



Loss Prevention Data Mining

Using big data, predictive and prescriptive analytics to empower loss prevention



Abstract

In the current economy where growth is stumpy and margins reduced, retailers are compelled to think about the components impacting their bottom line. One critical driver in improving profitability is loss prevention. In this paper, we outline our loss prevention analytics solution that can help reduce retail shrinkage. In addition, we discuss how effective usage of analytics can aid in detecting losses early thereby increasing margins.

Introduction

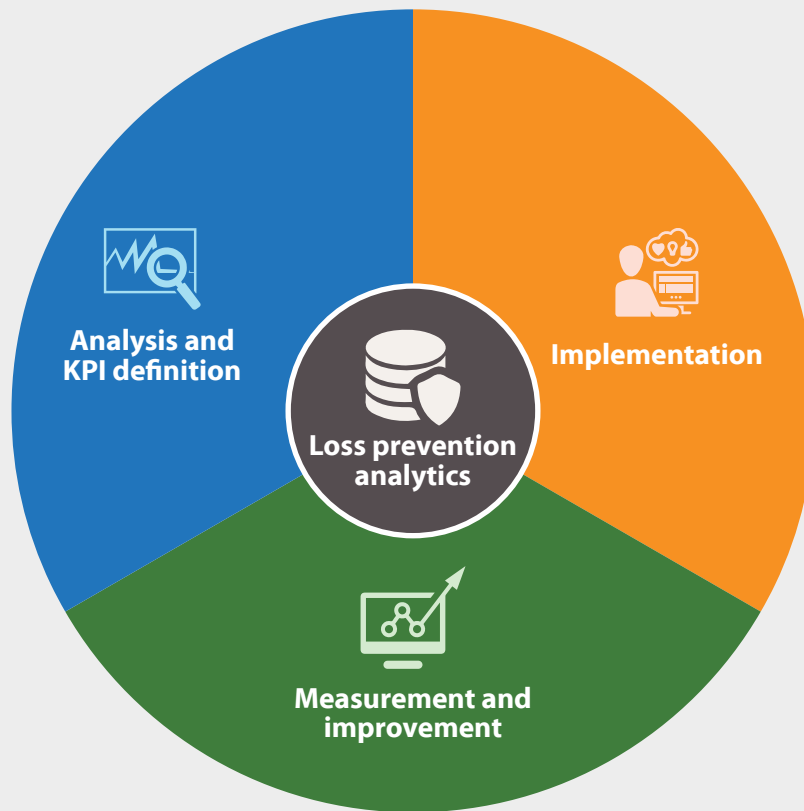
A recent National Retail Security Study revealed that inventory shrinkage represents 1.38% of retail revenues, which equates to more than US\$44 billion in annual losses for US retailers*. Out of this, 38% of loss is attributed to shoplifting and 34.5% to employee theft. The remaining loss is attributed to administrative and paperwork errors (16.5%), vendor fraud or error (6.8%), and unknown loss (6.1%). Since retail

margins have been historically low, the ability to reduce shrinkage will have a big impact on a retailer's bottom line. With the right data and analytics in hand, retailers can reduce the overall shrink, use resources more effectively, reduce exposure to other risk factors, and enjoy meaningful benefits.

Every sale in a retail store generates data. While data volumes are huge, the

challenge lies in converting this data into actionable information and insights. Loss prevention data mining is an approach that uses advanced analytical systems to mine the generated data to identify fraud, suspicious activity, employee compliance, and more. The analysis can be further extended by integrating data with security camera footage, case management systems, and more.





Our three-step solution in detail

Our solution approach

Loss prevention (LP) is always a moving target. The key is to stay on top of the changing LP requirements and respond to them faster than the time the contributing factors take to adapt to the circumstances – be it shrinkage or salvage.

The Infosys approach starts with analyzing the existing LP framework and defining the key performance indicators (KPIs) on loss prevention. Once the requirements are finalized, we start designing and building the solution. Our solution involves various analytical methods based on the need and helps prevent loss from occurring. Once the solution is implemented, we constantly monitor its effectiveness and identify improvement areas. The process is continuous and is carried on till the required state is reached.

Step 1: Analyzing the existing LP framework and defining LP KPI's

While shrinkage affects all types of retailers, certain categories of retailers are affected at a disproportionately higher rate. Therefore, the strategies that each retailer needs to adopt depends on and varies primarily according to the business model, line of business, sources of retail shrinkage, and other major contributors to the loss. Analyzing the existing LP framework and comparing it with the programs of peers help incorporate the lessons learnt and allocate funds effectively. As the program moves forward, we quantify the present state and define the key parameters to achieve our goal.

