SYNOPSIS

TITLE OF THE DISSERTATION

Leveraging Artificial Intelligence for Audit and Integrity in Healthcare Claims: A Case Study of Fraud Claim Investigation under Rajasthan Government Health Scheme

(A) INTRODUCTION

The Rajasthan Government Health Scheme (RGHS) is a public insurance initiative aimed at providing cashless healthcare services to government employees, pensioners, and their dependents. While RGHS has improved access to healthcare, it has also witnessed a rise in fraudulent claims—ranging from duplicate diagnostic reports and reused radiology images to inflated billing and unjustified inpatient admissions. Manual audit processes, which rely on retrospective checks by Third Party Administrators (TPAs), have proven inadequate in identifying complex, large-scale fraud in real-time. This dissertation explores how Artificial Intelligence (AI) tools can be integrated into the RGHS audit mechanism to enhance the detection of such fraudulent practices and improve the efficiency and transparency of healthcare claim audits.

(B) REVIEW OF LITERATURE

Extensive research has been conducted globally on healthcare fraud and the limitations of manual auditing systems. Studies show that 5–10% of total healthcare spending is lost annually to fraudulent claims (Joudaki et al., 2015). Countries like the U.S. and South Korea have already deployed AI-driven fraud detection in their national health schemes, using tools like computer vision, natural language processing (NLP), and predictive analytics (Lee & Park, 2019). Indian research, however, remains limited. Some AI pilots have been initiated under PM-JAY, but their extension to state-level schemes like RGHS is yet to be explored in depth. Manual audits in India struggle with scalability, delay, and underreporting of anomalies (MoHFW, 2023; NHA, 2022).

(C) THEORETICAL/CONCEPTUAL FRAMEWORK

The dissertation is grounded in Fraud Triangle Theory, which attributes fraudulent behavior to three conditions: opportunity, pressure, and rationalization. In the context of RGHS, the opportunity arises from weak audit mechanisms, pressure from financial incentives, and

rationalization due to the perceived low risk of detection. The conceptual model integrates AI-enabled audit systems as deterrents that reduce the opportunity for fraud by introducing automated, real-time checks and predictive monitoring. The proposed AI framework comprises computer vision for detecting duplicate diagnostic images, NLP for analyzing text consistency in prescriptions and reports, predictive analytics for anomaly detection and hospital behavior scoring, and rule-based engines for flagging missing documentation.

(D) RESEARCH GAP

While global health systems have adopted AI to combat fraud, Indian literature and real-world applications of AI in public insurance schemes like RGHS remain scarce. No comprehensive studies have examined how AI could be systematically deployed to audit healthcare claims at the state level. There is also a lack of Indian datasets, AI model simulations based on regional fraud patterns, and contextual studies combining healthcare management and data science.

(E) RESEARCH QUESTIONS

1. What are the most common types and patterns of fraudulent healthcare claims under the RGHS?
2. What limitations exist in the current manual audit mechanisms?
3. How can AI tools (e.g., computer vision, NLP, predictive analytics) be applied to detect fraud in healthcare claims?
4. What policy, operational, and ethical considerations are necessary for integrating AI into public health insurance auditing?

(F) RESEARCH OBJECTIVES

1. To identify the key types and frequency of fraud in RGHS claim submissions
2. To evaluate the inefficiencies in current manual auditing systems
3. To simulate and assess the effectiveness of AI techniques in fraud detection
4. To propose a policy and operational roadmap for AI integration in RGHS auditing

(G) METHODOLOGY

The study adopts a mixed-methods approach:

- Qualitative Component:
  - Case studies from RGHS audit webinars (April 2025)
  - Interviews with hospital administrators and quality assurance personnel

- Field observations at selected high-risk RGHS-network hospitals

- Quantitative Component:
  - Simulation of AI frameworks using Python (scikit-learn, OpenCV, NLTK)
  - Development of rule-based and predictive models using historical fraud indicators
  - Design of a modular AI architecture for real-time audit triggers

The data sources include RGHS webinar content, anonymized sample claims, academic studies, and field-level insights.

(H) PLAN OF ANALYSIS

- Qualitative Data: Thematic analysis of interviews and webinar content to identify prevalent fraud types and audit gaps
- Quantitative Data: Simulation-based testing of AI models using synthetic fraud scenarios
- Comparative Evaluation: Manual vs. AI-based audit efficiency
- Visualization: Fraud frequency heatmaps, AI flag triggers, and dashboard simulations using tools like Power BI and Tableau
- Risk Scoring Models: Classification of hospitals by fraud probability based on AI output

(I) TENTATIVE CHAPTER PLAN

Chapter 1: Introduction – Background, rationale, objectives, and significance of the study
Chapter 2: Review of Literature – Existing work on healthcare fraud, AI in audits, and research gaps
Chapter 3: Theoretical and Conceptual Framework – Models and theories underpinning AI-driven audits
Chapter 4: Research Methodology – Design, data sources, tools, and ethical considerations
Chapter 5: Results – Findings on fraud patterns and AI model performance
Chapter 6: Discussion – Interpretation, implications, policy recommendations
Chapter 7: Conclusion and Way Forward – Summary of findings, limitations, and future research
Chapter 8: References & Appendices – All citations and supporting materials

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