maps. For the diversification of fraud detection, self-organized grouping of fraudulent and nonfraudulent activities yields encouraging solutions [2,4,6].

11.5.3. Investigative Techniques

Risk assessment is a vital part of insurance risk management. Proper risk assessment enables an insurer to evaluate the cost-effectiveness of introducing a new line of insurance, predicting the probability of a consumer filing a claim, identifying areas with a higher likelihood of natural disasters, as well as many other aspects of insurance risk management. Due to many intrinsic reasons, the concept of risk assessment in insurance can be an exhausting task. Factors leading to the probability of insurance claims filing can be rooted down to the smallest details or be the events that the insured parties consider the most.

11.6. Future Trends in Insurance Fraud Management

The insurance sector is highly sensitive to fraud-related risks that are inherent within the existing processes of the industry. These processes create opportunities for fraudsters to commit insurance fraud by exploiting operational loopholes and gaps. Even the most robust processes cannot offer complete immunity to errors and fraudulent activities. Fraud schemes continue to grow, evolve, and change shape in response to newly adopted measures, technologies, and regulations implemented by insurers to combat these crimes. The fraud numerator continually seeks creative and sophisticated ways to commit insurance fraud. After having spent millions of dollars to eliminate fraud and error, many insurers are now making strategic progress by effectively balancing their activities between Fraud Investigation and Fraud Assessment, which ultimately result in Fraud Detection.

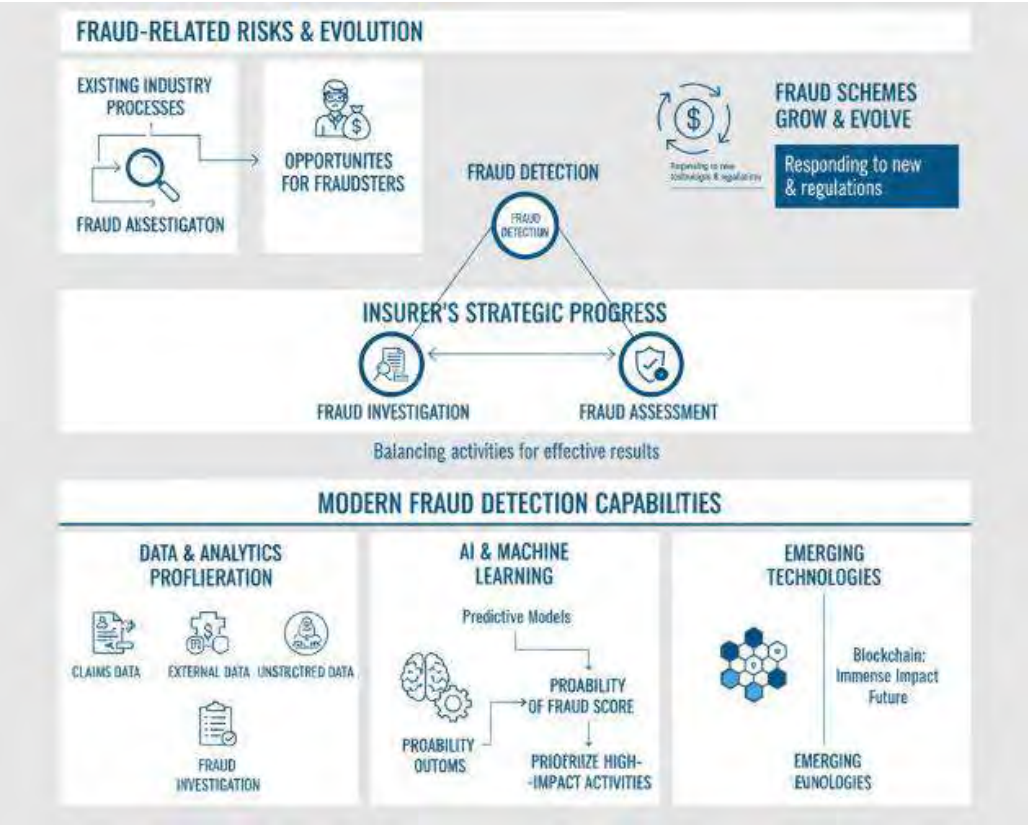


Fig 11 . 4 : Evolving Insurance Fraud and Modern Detection Strategies

The proliferation of data, developments in advanced analytics, and innovations in Artificial Intelligence and Machine Learning have supported insurers in their ability to assess a claim for signs of fraud. Many insurers are now deploying predictive models that use the outcomes of Fraud Investigation to create a probability of fraud score along

with every claim at the very beginning of the claim life cycle. This score is used to prioritize activities that deliver high impact. Emerging technologies, like Blockchain, are also likely to have an immense impact on fraud detection in the near future. Insurance fraud, one of the oldest crimes, thus remains a constant threat.

