

Knowledge-Based Forensic Patterns and Engineering System

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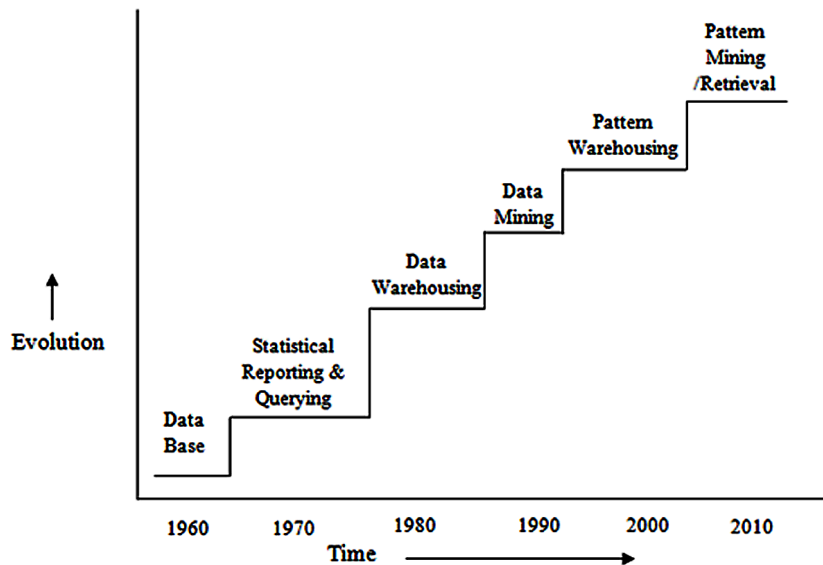
INTRODUCTION

The primary center behind this chapter is outline a devoted framework which can store forensic digital data patterns permanently. The issues, challenges, conceptual multilayer framework for developing forensic pattern warehouse for betterment of forensic prediction and forecasting has been discussed. A sequence of phases is involved during the design processes of forensic pattern warehouse and initially, conceptual modeling is one of the significant and the initial phase of forensic pattern warehouse design, because it constructs the solid framework for the next level of phases. In view of high semantic nature, there is a need to take a different approach for forensic pattern warehouse design to accommodate flexibility, isolation, extensibility and robustness. In this way, the context oriented forensic pattern warehouse design is one of the possible ways to manage patterns in a better way. The context of underlying pattern also helps to guide the queries to give more satisfactory result. Moreover, the logical modeling of the pattern warehouse should incorporate a mechanism to properly hierarchized the patterns and able to make sharp isolation among patterns. Furthermore, there is a need to provide additional information in logical modeling with patterns to improve query processing by revealing the sense of the underlying domain of source data.

BACKGROUND

In the mid of the 90s, organizations have started to recognize the strategic use of databases as a new discipline which was entirely different from theme of operational database (Tiwari V. at 2010). Traditionally, operational database has been used to full fill mission-critical, day to day needs for online transaction processing (Inmon W.H., 2005). Organizations have a variety of computer based data processing system such as financial, making, feedback, attendance, and sales etc. which generate operational data (Agrawal R. & Srikant R. 1994). These kinds of data contain detailed, non-redundant and updated values. Those organizations that have recognized the power of information timely will have huge advantages over their competitors and it leads to design an effective data warehouse strategy (Kimball R. & Ross M. 2011). A data warehouse and data mining have given a platform to recognize the role of information behind successful business and much more. Data warehousing improves the productivity of an expert's decision making though consolidation, conversion, transformation, and integration of scattered data, and represents a trusted view of the enterprise. The data warehouse should not consider as a product rather than it is an environment. The data warehousing is a layered process to construct of information system that helps with

Figure 1. Evolution of database technology



organization in their decision making by giving historical data (Romero et al, 2010)). There are some following reasons that make data warehouse is very special:

- Prompt decision need to be made correctly by analyzing available data.
- Business workers are expert in their domain, not in the computer.
- The amount of data doubles in every one and half year, which create the problem in deep data analysis.
- The required infrastructure cost of development of a data warehouse is continuing to decline.
- Organizations have to take critical decisions based on the entire data rather than using rough estimates based on incomplete data.

In the recent evolution of database technology as depicted in Figure 1, patterns are being managed and maintained by Pattern Warehouse Management System (PWMS). Pattern warehouse is a brand-new concept and little emphasis has been given till date. A pattern warehouse is as attractive as data warehouse as the main repository of an

organization's historical pattern and is optimized for on-demand reporting and analysis (Mohammad R. et al (2009), Bartolini et al, (2003)). By nature, patterns are not persistent. There is a need to execute pattern generating methods when patterns are required. Pattern warehouse is a way to make the patterns persist by storing them permanently and it can be considered as a collection of persistently stored patterns.

In order for someone to be able to exploit these patterns on-demand, an efficient general PWMS is required for handling (storing/processing/retrieving) the patterns. The general means, the system must be able to handle all kinds of patterns. Patterns share some characteristics that make traditional DBMSs unable to represent and manage them. Patterns thus, can be regarded as knowledge units that effectively describe entire subsets of data (in this sense, they are compact) (Tiwari V. & Thakur R.S. 2015b). Patterns can be generated from different application domain so they are very heterogeneous in structures and often, heterogeneous patterns are needed to be managed together. The structure of patterns is required to be investigated for the design of a flexible pattern warehouse management system. Pattern management is an important issue in

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