Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques: A Guide to Data Science for Fraud Detection (Wiley and SAS Business Series)

By Bart Baesens, Veronique Van Vlasselaer, Wouter Verbeke

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Detect fraud earlier to mitigate loss and prevent cascading damage

Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques is an authoritative guidebook for setting up a comprehensive fraud detection analytics solution. Early detection is a key factor in mitigating fraud damage, but it involves more specialized techniques than detecting fraud at the more advanced stages. This invaluable guide details both the theory and technical aspects of these techniques, and provides expert insight into streamlining implementation. Coverage includes data gathering, preprocessing, model building, and post-implementation, with comprehensive guidance on various learning techniques and the data types utilized by each. These techniques are effective for fraud detection across industry boundaries, including applications in insurance fraud, credit card fraud, anti-money laundering, healthcare fraud, telecommunications fraud, click fraud, tax evasion, and more, giving you a highly practical framework for fraud prevention.

It is estimated that a typical organization loses about 5% of its revenue to fraud every year. More effective fraud detection is possible, and this book describes the various analytical techniques your organization must implement to put a stop to the revenue leak.

- Examine fraud patterns in historical data
- Utilize labeled, unlabeled, and networked data
- Detect fraud before the damage cascades
- Reduce losses, increase recovery, and tighten security

The longer fraud is allowed to go on, the more harm it causes. It expands exponentially, sending ripples of damage throughout the organization, and becomes more and more complex to track, stop, and reverse. Fraud prevention relies on early and effective fraud detection, enabled by the techniques discussed here. *Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques* helps you stop fraud in its tracks, and eliminate the opportunities for future occurrence.

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Editorial Review

From the Inside Flap

The sooner fraud detection occurs the better—as the likelihood of further losses is lower, potential recoveries are higher, and security issues can be addressed more rapidly. Catching fraud in an early stage, though, is more difficult than detecting it later, and requires specific techniques. Packed with numerous real-world examples, *Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques* authoritatively shows you how to put historical data to work against fraud.

Authors Bart Baesens, Véronique Van Vlasselaer, and Wouter Verbeke expertly discuss the use of unsupervised learning, supervised learning, and social network learning using techniques across a wide variety of fraud applications, such as insurance fraud, credit card fraud, anti-money laundering, healthcare fraud, telecommunications fraud, click fraud, and tax evasion. This book provides the essential guidance you need to examine fraud patterns from historical data in order to detect fraud early in the process.

Providing a clear look at the pivotal role analytics plays in managing fraud, this book includes straightforward guidance on:

- Fraud detection, prevention, and analytics
- Data collection, sampling, and preprocessing
- Descriptive analytics for fraud detection
- Predictive analytics for fraud detection
- Social network analytics for fraud detection
- Post processing of fraud analytics
- Fraud analytics from an economic perspective

Read *Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques* for a comprehensive overview of fraud detection analytical techniques and implementation guidance for an effective fraud prevention solution that works for your organization.

From the Back Cover

THE DEFINITIVE GUIDE TO THE DETECTION AND PREVENTION OF FRAUD THROUGH DATA ANALYTICS

Catch fraud early! *Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques* shows you how with a thorough overview of how to prevent losses and recover quickly as well as the security issues you need to address now. Exploring how auditors, corporate security prevention managers, and fraud prevention professionals can stay one step ahead of cyber criminals, this book addresses the different types of analytics in detecting fraud, including descriptive analytics, predictive analytics, and social network analysis.

Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques offers a current, state-of-the-art detection and prevention methodology, describing the data necessary to detect fraud. Taking you from the basics of fraud detection data analytics, through advanced pattern recognition methodology, to cutting-edge

social network analysis and fraud ring detection, this book presents essential coverage of:

- The fraud analytics process model
- Big data
- Break point/peer group analysis
- Anomaly detection
- Linear/logistic regression
- Neural networks
- Ensemble methods
- Social network metrics
- Bipartite graphs
- Community mining
- Visual analytics
- Model monitoring and backtesting

Insightful and clearly written, this hands-on guide reveals what you need to know about fraud analytics and the secret to putting historical data to work in the fight against fraud.

About the Author
Professor Bart Baesens is a professor at KU Leuven (Belgium), and a lecturer at the University of Southampton (United Kingdom). He has done extensive research on big data & analytics, customer relationship management, web analytics, fraud detection, and credit risk management. His findings have been published in well-known international journals (e.g. Machine Learning, Management Science, IEEE Transactions on Neural Networks, IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Evolutionary Computation, Journal of Machine Learning Research, ...) and presented at international top conferences. He is also author of the books Credit Risk Management: Basic Concepts (goo.gl/T6FNOn) , published by Oxford University Press in 2008; and Analytics in a Big Data World (goo.gl/k3kBrB), published by Wiley in 2014. His research is summarized at dataminingapps.com. He also regularly tutors, advises and provides consulting support to international firms with respect to their analytics and credit risk management strategy.

Users Review

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David Rutherford:

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Byron Hiebert:

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