11.6.1. Predictive Analytics

Insurance risk management is a field of insurance that focuses on minimizing the possibility of financial losses in an insurance portfolio. The impact of risk management extends beyond risk mitigation to insurance fraud control. Fraud often results in risks associated with an insurance portfolio. Insurance fraud can be defined as any act committed with the intent to defraud an insurance process. Fraud produces, among others, financial harm to insurance companies, agencies, third-party providers, insured individuals, and governmental agencies. During the last decade, several advances have been introduced for identifying, evaluating, and quantifying the risk in insurance. In the context of insurance and especially in the context of fraud, certain factors are considered risk factors, and the identification and quantification of these risk factors are of utmost importance. For fraud detection, several techniques are applied, including data analysis, machine learning, and various investigative techniques. For a detailed description of risk in insurance, see Risk Assessment in Insurance. These methods are applied to the different categories of fraud, described in Types of Insurance Fraud [6,9,10].

Health insurance fraud is commonly associated with the altered disclosure of claims for medical care, products, or services that are not provided or performed. Auto insurance fraud involves false steps that occur before or after an accident, such as staging accidents, purposely overcharging, or making deceptive claims for the repair or replacement of the vehicle. Property insurance fraud takes place when the reported location is compromised, when the insured purposely causes the loss, or when inaccurate information is used to acquire an insurance policy. Life insurance fraud involves scheme concoctions to enjoy life insurance proceeds in the event of death. As part of the future prospects of insurance fraud identification, predictive analytics is an emerging concept, in which technologies such as data mining, statistics, modeling, machine learning, and artificial intelligence are used. The term predictive analytics is often used interchangeably with other terms such as data mining and statistical analysis. With predictive analysis, insurance companies can examine past claim histories, customer profiles, and related data to predict the likeliest frauds before they occur. Other methods that will bring significant improvements in fraud detection are block-chain-driven insurance.

11.6.2. Blockchain Technology

Self-executing, programmable digital contracts called smart contracts enable organizations to automate a wide range of processes. When strategically deployed in blockchain-based platforms, they can trigger payments by matching a set of predefined rules, such as the delivery of an invoice. Smart contracts can help bring more efficiency and accuracy to claims processing and shipping or supply chain management.

In the future, blockchain's ability to support operational efficiency and automated processes using smart contracts could further help insurance companies and customers reduce the threat of insurance fraud. The speed, security, and accuracy of required data processing that blockchain provides could help both the insurer and the insured. The insured could enter necessary details into the blockchain platform, which, in turn, would send required updates to various authorities such as the police, hospital, and repair shop. The insurance company would receive information about the incident and accurately evaluate the service required to proceed with processing the claim. Blockchain technology's benefits could be realized throughout the entire claims process—from submission and approval to the final payment.

The application of blockchain technology promises to deliver new and creative ways to mitigate insurance fraud, but winning the fight requires an integrated approach that begins with a thorough understanding of insurance risks and their subsequent determination. Detecting fraudulent activities requires the use of present-day data analytics, machine learning, and investigative techniques.

11.7. Conclusion

Insurance risk management is a set of rules and procedures that a company follows to handle its exposure to accidents, natural disasters, litigation, and other risks. The management of insurance risks is essential in every line of coverage to avoid abuse and reduce the risks associated with fraud. Fraud is a deliberate act with the intent to deceive for financial or personal gain against an insurance person or company at the expense of honest customers. Insurance fraud may affect policyholders by making premiums increase to pay for losses caused by dishonest claims. Consequently, a risk assessment was conducted to help determine whether insurance fraud exists and to identify the different areas of insurance fraud that are most susceptible to risk. The results established that claims were the most vulnerable in insurance practice. Data analytics, machine learning, and investigative techniques were identified as helpful modern methods for identifying, preventing, and combating insurance fraud.

The integration of extra technologies that assist in fraud detection is considered the future of insurance risk management. Even more advanced technologies in insurance fraud

detection, such as predictive analytics, which anticipate the risk's manifestation, and blockchain technology, which secures claim processing operations, will revolutionize the insurance domain by eliminating any fraud attempts. The analysis demonstrates that stronger elements to prevent insurance fraud occurrences and growth rates are highly crucial for the insurance industry. Over the years, the awareness of insurance fraud and fraud risk management has become a necessity in the business world.

