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A STUDY OF THE PROSPECTIVE SCOPE OF ARTIFICIAL INTELLIGENCE IN HEALTH INSURANCE CLAIM SETTLEMENT

Ashok S. Mahajan[1], Dr. Nishant R. Ghuge[2]
[1] *Research Scholar, Moolji Jaitha College, Jalgaon.*
Email: ashokkesharaai@gmail.com
[2] *Assistant Professor, Moolji Jaitha College, Jalgaon.*
Email: gnishantr@gmail.com

Abstract
In the health insurance industry, claim settlement is the moment of truth. It determines the truth between the insured and the insurer. Traditional models are always troubled by human errors and manual delays, which increase the operational costs. This paper emphasizes on the prospective scope of AI in transforming claim settlement from a reactive process to a proactive experience. The study outlines how the use of emerging technologies like smart contracts, Deep learning and predictive analytics can minimize the "claim-to-settlement" gap while enhancing fraud detection and transparency.
Keywords: AI in Insurance, Claim Settlement, Health Insurance, Smart Contracts, Machine Learning, Fraud Detection, Customer Satisfaction.

► *Corresponding Author: Ashok S. Mahajan*

I. Introduction:

The quality of service is inherently linked to the efficiency of claim processing by the health insurer. Due to increasing healthcare costs, customers are demanding transparency and speed in claim settlement. Medical and claim documentation is dynamic, which is why traditional settlement models often fall short. To overcome the barriers of traditional claim settlement models, Artificial Intelligence (AI) offers a perfect solution by automating the adjudication of claims. It helps reduce human intervention and increase accuracy. This study examines the future landscape of these technologies and their potential to transform the claims settlement process.

II. Objectives of the Study:

This study examines how the Artificial Intelligence (AI) enhancing claim settlement process and influence customer satisfaction. The paper also tries to bridge the gap in the existing literature by studying, compiling and analysing evidence from multiple authoritative sources.

1. To analyze the role of AI in enhancing claim settlement process in the health insurance industry.
2. To identify the impact of AI-driven service improvements on customer satisfaction.
3. To provide practical recommendations for implementing AI in health insurance services.

III. Significance of the Study:

This study is important as it provides insights about the prospective scope of AI in bridging the gaps between traditional claim settlement models and customer satisfaction. Implementing AI

claim settlement process would undoubtedly reduce the time required in traditional models and increase the service quality, gaining the customers' trust.

IV. Methodology:

This research paper is an outcome of findings from secondary sources, a qualitative analysis methodology. Multiple Peer-reviewed journals, books and reputable online repositories have been used to collect data. The SERVQUAL model guided the classification of service quality dimensions, enabling a structured analysis of their impacts on customer satisfaction. This methodology ensures a comprehensive understanding of the subject while maintaining academic accuracy.

V. Literature Review of Studies on AI integration in the Health Insurance Industry:

(Vineet Mishra, 2025)

Mishra's work highlights the technical efficacy of algorithms like Random Forest and K-Nearest Neighbors in predicting claim denials and identifying Fraud, Waste, and Abuse (FWA). With accuracy rates exceeding 90% in specific medical claim categories, AI is proven to drastically reduce human error. However, the study concludes that the future of a transparent insurance ecosystem depends entirely on the availability of high-quality, diverse training data.

(D, 2021)

Applying Porter's Value Chain and Berliner's Insurability Criteria, this study evaluates AI's maturity across a broad dataset of industry papers. The findings suggest a fundamental evolution in business models: moving from traditional loss compensation to proactive loss prevention. While AI minimizes asymmetric information and enhances cost efficiency, it simultaneously introduces new risks, potentially shifting the landscape toward high-severity, low-frequency events that require novel actuarial approaches.

(Rahul, 2022)

This research explores the paradigm shift in Property and Casualty (P&C) insurance through the deployment of AI within the Guidewire framework. By embedding machine learning and predictive analytics into core modules—specifically ClaimCenter, PolicyCenter, and BillingCenter—insurers can transition from reactive processing to real-time, data-driven decision-making. The study highlights that while these automated workflows significantly bolster ROI and customer retention, the transition is often impeded by legacy system constraints and the complexities of regulatory compliance.

(K. Pandieswari, 2026)

Focusing on the revolutionary impact of behavioral data, this paper quantifies the benefits of AI-driven predictive models. Industry data suggests a 40% reduction in claim processing time and a 25% improvement in fraud detection accuracy. Within the Indian insurance context, the research underscores how AI-powered tools, such as chatbots, enhance customer satisfaction by nearly 20%, though it emphasizes that technology must remain balanced with human oversight to maintain institutional trust.

(Sangeeta Anand, 2022)

This research addresses the administrative bottlenecks in healthcare by proposing Machine Learning (ML) as a substitute for manual Prior Authorization (PA) processes. By analyzing historical health claim data, supervised and deep learning models can project approval outcomes with a consistency that manual judgment lacks. The literature argues that while automation

prevents treatment interruptions, practitioners must remain vigilant regarding data privacy and algorithmic bias to ensure equitable patient outcomes.

