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REVIEW OF LITERATURE
NEED/IMPORTANCE OF THE STUDY
STATEMENT OF THE PROBLEM
OBJECTIVES
HYPOTHESIS (ES)
RESEARCH METHODOLOGY
RESULTS & DISCUSSION
FINDINGS
RECOMMENDATIONS/SUGGESTIONS
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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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KNOWLEDGE DISCOVERY IN DATABASES

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ABSTRACT

Knowledge discovery in databases((Data Mining) is a rapidly growing field, whose development is driven by strong research interests as well as urgent practical, social, and economical needs. While the last few years knowledge discovery tools have been used mainly in research environment. Sophisticated software products are now rapidly emerging. In this, we provide an overview of common knowledge discovery tasks and approaches to solve these tasks. We propose a feature classification scheme that can be used to study knowledge and data mining software. This scheme is based on the software's general characteristics, database connectivity and data mining characteristics. Finally, we specify features that we consider important for knowledge discovery software to possess in order to accommodate its users effectively. This research work, first of all, focuses on analyzing different processes of supervised learning. Secondly, it proposes a new improved process for developing knowledge extraction.

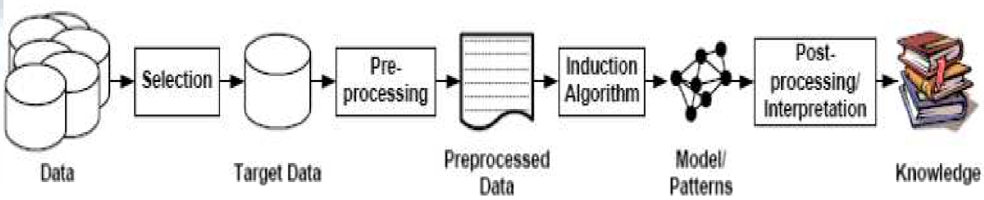
KEYWORDS
Data Mining, Knowledge Discovery in Databases, Supervised learning algorithms, Stacking, Classification, Regression.

INTRODUCTION

Data mining involves the use of sophisticated data analysis tools to discover previously unknown, valid patterns and relationships in large data sets. These tools can include statistical models, mathematical algorithms, and machine learning methods (algorithms that improve their performance automatically through experience, such as neural networks or decision trees). Consequently, data mining consists of more than collecting and managing data, it also includes analysis and prediction. Data mining can be performed on data represented in quantitative, textual, or multimedia forms. Data mining applications can use a variety of parameters to examine the data. They include association (patterns where one event is connected to another event, such as purchasing a pen and purchasing paper), sequence or path analysis (patterns where one event leads to another event, such as the birth of a child and purchasing diapers), classification (identification of new patterns, such as coincidences between duct tape purchases and plastic sheeting purchases), clustering (finding and visually documenting groups of previously unknown facts, such as geographic location and brand preferences), and forecasting (discovering patterns from which one can make reasonable predictions regarding future activities, such as the prediction that people who join an athletic club may take exercise classes).As an application, compared to other data analysis applications, such as structured queries (used in many commercial databases) or statistical analysis software, data mining represents a difference of kind rather than degree. Many simpler analytical tools utilize verification-based approach, where the user develops a hypothesis and then tests the data to prove or disprove the hypothesis. For example, a user might hypothesize that a customer who buys a hammer, will also buy a box of nails. The effectiveness of this approach can be limited by the creativity of the user to develop various hypotheses, as well as the structure of the software being used. In contrast, data mining utilizes a discovery approach, in which algorithms can be used to examine several multidimensional data relationships simultaneously, identifying those that are unique or frequently represented. For example, a hardware store may compare their customers' tool purchases with home ownership, type of automobile driven, age, occupation, income, and/or distance between residence and the store. As a result of its complex capabilities, two precursors are important for a successful data mining exercise; a clear formulation of the problem to be solved, and access to the relevant data. Data mining, popularly known as Knowledge Discovery in Databases (KDD), it is the nontrivial extraction of implicit, previously unknown and potentially useful information from data in databases. Though, data mining and knowledge discovery in databases (or KDD) are frequently treated as synonyms, data mining is actually part of the knowledge discovery process.