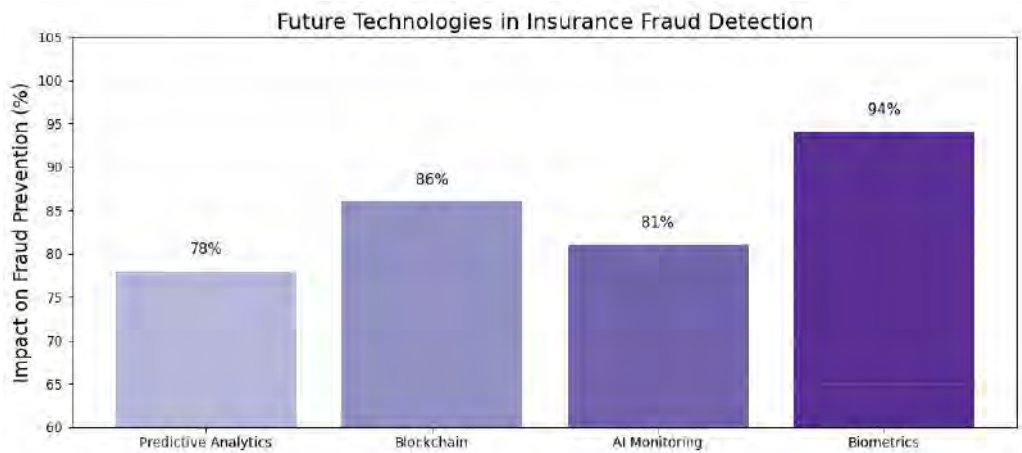


Fig 11 . 5 : Future Technologies in Insurance Fraud Detection

11.7.1. Key Takeaways and Implications for the Future of Insurance Fraud Management

Insurance risk management is the identification and analysis of exposure to potential loss in order to minimize the possibility and the severity of that loss. Liability insurance provides protection for the insured against lawsuits for negligently or intentionally causing injuries to other people or damage to their property. Fraud is activity of deceiving that causes a loss of money or property or service or information from another person or company. Insurance fraud is an attempt to obtain a fraudulent outcome from an insurance process. It increases operational costs in insurance companies because it involves under-reporting of earnings, failure to disclose information, underwriting issues, and non-disclosure of hazards. These fraudulent activities result in financial losses to the insurance, government, and citizens of a country.

At present, fraud detection is performed using data analytics, machine learning, and investigative techniques. Insurance fraud can be broadly classified as health insurance fraud, auto insurance fraud, property insurance fraud, and life insurance fraud. Managing insurance fraud requires a complete understanding of risk assessment. Risk assessment identifies all risk factors that affect the insurance business and quantifies these risk

factors. These techniques rely on businesses' historical fraud data. Applying predictive analytics on more varied internal and external data both within and beyond the insurance field promises further advances in reducing fraud risk. Blockchains have the ability to improve the authenticity and transparency of data; therefore, new blockchain solutions for insurance fraud detection will be introduced.

References

- [1] Zhang W, Yang D, Wang H. (2019). Data-driven methods for predictive maintenance of industrial equipment: A survey. *IEEE Systems Journal*, 13(3), 2213–2227.
- [2] Inala, R., & Somu, B. (2024). Agentic AI in Retail Banking: Redefining Customer Service and Financial Decision-Making. *Journal of Artificial Intelligence and Big Data Disciplines*, 1(1).
- [3] Lee J, Bagheri B, Jin C. (2016). Introduction to cyber-physical systems and data-driven predictive maintenance. *Journal of Manufacturing Systems*, 39, 12–20.
- [4] Kalisetty, S. (2023). Harnessing Big Data and Deep Learning for Real-Time Demand Forecasting in Retail: A Scalable AI-Driven Approach. *American Online Journal of Science and Engineering (AOJSE)*(ISSN: 3067-1140), 1(1).
- [5] Susto GT, Schirru A, Pampuri S, McLoone S, Beghi A. (2015). Machine learning for predictive maintenance: A multiple classifier approach. *IEEE Transactions on Industrial Informatics*, 11(3), 812–820.
- [6] Gadi, A. L. The Role of Digital Twins in Automotive R&D for Rapid Prototyping and System Integration.
- [7] Zhao R, Yan R, Chen Z, Mao K, Wang P, Gao R X. (2019). Deep learning and its applications to machine health monitoring: A survey. *Mechanical Systems and Signal Processing*, 115, 213–237.
- [8] Pandiri, L., & Singireddy, S. (2023). AI and ML Applications in Dynamic Pricing for Auto and Property Insurance Markets. *Journal for ReAttach Therapy and Developmental Diversities*. [https://doi.org/10.53555/jrtdd.v6i10s\(2\).3611](https://doi.org/10.53555/jrtdd.v6i10s(2).3611)
- [9] Lee J, Wu F, Zhao W, Ghaffari M, Liao L, Siegel D. (2014). Prognostics and health management design for rotary machinery systems — Reviews, methodology and applications. *Mechanical Systems and Signal Processing*, 42(1-2), 314–334.
- [10] Recharla, M., & Chitta, S. AI-Enhanced Neuroimaging and Deep Learning-Based Early Diagnosis of Multiple Sclerosis and Alzheimer's.