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Walmart Transaction Fraud Detection System

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Review of Related Literature

S.No.	Title of the Paper	Authors	Journal/Conference & Publisher	Year	Methodology	Performance of the proposed algorithm	Limitations	Future Approach
1	Walmart AutoML Libraries, Tools and Services	R. Bajaj et al.	2022 48th Euromicro Conference on SEAA, IEEE	2022	AutoML framework with various tools like automated feature engineering	Eases creation and maintenance of ML models	Challenges in model generalizability, data privacy concerns, and adaptability to rapid market shifts.	Could focus on enhancing cross-domain adaptability, improving data security, and integrating real-time adaptation algorithms for dynamic market responsiveness.
2	Exploratory Data Analysis of Walmart Outlets Sales using Data Analytics Techniques	M. V. Ramasami et al.	2023 International Conference on ICDATE, IEEE	2023	Statistical techniques and visualizations for data analysis	Identifies patterns and variables affecting sales	Reliance on historical data, potentially overlooking future trends, and dependency on data integrity.	Could expand to predictive analytics and real-time data analysis for more dynamic market insights.
3	An Adaptive Machine Learning model for Walmart sales prediction	S. B. Latha et al.	2023 ICCPCT, IEEE	2023	Sophisticated algorithms for dynamic adaptability in sales prediction	Improves forecasting accuracy and resilience	Potential overfitting to specific data sets and challenges in	Integrating real-time market trend data and further refining adaptability to

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							scaling across diverse markets.	diverse retail environments.
4	Walmart Sale Forecasting Model Based On LightGBM	Z. Qiao	2020 MLBDBI, IEEE	2020	LightGBM (Gradient Boosting Framework)	Accurate sales forecasting over a range of categories	Potential overfitting to specific data patterns and the need for continuous updating to adapt to changing market dynamics.	Incorporating more diverse data sources and real-time analytics for more accurate and timely predictions.
5	Walmart Credit Card Fraud Analytics	V. Jain et al.	2022 IEEE ICDSIS	2022	Advanced credit card fraud analytics system	Protects financial transactions and personal data	Challenges in detecting sophisticated fraudulent tactics and maintaining customer privacy.	Integration of artificial intelligence for more nuanced fraud detection and the continuous evolution of security protocols to keep pace with emerging fraud methods.
6	Synthetic Financial Datasets For Fraud Detection	C. G. Tekkali et al.	2023 ICAIS, IEEE	2023	Creation of artificial financial datasets for model validation	Assists in efficient fraud detection algorithms development	Challenge of ensuring these synthetic datasets	Refining the generation process of these datasets to more closely mimic

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							accurately represent real-world scenarios.	actual financial transactions and patterns.
7	Walmart Credit Card Fraud Detection	A. Mahajan et al.	2023 INDIACom, IEEE	2023	Machine learning algorithms for credit card fraud detection	Improves accuracy, efficiency, and flexibility	Complexity of detecting increasingly sophisticated fraud methods and ensuring data privacy.	Developing more advanced machine learning algorithms and enhancing real-time detection capabilities to keep pace with rapidly changing fraudulent tactics.
8	Fraud Detection	T. Zhang and S. Gao	2022 IIP, IEEE	2022	Real-time monitoring, ML algorithms, advanced analytics	Strengthens defenses against new fraud techniques	Challenge of keeping pace with rapidly evolving fraudulent techniques.	Including more adaptive and predictive analytics, as well as exploring the use of artificial intelligence to enhance the detection of subtle and complex fraud patterns.
9	Online Payments Fraud Detection	Z. Chen et al.	2022 ICPICS, IEEE	2022	Real-time monitoring, user behavior analysis, ML algorithms	Enhances digital payment security	Challenge in accuracy in detecting fraud while minimizing	Integrating more advanced AI techniques to improve detection accuracy and

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							false positives in a rapidly evolving digital transaction environment.	adapting to new forms of online payment fraud.
10	Fraud detection via autoencoders	A. Namiranian and M. R. Hashemi	2021 IST, IEEE	2021	Autoencoders for learning complex data representations	Improves identification of fraudulent patterns	Potential for autoencoders to miss novel fraud techniques not represented in the training data.	Integrating more diverse data sources and incorporating real-time anomaly detection techniques to enhance the model's adaptability to new types of fraud.

Points Taken into Consideration for My Research Work:

- ML Fraud Detection: Research employs machine learning for enhanced fraud detection in electronic transactions, analyzing past payment data.
- Structured Training Data: A structured dataset forms the foundation for training and validating robust fraud detection models.
- Diverse ML Techniques: Decision trees, neural networks, and more are used for comprehensive fraud detection.
- Adaptation to Patterns: Models adapt continuously to evolving fraud patterns for sustained effectiveness.

- Gradual Accuracy Improvement: Ongoing model refinement contributes to gradual improvement in fraud detection accuracy.
- Integration with Walmart's Systems: Machine learning models integrate into Walmart's transaction systems for real-time monitoring.

Approach to be Followed for My Research Work:

- Data-driven Strategy: Research adopts a data-driven approach using a structured dataset for relevant model training.
- Multi-Technique Development: Various ML techniques are systematically applied for overall effectiveness in fraud detection.
- Continuous Adaptation: Models continuously adapt to changing fraud patterns for resilience against evolving threats.
- Validation Protocols: Robust protocols validate and test model performance, meeting accuracy and reliability standards.
- Collaboration with Transaction Systems: Collaboration streamlines model integration into Walmart's systems, improving fraud detection efficiency.

Expected Outcome through the Proposed Methodology:

- Swift Real-time Monitoring: Integration enhances real-time monitoring, swiftly detecting and preventing fraudulent transactions.
- Improved Accuracy: Continuous refinement anticipates accuracy improvement, minimizing false positives and negatives.
- Resilience to Risks: The methodology aims to make Walmart resilient to changing retail risks by countering emerging threats effectively.
- Cutting-edge Application: Research places Walmart at the forefront of countering fraud in retail through cutting-edge technology application.
- Comprehensive Fraud Detection Framework: The study provides a comprehensive framework for transaction fraud detection, incorporating state-of-the-art tools tailored to Walmart's needs.