A lot of research efforts are performed around the world to find unknown facts hidden in millions of records, stored in huge databases. As databases are growing in size, there is a need to explore new patterns from existing database(s) and there is a need to develop new techniques that are efficient enough to find such patterns and should also be able to fulfill future needs of the companies demanding such solutions. There are different perspectives, why we search for such new patterns e.g. sales/marketing, customer retention, buyer behaviour, cost/utilization, quality control, inventory and fraud detection *etc.* Most important among them is marketing department(s) of the organizations, who are always looking for such patterns, which can furnish new prospects for marketing managers to think upon new trends, aspects and emerging scopes to take decisions at different managerial levels. Data mining techniques can be categorized in different ways. One of the most important categorization is based on kind of problems solved. Classification, Clustering and Association rules are most important kind of problems that are solved by data mining. Present work concentrates upon classification tasks. A large number of techniques and algorithms have been devised for extracting knowledge from databases. A large part of these techniques and algorithms concentrate upon classification problems. Classification task comprises of assigning objects to classes (groups) on the basis of measurements made on the objects. Classes of data are predefined, a set (the train set) of labeled objects are used to form a model through classifier for classification of future observations (or the test set). Such a processing is named as supervised learning. Supervised learning techniques are usually used for the solution of classification problems. Usually a general process is recommended for supervised learning as shown in Figure[1].

FIGURE 1: THE GENERAL KDD PROCESS



LITERATURE REVIEW

The amount of data continues to grow at an enormous rate even though the data stores are already vast. The primary challenge is how to make the database a competitive business advantage by converting seemingly meaningless data into useful information. How this challenge is met is critical because companies are increasingly relying on effective analysis of the information simply to remain competitive. A mixture of new techniques and technology is emerging to help sort through the data and find useful competitive data. By knowledge discovery in databases, interesting knowledge, regularities, or high-level information can be extracted from the relevant sets of data in databases. It is investigated from different angles, and large databases thereby serve as rich and reliable sources for knowledge generation and verification. Mining information and knowledge from large database has been recognized by many researchers as a key research topic in database systems and machine learning. Companies in many industries also take knowledge discovering as an important area with an opportunity of major revenue (Fayyad., 1996. Piatetsky-Shapiro.1991, Silberschatz.,1995). The discovered knowledge can be applied to information management, query processing, decision making, process control, and many other applications.

For example, Fayyad stated KDD process as follows (1996):

1. Learning the application domain 2.Creating a target dataset 3.Data cleaning and preprocessing 4.Data reduction and projection 5.Choosing the function of data mining 6.Choosing the data mining algorithm(s) 7.Data mining 8.Interpretation 9.Using the discovered knowledge

As the KDD process shows, data mining is the central of knowledge discovering, it requires complicated data preparation work. Data cleaning and preprocessing includes basic operations, such as removing noise or outliers, collecting the necessary information to model or account for noise, deciding on strategies for handling missing data fields, and accounting for time sequence information and known changes, as well as deciding DBMS issues, such as data types, schema, and mapping of missing and unknown values. Useful data are chosen from the formatted data to increase the effectiveness and focus on the task.

SUPERVISED LEARNING AND CLASSIFICATION

Different studies have been conducted from time to time for accounting the development of supervised learning techniques and algorithms. Data mining itself has emerged from other disciplines like Machine Learning, Artificial Intelligence and Statistics etc. Hence, it is obvious to get initial references related to comparisons of algorithms from its parent disciplines. Many researches were being performed before the time data mining was coined as a separate discipline for study. Fahrmeir et al., compared the results of a point awarding approach with the results obtained by the linear discriminate[4]. Gorman et al., reported that back-propagation outperformed nearest neighbour for classifying sonar targets[5], whereas Shadmehr et al., showed that some Bays algorithms were better on other tasks[118]. Kirkwood et al., developed a symbolic algorithm ID3, which performed better than discriminant analysis for classifying the gait cycle of artificial limbs[7].

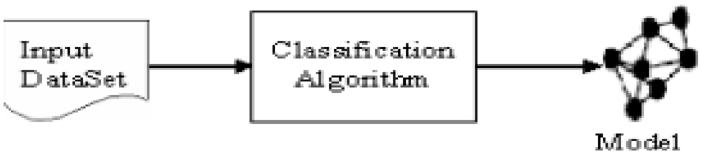
VARIOUS PROCESSES FOR SUPERVISED LEARNING

Supervised learning processes can vary from simple processing to very complex processing. Different techniques and algorithms are used to extract knowledge from data. These algorithms involve certain criteria to extract knowledge. A particular technique or algorithm may be suitable for a segment of problems only, but may not be suitable for others. There is no unique technique or algorithm that solves all types of problems. Supervised learning involves the use of the train set to train algorithms for the creation of a model of that technique or algorithm. This model is then applied on the test set to generate and compare results. Different supervised learning processes as discussed by Witten et al.[8], are as follows:

(i) SIMPLE SUPERVISED LEARNING

In its simplest form, input data is applied to classification algorithm and result is generated. It is also called Fixed Split experimentation as data is divided into the train and the test set. Such experimentation suffers with over fitting and under fitting model and results may not fulfill the reliability criteria. So there is need for pre-processing and post-processing of data.

