

Chapter 7

Short Time Comparison of Item Sets With Market Basket Analysis Using Frequent Pattern (FP) Growth Method

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ABSTRACT

Supermarket analysis examines purchasing patterns to identify relationships among the various goods in a customer's shopping cart. The results of these correlations have assisted businesses in developing a successful sales strategy by grouping goods that customers commonly buy. Due to the expanding volume of data and its widespread utilization in the retail sector to enhance marketing strategies, Data Mining (DM) has become increasingly important in recent years. Transaction data analysis from the past yields a wealth of knowledge about consumer behaviour and commercial choices. The rate at which data is saved doubles every second that the fastest processor is available for its analysis. In a huge dataset or database, the Market Basket Analysis (MBA) approach of DM seeks out a group of items that commonly appear together. This technology is employed in a variety of sectors, including retail, to encourage cross-selling, assist with fraud detection, product replacement, and certain purposes. Based on this technology, it is simple to understand the buying trends of consumers and their preferences. Technology has advanced, and current business practices have significantly changed as a result. By figuring out the connections among the various things in the consumer's buying baskets, this approach examines their purchasing behaviours. Businesses must increase the accuracy of their operations as a result of changes in customer demands. This research focuses on FP growth, which performs better in mining frequent itemsets than apriori. Hence, this paper focuses on analyzing frequent patterns using conditional FP-Tree in FP growth and compares it with improved and traditional apriori with minimum support as the threshold for identifying the frequently occurring item sets. Moreover, the time consumption of the Associative Rule Mining (ARM) model has been compared with the FP Growth algorithm for identifying the short-time comparison model.

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INTRODUCTION

One of the sectors with intense rivalry is the retail industry. The speed of response and the capacity to comprehend client behaviour determine how quickly a business will grow. The gathering of client data is this sector's biggest problem. MBA is the accumulation of analytical methods intended to identify relationships and connections between goods based on consumer purchases (Zheliznyak et al., 2017). MBA aids in determining the likelihood of a buyer purchasing multiple products at the same time. In order to boost sales and profits, marketing strategies can be improved with the aid of analysis of purchasing patterns of customers. MBA, which is practical and simple to grasp, is now being used to determine the connection between complicated scientific phenomena that are occurring concurrently in a number of domains, including nuclear science, geophysics, bioinformatics, immunology and pharmacodynamics (Boratto et al., 2020; Reddy, & Reddy, 2021; Szymkowiak et al., 2018). The majority of the data is kept in the archive so that sales reports can be generated from it. The application of data mining methods is crucial for the achievement of business objectives in the retail sector.

Data mining techniques aid in the discovery of customer spending patterns by separating the numerous product links and associations. Based on various levels of confidence and support thresholds, association rules are used to identify common item sets. A collection of items with little support is referred to as a "frequent itemset" (Kumar et al., 2021). It is fundamental to the process of discovering association rules, sequences, and classifications in transaction databases to Mining Frequent item sets. When a collection of items consists of a number of subsets, then the item is frequent. To create association rules, frequent item sets are typically used. Support in a data set refers to how many transactions there were for a given item set. Confidence is quantified by the degree of certainty of every disclosed structure. Extraction of knowledge from these enormous databases requires numerous techniques that have been developed. One of the foremost crucial measurements is mining association rules. A rule of association has the structure $X \Rightarrow Y$. Where, X = antecedent; Y = Consequent.

According to the rule, clients who buy X have a greater probability of buying Y . Indicators of rule interest include confidence and support. They reflect the value and certainty of the rules that have been identified.

The computer industry's expanding business actors might make it difficult for the participants to establish a distinctive difference and a distinct positioning so that customers can distinguish them from their rivals. Every organization should be aware of competition in their working environment due to the competitive and dynamic nature of the market. Every organization must be able to build a number of successful marketing strategies constantly and consistently in order to survive in today's intense and increasingly competitive marketplace. The goal of doing this is to have a competitive advantage over rivals. Mizan Computer Retail Store needs to be able to choose a more targeted marketing approach in order to compete with this market. Retail stores must utilize all of their resources, including data, while choosing a marketing strategy. It is anticipated that data processing will be likely to produce data that will subsequently be used to assist marketing plans. The usage of data mining methods such as MBA is one of the data processing techniques that is frequently employed in marketing approaches.

An effective method for developing frequent item sets without the development of candidate item sets is the FP growth algorithmic programme. It employs a divide-and-conquer method and requires two database scans to locate the Support count. When a minimum threshold is specified, it can be used to mine the items using lift, leverage, and conviction. The FP-Growth algorithm is an improvement on the Apriori algorithm in that it addresses some of its shortcomings (Mustakim, Herianda et al., 2018).

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