(Naman Kumar, 2019)

Kumar provides a structural overview of AI, categorizing it into Weak (ANI), Strong (AGI), and Super Intelligence (ASI). The research frames AI as a "sense-think-act" cycle essential for modernizing an industry historically plagued by slow digitization. With global investment in AI for process optimization and customer experience reaching tens of billions of dollars, the "datafication" of insurance is presented as an irreversible trend toward total product innovation.

(Komperla, 2021)

The provided research highlights how artificial intelligence is disrupting traditional insurance by shifting the focus from simply paying for losses to actively predicting and preventing them. Key studies within the paper demonstrate that AI-driven models can now identify potential customers, detect fraudulent claims, and even suggest policy updates without requiring a human agent. While early adopters in financial services are already leveraging machine learning to apply human-like reasoning to data, some insurers remain cautious about the lack of transparency in complex algorithms. Furthermore, the COVID-19 pandemic acted as a catalyst, accelerating the use of tools like chatbots and telematics to fix historical inefficiencies. Ultimately, this technological evolution is reshaping the entire value chain, allowing for more accurate risk assessment and a more streamlined, customer-centric approach to claims processing.

VI. Prospective Scope of AI Technologies in Claim Settlement:

The future of claim settlements involves evolving from manual "Auto-Settlement" to fully autonomous "Intelligent Settlement." The following technologies will facilitate this transition:

- **Automated Document Extraction (OCR | NLP):**

The future scope includes the use of advanced Optical Character Recognition (OCR) and Natural Language Processing (NLP) to read and process doctors' handwritten prescriptions and complex hospital bills instantly, thereby eliminating manual data entry errors.

- **Predictive Fraud Analytics:**

Insurers can use Machine Learning with integrated Markov Models to identify existing fraud as well as predict the likelihood of a fraudulent claim even before it is filed.

- **Blockchain and Smart Contracts:**

Smart Contracts automatically trigger payments as soon as a valid medical discharge summary is uploaded to a shared ledger. It has a significant prospective scope to ensure 100% transparency and security.

- **Computerised Diagnosis:**

Future AI models may assist in claim settlements by scrutinising the medical reports (CT scans, MRIs, X-Rays) and verifying them against the diagnosis and treatments provided by the hospitals, aligning with the claims.

VII. Impact on Service Quality and Satisfaction:

Integrating these technologies will directly enhance the following dimensions of the SERVQUAL model:

- **Tangibles:**

Seamless interaction using AI-driven dashboards and mobile apps for tracking claim status in real time.

- **Reliability:**

Application of policy rules consistently ensures each and every customer is treated fairly and without bias.

- **Responsiveness:**

AI models reduce settlement time from days to minutes through AI-driven underwriting and approval.

VIII. Current Adoption in the Indian Market:

The following data explains to what extent the pioneer health insurers have already implemented AI in their operations:

Insurer	AI-Driven Metric	Impact/Efficiency Gain
Star Health & Allied Insurance	Cashless Claim Auto-Adjudication	**65%** of cashless claims are now evaluated through AI and machine learning tools.
HDFC ERGO	Policy & Claim Processing Speed	Policies are processed in **15 minutes**, with digital issuance occurring within **5 minutes**.
Niva Bupa	Digital Policy Issuance	Over **50%** of all policies are issued digitally without any human intervention.
Niva Bupa	Digital Renewals	Approximately **90%** of policy renewals are processed through digital AI platforms.
General Industry Standard	Claim Processing Time	AI-driven automation has reduced processing times from **days to hours** and, in some cases, **hours to minutes**.

IX. Technical Breakdown of AI Performance:

On researching into specific AI models, the following technicalities explain how these companies are improving fraud detection and settlement reliability:

- **Accuracy in Fraud Detection:**

Overcoming the traditional rule-based systems, the Markov Model integrated with Gradient Boosting Machine (GBM) achieved 97.10% accuracy in identifying fraudulent claims.

- **Fraud Identification Rate:**

A research study of over 3,82,000 claims found 9.95% (38,082 claims) fraudulent. It was possible with the use of AI.

X. Challenges and Threats:

Despite the prospective future of AI benefits, the following threats remain:

- **Algorithmic Bias:**

If the training data is defective, AI may reject claims from specific demographics.

- **Data Privacy:**

AI takes control over the sensitive medical records, which require robust cybersecurity to prevent breaches.

- **Regulatory Gaps:**

The absence of a clear legal framework for AI-led settlements creates uncertainty for insurers.

Trust issues:
In some situations, customers expect human assistance, which establishes trust among both the parties, i.e. insurer and insured.

XI. Recommendations:

- **Hybrid Settlement Models:**

AI should be moderately used for high-volume but low-complexity claims, while human expertise should be used for complex medical cases.

- **Investment in Infrastructure:**

To sustain a competitive edge, small insurance companies must join hands with or invest in cloud computing and AI training.

- **Standardized Ethics:**

Developing an ethical AI framework to ensure transparency in how claims are approved or denied.

XII. Conclusion:

The prospective scope of AI in health insurance claim settlement is vast and unavoidable. It promises a future-ready solution where settlements are not just fast, but invisible, embedded directly into the healthcare delivery process. Working on ethical concerns and investing in advanced technologies like Smart Contracts and Predictive Analysis, the health insurance industry can achieve a level of customer loyalty and operational efficiency previously considered impossible.

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