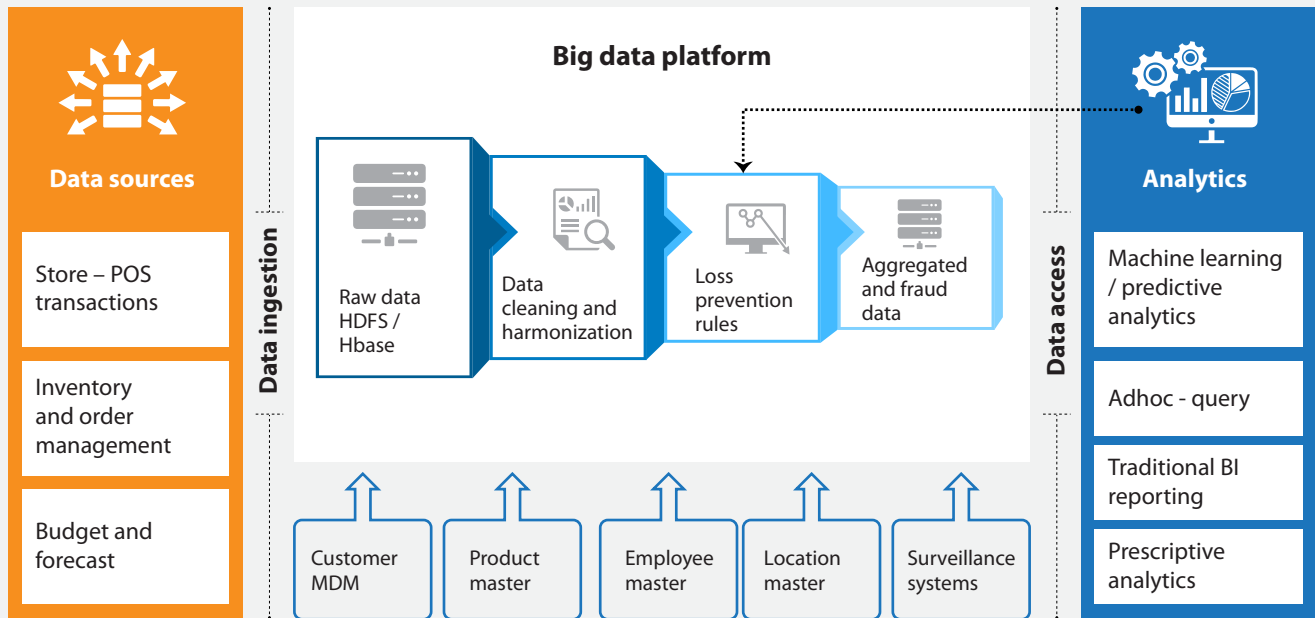
Step 2: Implementing the solution

Once the KPIs are defined, the next step is to implement the solution. Our solution

takes an accelerated data-driven approach to loss and shrinkage analysis. Data from disparate sources are integrated to provide a data discovery platform, enabling timely detection of risk patterns. Statistical rules along with historical patterns are used to identify potential fraudulent transactions at the point of sale (POS) and alert the concerned stakeholders at the right time. Our advanced visualization techniques enable early detection and quick decision-making. The Infosys loss prevention data mining solution offers prescriptive and predictive analytics in addition to the standard reports and dashboards. The level of analytics required in a specific retail setup is determined by factors such as the line of business corporate policies, etc.

Broadly, analytics can be classified into operational, strategic, predictive, and prescriptive.

Loss prevention analytics



Operational analytics:

The main aim of operational analytics is to identify retail shrinkage for shorter periods. By providing a near real-time view, shrink can be identified quickly. Early identification leads to faster response, thus preventing further loss. Operational analytics report at the category level provides the ability to drill down to the sub-category level and then to the stock keeping unit (SKU) level. Comparative reports with other sub-categories help devise prevention strategy at the department or SKU level. For example, when a new range of a particular product is introduced in a store, operational analytics can provide a view of the retail shrinkage for this range for a specific time period, compared with other products in that range. This enables the department managers to act quickly and prevent loss.

Strategic analytics:

These reports provide an executive snapshot into retail shrinkage data, thus

helping evaluate the effectiveness of the program as a whole. Based on this data, the top management can make informed decisions that influence the corporate loss prevention strategy, loss prevention budget allocation, return on investment, and so on. Trend analysis, comparative analysis comparing various time periods such as year-on-year (YOY) shrinkage for a particular department, store YOY shrinkage, and region YOY are some examples of strategic analytic reports.

Predictive analytics:

Historical data from POS, inventory transactions, budget and forecast is combined with rules, algorithms, and external data such as human resource data, customer relationship management data, etc., to determine accurately the likelihood of loss occurring. Applying rules and algorithms to transaction data as soon as the data is available allows the solution to automatically pinpoint

otherwise undetectable losses and sales data abnormalities at the transaction and cashier levels.

