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Research Assessment #2

Assessment #3 Annotated Bibliography

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September 18, 2025

Data Analytics with a concentration in Prescriptive Analytics

MLA Citation:

Alfaiz, Noor Saleh, and Suliman Mohamed Fati. "Enhanced Credit Card Fraud Detection Model Using Machine Learning." MDPI, Multidisciplinary Digital Publishing Institute, 21 Feb. 2022, www.mdpi.com/2079-9292/11/4/662. Accessed 18 Sept. 2025.

This article provides context on credit card fraud before delving into using Machine Learning to create a comprehensive detection model. The paper begins by providing the best methods and models to use to detect credit card fraud as per the research conducted by the authors. Per each model referenced, the authors explain what the model does, experiments conducted using the model, and the results from the experiment. After analyzing the models, the authors conclude a proposed approach which explains the overall system, the hardware and software used, and the dataset used to create the detection system. In subsections of this explanation, the authors elaborate on the algorithms, techniques, and datasets used and how they apply to the situation. For example, the authors talk about 9 algorithms, including Logistic Regression, Decision Tree, and K-Nearest Neighbors, explaining what each method does in the context of fraud detection. Then, the authors explain 19 different resampling techniques, classified as either undersampling (11 total; the process of removing data from the majority class (larger dataset) to balance out with the minority class), oversampling (6 total; the process of adding data to the minority class (smaller dataset) to balance out with the majority class), or both. The authors then explain the evaluation factors used to determine the results including Accuracy, Recall, Precision, and F1 Score, and provide equations for each to determine accurate results. The authors then make a final conclusion - an elaborate analysis on the models used and ultimately which serves as the most accurate and most efficient in detecting credit card fraud.

This article is very relevant to my research because it explores the use of data analysis for a growing issue: credit card fraud. It also offers a solid framework of methods, algorithms, and evaluation strategies that I can apply to prescriptive analytics. Fraud detection is a critical area where predictive modeling alone isn't enough; it needs actionable decisions that consider accuracy, efficiency, and costs. By studying this paper, I can see similarities between fraud detection techniques and prescriptive approaches that suggest the best actions to reduce financial losses while keeping customer trust. The first major benefit of this article is the explanation of

the different algorithms and models. By understanding what each algorithm does, I am able to research other implications of the models that involve other fields of work. Moreover, I am able to understand the true efficiency of each algorithm or model through the extra research which is equally important so I can determine the best models for my projects and research. The article also talks about trade-offs for certain models. This is extremely important - some models may have issues which lead to inaccurate results. This consequence is dangerous in the world of finance, especially when dealing with credit card fraud, as the data needs to be as accurate as possible for consumers to stay stress-free, safe, and able to make the right financial decisions to prevent loss. By understanding the trade-offs for the models, I can make my own conclusions as to which models are best for certain scenarios.