FIGURE 2: SIMPLE SUPERVISED LEARNING PROCESS



(ii) PREPROCESSING OF THE DATA

A data set collected is not directly suitable for induction (knowledge acquisition); it comprises in most of cases noise, missing values, the data are not consistent, the data set is too large, and so on. Therefore, we need to minimize the noise in data, choose a strategy for handling missing (unknown) attribute values, use any suitable method for selecting and ordering attributes (features) according to their informative (so-called attribute mining), discretize/fuzzify numerical (continuous) attributes and eventually, process continuous classes.

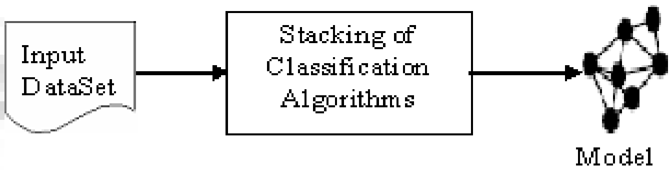
(iii) POST PROCESSING OF THE KNOWLEDGE DERIVED

The pieces of knowledge extracted in the previous step could be further processed. One option is to simplify the extracted knowledge. Also, we can evaluate the extracted knowledge, visualize it, or merely document it for the end user. There are various techniques to do this. Next, we may interpret the knowledge and incorporate it into an existing system, and check for potential conflicts with previously induced knowledge.

(iv) STACKING

Stacking combines the output of a number of classifiers. Stacked generalization, also known as Stacking in the literature. It is a method that combines multiple classifiers by learning the way that their output correlates with the true class on an independent set of instances. At a first step, N classifiers Ci, i = 1..N are induced from each of N data sets Di, i = 1..N. Then, for every instance ej , j = 1..L of an evaluation set E, independent of the Di data sets, the output of the classifiers Ci(ej) along with the true class of the instance class(ej) is used to form an instance mj , j = 1..L of a new data set M, which will then serve as the meta-level train set. Each instance will be of the form: C1(ej), C2(ej), . . . , CN(ej), class(ej). Finally, a global classifier GC is induced directly from M. If a new instance appears for classification, the output of all local models is first calculated and then propagated to the global model, which outputs the final result. Any algorithm suitable for classification problems can be used for learning the Ci and GC classifiers. Independence of the actual algorithm used for learning Ci, is actually one of the advantages of Stacking, as not every algorithm might be available for each data set and not the same algorithm performs best for every data set.

FIGURE 3: STACKED SUPERVISED LEARNING PROCESS.



COMPLEX PROCESSING

Different pre-processing, Post-processing and stacking of different algorithms may be combined to extract knowledge from databases. Such complex criteria may involve parallel processing of different algorithms as well.

OUTLINE OF THE METHOD

It is often observed that human beings deal with new and old situations or problems which they face, by first composing relevant queries from the information available about the situation or the problem at hand and its domain, and then posing these queries to the reserved knowledge in their minds. They then use their reasoning techniques to collect the relevant knowledge and try to make links among this knowledge in a way to help them dealing with the situation.

Reasoning is the process of drawing new conclusions from some premises which are known facts and/or assumed hypotheses. In general, a reasoning comprises a number of arguments or inferences. In any valid argument of human logical thinking, the premises must be relevant to the conclusion. Informally, we say a reasoning is ***relevant*** if and only if in every argument or inference of that reasoning the premises is relevant to the conclusion; a reasoning is ***irrelevant*** if and only if it **is** not relevant.

The previous observation inspires us to propose a new integration method to integrate the already exist domain knowledge bases into the KDD process. The key idea behind the proposed method, which is acquired from the previous observation, is that the relevancy among knowledge is dynamically changing and the most important factor which decides it is the situation or the problem at hand. Some knowledge in the knowledge base are relevant to each other in the current situation but are not relevant in another one. Therefore, in our proposed method the characteristics of relevant knowledge are identified from the application information and the database meta-knowledge (e.g.biases in data collection and data-base schema). Then, these characteristics are compiled automatically to a set of queries posed to the knowledge base. In order to solve the relevancy problem and assure the generality of the method, the queries and the knowledge base have to be rendered to a domain-independent form which both permits automated relevant reasoning and overcomes the language gab exist between the terminology of the knowledge base and of the queries' description. In the method we suggest that this form will be the relevant logic form and the reasoning engine will be the relevant reasoning based on strong relevant logic, which **is** proposed by Cheng recently [9]**.**

