# Introduction

Financial institutions face persistent challenges in detecting fraudulent transactions while minimizing false positives. Traditional transaction monitoring systems rely heavily on rule-based methods, which often fail to detect evolving fraud patterns and miss negative news insights. This literature review synthesizes existing research on machine learning-based fraud detection, risk scoring techniques, and web scraping applications in financial risk assessment. It highlights key methodologies, compares their effectiveness, and identifies gaps that this project aims to address.

# Machine Learning in Fraud Detection

Machine learning has significantly improved fraud detection by identifying anomalies in transactional data. Techniques such as Isolation Forest, Autoencoders, and ensemble models like Random Forest have been widely adopted. Research indicates that anomaly detection models improve fraud identification rates compared to static rule-based systems. However, challenges such as imbalanced datasets and interpretability remain concerns.

# Risk Scoring in Transaction Monitoring

Risk scoring systems help prioritize alerts by assigning risk levels based on transaction characteristics. Traditional risk models use statistical techniques, whereas modern approaches integrate AI-driven risk assessment. Studies show that integrating machine learning-based risk scoring reduces false positives significantly. This project aims to leverage a hybrid model combining anomaly detection with rule-based scoring for enhanced accuracy.

# Web Scraping for Negative News Analysis

Negative news analysis is critical for proactive fraud detection. Web scraping techniques, such as those using BeautifulSoup and Scrapy, extract relevant financial news for sentiment and risk assessment. Research demonstrates that web-scraped data improves fraud detection models by incorporating external risk factors. However, regulatory compliance and ethical considerations pose implementation challenges.

# Challenges and Future Directions

Despite the advancements, challenges such as data privacy, regulatory restrictions on web scraping, and evolving fraud tactics persist. Future research should explore real-time adaptive fraud

detection models that incorporate continuous learning from new fraud trends

Conclusion

This literature review highlights the effectiveness of machine learning, risk scoring, and web scraping in transaction monitoring. The proposed 'Investigator Toolkit' builds on these methodologies to improve fraud detection accuracy by at least 20% while reducing false positives. By addressing current gaps, this project contributes to the evolution of financial fraud detection systems.