Prescriptive analytics:

By ingesting hybrid data, a combination of structured (KPI's, metrics) and unstructured data (videos, images), and business rules, we help predict what lies ahead and prescribe how to take advantage of this predicted future without compromising other priorities. For example, by unifying the POS data and calculated key metrics for each retail location including the average number of voided sales and the number of times the cash drawer was opened, the locations and time of unusually high levels of suspicious activity can be identified. By correlating suspicious activities with video from surveillance systems, cases can be prioritized and loss investigators deployed to either confront employees or gather additional evidence.

Step 3: Measuring and improving

Once the solution is implemented, we measure its effectiveness and identify areas of improvement. The solution should have the ability to measure key loss prevention metrics and KPIs to prevent

shoplifting, inventory loss, pilferage, theft, sales audit mismatch, and coupons misuse. The solution should also have the ability to track audits, drill down to details, and manage losses at the SKU level. The solution can be improved further by

integrating new sources of data such as shipping, stock ledger, vendor data along with data from POS, inventory, order, returns, shrink, product, store, and LP manager depending on the requirements and focus areas.





Infosys transforms a pharmacy retailer's loss prevention management

The client is a US-based pharmacy retailer, who is facing employee theft, shrinkage, inventory losses, pilferage, and other losses which are substantial every year. Fragmented data sources and large scale operations slowed their ability to take informed decisions and this necessitated an integrated loss prevention management system to be in place.

Infosys Solution

- Provides data management capabilities for business users to provide an integrated view of data, adhoc reporting, and self-service BI

- Facilitated with advanced visualizations and alert-based reporting capabilities which uses consolidated data from all sources including POS data, inventory, supply chain, stock ledger data, etc.
- Developed a data strategy to integrate data across different functional areas and enable access to the lowest granular data from the system of record
- Provided the ability to measure key metrics and KPIs to prevent shoplifting, inventory loss, pilferage, theft, sales audit mismatch, coupons misuse, and thereby reduce shrinkage

Benefits

- The client is able to identify additional loss prevention cases which will reduce their losses by 5%
- Time taken to identify a 'case' reduced from 6 – 8 weeks to less than a week
- Time taken for data mining has reduced from 4 – 6 weeks to less than a week
- The solution provides a customized data warehouse with in-house infrastructure and advanced analytics



Conclusion

In the current economy, the ability to reduce retail shrinkage is critical as it presents retailers with an opportunity to enhance profits. However, a 'one-size-fits-for-all' strategy does not work in loss prevention. Loss prevention programs need to be tailored to address specific retailer challenges based on the impact and sources of loss. The ability to predict retail shrinkage proactively, identify and react as soon as anomalies surface is a key determining factor for the success of any loss prevention program. IT as the key enabler for this business objective plays an important role in empowering the business with innovative solutions using advanced analytics.

About the Authors



Girish Viswanathan

Principal Technology Architect, Infosys

Girish has more than 15 years of techno-functional experience working in major areas like data warehousing and business intelligence, enterprise information architecture consulting, data management, and data architecture solutions, predominantly in the retail domain. Girish has architected and implemented large end-to-end DWH/BI projects with multimillion dollar budgets, complicated multi-source integration with sophisticated business requirements, from initial discovery to production deployment. He has extensive experience in implementation, solution-building, and bringing thought leadership in information architecture and big data space. He is currently focusing on big data integration and analytics.



Ritesh Pal

Principal Technology Architect, Data and Analytics Technology Consulting, Infosys Limited

Ritesh has 18+ years of experience. He specializes in big data, business intelligence strategy and implementation, corporate / enterprise performance reporting, and performance measurement solutions in retail and CPG industries. Ritesh has led various transformation projects in big data, BI, data management, and data governance. He has a strong combination of functional (retail, CPG, manufacturing, transportation, and health care), and technical (big data, BI, DW, PM, open source, and master data management) skills. He has been instrumental in developing BI applications with a strong insight in business processes and technical capabilities. He has also led major MDM programs from developing all hierarchies and data governance frameworks. He specializes in helping retailers and CPG companies on business process improvements and building solutions across retail operations, marketing, loyalty management, CRM, merchandising, and supply chain.

He can be contacted at Ritesh_Pal@infosys.com



For more information, contact askus@infosys.com

© 2017 Infosys Limited, Bengaluru, India. All Rights Reserved. Infosys believes the information in this document is accurate as of its publication date; such information is subject to change without notice. Infosys acknowledges the proprietary rights of other companies to the trademarks, product names and such other intellectual property rights mentioned in this document. Except as expressly permitted, neither this documentation nor any part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, printing, photocopying, recording or otherwise, without the prior permission of Infosys Limited and/ or any named intellectual property rights holders under this document.