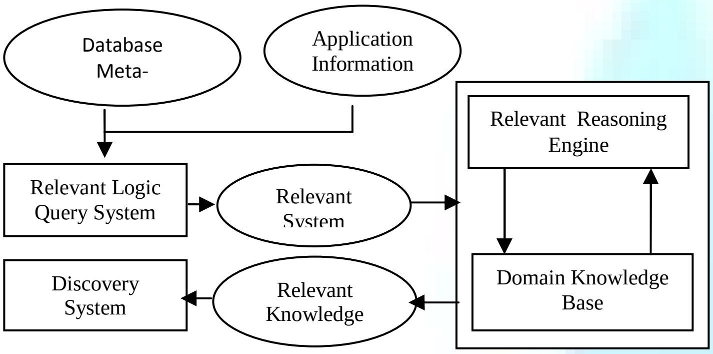
The method is shown in Figure, it consists exactly of three phases:

Phase 1: Specify the characteristics of the relevant knowledge by using the KDD task or application at hand and the database meta-knowledge.

Phase 2: Design relevant queries from the above characteristics in the form of relevant logic language.

Phase 3: Pose these queries to the domain knowledge base and use the relevant reasoning engine to collect the relevant knowledge.

FIGURE 4



Relevant reasoning based on Strong Relevant Logic(SRL) is preferred rather than any other reasoning techniques, e.g., those which are based on Classical Mathematical Logic (CML), because our aim is to get the relevant Knowledge automatically but the conclusions reasoned and/or deduced based on CML from the premises may be irrelevant at all, in the sense of meaning, to the premises. In the framework of the CML, there is no guarantee that the conclusion of a reasoning is necessarily relevant to its premises, even if the reasoning is valid in the sense of CML. As a result, for a conclusion reasoned and/or deduced based on the CML, we have to investigate whether it is relevant to its premises or not by ourselves. Obviously, the more information and/or knowledge we have, the more difficult investigation task we do. SRL gives us high level evidences that the reached conclusions are relevant to the given premises.

AN APPLICATION OF THE METHOD

Many of the existing KDD systems produce knowledge in the form 'If ... Then . . . ' represented as attribute-value rules[10] or relational rules[11] based on the similarities and differences between vectors of attributes. These attributes are static and exist in the initial description language of the examples in the database. In this section we present an algorithm designed under the framework of the proposed method. The goal of this algorithm is to use the prior domain knowledge bases where the knowledge is represented in the form of propositional rules to create new k relevant attributes, not already present in the attributes originally exist, for KDD systems to use. This algorithm works by using the attributes originally exist in the database schema to design relevant queries in the form of propositional rules and use the relevant reasoning engine to retrieve all their relevant rules which define new attributes. The new attributes are used to augment the description language a standard KDD system can operate with.

Algorithm (Task): Creating new k relevant attributes from the prior domain knowledge bases where the knowledge are represented in the form of propositional rules.

Input: An array of the old attributes A_l, ..., An,; and the required number k of new attributes.

Output: Array of the old and new attributes A_1, ..., A_n, $_{n+i}$....,A_{n+k}.

Method: The algorithms proceed in the following manner. For each encountered old attribute A, in the attributes array a relevant query ***SQ,*** in the form of propositional rule, is designed from it. In general,

suppose SQ = $A_i \rightarrow A_i$ is the most recently designed query. The relevant reasoning engine takes this query (rule) and finds all its relevant rules from the knowledge base. There are two forms of relevant rules important to the task, namely,

- A_i (=,< >,<,>)value → B(=,< >,<,>)value
- A_i (=,< >,<,>)value **^** H(=,< >,<,>)value
→ B(=,<>,<,>)value

where H is an attribute in the schema (new or old),
this can be tested by comparing H with the attributes
A_{i+1},...,A_f only, where A_f is the last constructed attribute. The previous rule's forms are produced from the reasoning engine as a result of applying the two inference rules Modus Ponen and Adjunction on the old and most recently constructed attributes. The algorithm is continued by selecting a rule from the list of ***SQ's*** relevant rules. If the rule has been previously selected, a new one is selected. When the new rule defines a new attribute, i.e., **(**B(=,<>,<,>)value) is new, this attribute is constructed, and a new SQ= **(**B(=,<>,<,>)value →B(=,<>,<,>)value) is designed from it. The algorithm starts again from the new SQ. After trying all the relevant rules of the new SQ, the algorithm return to the list of (A_i + A_i **)'s** relevant rules. This process of selecting a rule is continued until the list of these rules is exhausted. The overall process repeatedly works until the required attributes k are defined for most of the examples in the database or the last old attribute is reached in the array. The method is summarized as follows:

