Historical Basket Analysis of Maintenance Material Requests: Optimizing Delivery and Stocking of Parts using Association Rules

Leonardo Gabriel Hernández Landa, Argelia Vargas Moreno, René Jair Garza Rojas and Ana Karen Chavez Arechiga
Department of Industrial engineer and management,
Universidad Autónoma de Nuevo León
San Nicolás de los Garza, Nuevo León, México
leonardo.hernandezln@uanl.edu.mx

Abstract

This study explores and proposes optimization solutions for maintenance material requests through historical basket analysis. The study evaluates the existence of relationships between parts requests and uses association rules to detect multiple parts and improve inventory management systems. The analysis is based on historical maintenance material requests and aims to improve delivery and parts stocking. The results of this study can be used to optimize the maintenance process and improve inventory management efficiency. The proposed optimization solutions can help to improve the delivery and stocking of maintenance parts, ultimately enhancing the efficiency of the maintenance process. The results of this study can be utilized by maintenance professionals and inventory managers to optimize the maintenance process and improve inventory management efficiency. Overall, our study highlights the importance of using historical basket analysis and association rules to optimize maintenance material requests and improve inventory management systems.

Keywords
Maintenance materials, Historical basket analysis, Association rules, Relationship analysis

Biographies
Leonardo G. Hernandez-Landa is an accomplished academic with extensive experience in the field of industrial engineering and optimization. He received his BSc. in Industrial Engineering and PhD in Engineering from the graduate program in System Engineering at the Department of Mechanical and Electrical Engineering at the prestigious Universidad Autónoma de Nuevo León (UANL). Currently, he serves as a professor of operations management at the Department of Industrial Engineering at UANL in San Nicolás de los Garza, México, where he has been a faculty member since 2016. Dr. Hernandez-Landa's research has primarily focused on developing novel methods to solve challenging discrete optimization problems that arise in logistic, routing, and transportation systems. He has conducted funded research on vehicle routing problems with accessibility and route design, which has contributed to the advancement of the field. In addition, Dr. Hernandez-Landa is the coordinator of the graduate program in industrial engineering and the program on data science and digital transformation at UANL.

Argelia Vargas-Moreno is a distinguished academic and the Director of the Faculty of Chemical Sciences at the Autonomous University of Nuevo León. Prior to this position, she served as the Vice Director of the Department of Industrial Engineering. As a Professor of Industrial Engineering, Methods Engineering, and Operations Research, she has taught undergraduate and graduate students and has mentored many successful professionals in the field.
In addition to her academic career, Professor Vargas-Moreno has worked as a project engineer at several prominent organizations, including Hylsa, TUBACERO, and IMSA. Her contributions to the field of Industrial Engineering have been recognized by the Secretaría de Educación Pública (SEP) with the PRODEP certification. Professor Vargas-Moreno is a member of the Institute of Industrial and Systems Engineers (IISE) and serves as the faculty advisor of Student Chapter #358. Her academic publications include several books on Industrial Engineering, Methods Engineering, Statistics, Probability, and Accounting. Her research and expertise in these areas have contributed significantly to the advancement of the field. Overall, Professor Vargas-Moreno's distinguished career and numerous accomplishments make her an asset to the academic community and the field of Industrial Engineering.