

## Chapter 13

# Ideating a Recommender System for Business Growth Using Profit Pattern Mining and Uncertainty Theory

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### ABSTRACT

*Association rule mining (ARM) alone is a classical yet powerful method for basic rule discovery. However, generic measures being used are insufficient for specific pattern generation and rules of business interest. Critical decision making is a “key” component in contemporary businesses which could be rewarded by periodically utilizing patterns and rules to steer business growth and profit as well. To effectuate self-propelled growth in businesses, a feasible optimal recommender system needs to be accomplished without human intervention that recommends targeted product marketing and promotional strategies. In conjunction to ARM, uncertainty is a growing challenge in data mining research with facets of being probabilistic, fuzzy, or vague. Among many set theories to surmount uncertainty, vague set theory is employed for handling vagueness in data which gives the motivation of implementing a knowledge-based recommender framework by aggregating the two approaches to predict uncertain market growth strategy patterns and profitable rules.*

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## INTRODUCTION

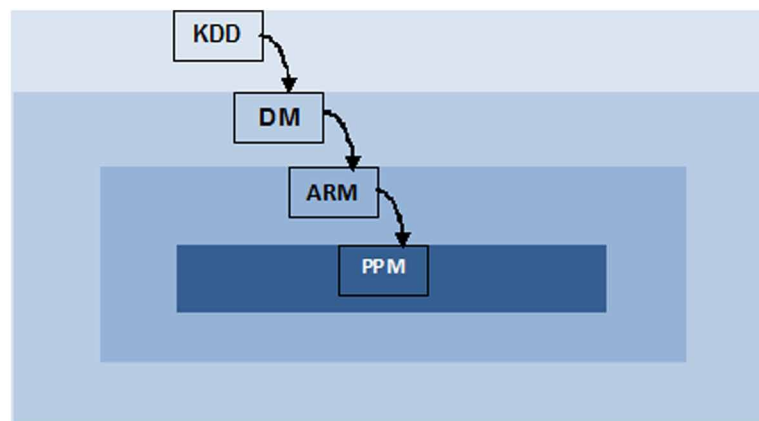
### Overview of Pattern Mining

In last few decades, information is being generated at a rapid pace. If Moore's law is applicable in information generation, then we surely can say it will be a 100 or 1000 times faster than the normal chipset designing rate to new trends. Owing to this huge amount of information, database systems have been and are being developed to manage such a pile. To store information is one thing, but to deal with it is another. To recognize and extract the hidden knowledge and potentially interesting patterns from these large databases is accomplished by Data Mining (DM) an essential process of Knowledge Discovery in Database (KDD) (Han & Kamber, 2001). In fact, Association Rule Mining (ARM) (Agrawal et al., 1993), a classical KDD technique algorithm is capable to generate several rules and patterns, but all the rules generate by mining algorithms not necessarily are interesting. As the rules generated by association rule mining algorithms depends only on the statistical significance which due to diverse information is incapable of producing utilitarian results for contemporary Market-Basket Analysis. The ARM technique has been used by many researchers and industry professionals in order to find the most important disclosure in market strategy, i.e., finding the best correlation among objects with a statistical significance which will govern the generation of rules that formerly were hidden in the raw data.

ARM created a buzz when it first came to light. Since then, as the database technology grew to allow more business to process and store data in databases, it still could lead to knowledge discovery but it will have subverted its meaning. As databases are becoming pervasive exponentially, it is important to consider ordinal parameters other than just support and confidence. The objective of Profit Pattern Mining (PPM) (Wang et al., 2002) is directly associated with businesses. It is one of the imperative application areas of association rule mining. Figure 1 shows the hierarchy of PPM.

Profit pattern discovery from a huge volume of data is one of the most desired attributes of Data Mining. The emerging growth of data mining raises a multitude of complex applications. Mining frequent sets over data streams present attractive new challenges over traditional mining in static databases (Tiwari et al., 2010) for retrieving the desired information to make it into knowledge from the large size databases.

*Figure 1. Hierarchy of profit pattern mining*



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