Step 1: Initialization: ***i*** := *1* (**i** is a counter on the old
attributes); l := 0 (l is a counter on the completely defined new attributes for most examples); ***f*** := *n+l;*

Step 2: REPEAT
SQ (Starting query):= $A_i \rightarrow A_l$
Relevance (SQ);
i := *i+l;*
UNTIL
l :=*k* OR *i:=n.*

The procedure Relevance is described as follows:

PROCEDURE Relevance (RULE: string);
begin
Find all the rules which are relevant to RULE;
FOR each rule R relevant to the task **DO**
CASE (R consequent variable) **OF**
New attribute and not constructed : {
CV := R antecedent;
A_f := R consequent variable;
f:= *f*+1
Assign R's consequent to all the examples
that satisfy CV;
SQ := R consequent → R consequent;
Relevance ***(SQ)*** }
New attribute and constructed before :{
CV := R antecedent;
Assign Rs consequent to all the examples
that satisfies CV;
IF (R consequent variable (=,<>,<,>)
value) is new value
THEN {
SQ := R consequent → R consequent;
Relevance ***(SQ)}}***
end CASE
end; FOR
IF most of the examples in the database is defined for the new attribute A_{n+1}
THEN ***l*** *:= l +1;*
end

Working Example: To illustrate how the algorithm works, consider the attributes list with their characteristics given in Table 1 and the rules given in Figure **.** These rules are constructed and given to the induction system CHARADE[12] by the knowledge shown in Table 2**.** Let these rules be exist in the domain knowledge base in a scattered form, Table **3** shows how the algorithm finds these rules and directly constructs new attributes from them. The column SQ's RELEVANT RULES in Table 3 contains all the relevant rules to the task. The assignment operations can be carried out on the examples given in [12].

TABLE 1: LIST OF ATTRIBUTES WITH THEIR CHARACTERISTICS

ATTRIBUTE	TYPE	DOMAINE
Humidity(H)	ordered set	low < high < very-high
Hygiene(h)	ordered set	very-bad < bad < average < good
Location(L)	string	NA
F_fruits/vegt.	Boolean	yes, no
Year(Y)	integer	NA
Temperature(T)	ordered set	severe-cold < cold < average
< hot < very-hot		
food-quantity (FQ)	ordered set	starvation<severe – restrictions < restrictions<ok
food-variety (FV)	ordered set	low < average < high
type-of-location (TL)	unordered set	land, sea
affection-severity(AS)	integer interval	[0,5]

IF (humidity = high)**THEN** (p e r s p i r a t i o n >= hard)

IF (hygiene = good) (humidity <= high) **THEN** (p e r s p i r a t i o n <= hard)

IF (humidity >= very--high) **THEN** (p e r s p i r a t i o n >= blocked)

IF (p e r s p i r a t i o n <= hard) **THEN** (f l u i d s <= healthy)

IF(fresh-fruits/vegetables = yes) **THEN** (f l u i d s <= healthy)

IF(fresh-fruits/vegetables <> yes) **THEN** (f l u i d s >= corrupted)

IF (hygiene <= average) (l o c a t i o n = sea) **THEN** (humidity >= very-high)

IF (hygiene = good) **THEN** (humidity <= high) **THEN** (humidity <= high)

TABLE 2: DEFINITIONS OF THE TWO NEW ATTRIBUTES

ATTRIBUTE	TYPE	DOMAINE
perspiration (P)	ordered set	normal < hard < blocked
fluids (P)	ordered set	healthy < corrupted

TABLE 3

ITERATION OF STEP 2	SQ	SQ' RELEVANT RULES	NEW ATTRIBUTES	ATTRIBUTES DOMAIN
1	H→H	H=high→ p>=hard	p	p>=hard
		H=very high p>=blocked		p>=blocked
		H<=high ∧ H>=good→p<=hard		p<=hard
	p>=hard→ p>=hard	no		
	p>=blocked→ p>=blocked	p>=blocked ∧F/V yes →+ F>=corrupted	F	F>=corrupt
	F>=corrupt→ F>=corrupt	no		
	P<=hard→p<=hard	p<=hard→F<=healthy		F<=healthy
2	h→h	h<=average ∧ L=sea →+ H>=very high h>=good -+ H<=high		
3	L→L	no		
4	F/V→F/V	F/V=yes →+ F<=healthy		

CONCLUSION

In this paper a new and general integration method for integrating the prior domain knowledge bases into the KDD process based on relevant reasoning to solve the relevancy problem and simulate the human way of thinking when one face a new or old situation. According to human being thinking, the principle factor which decides the relevancy among his knowledge is the situation or the problem at hand. The same idea is used by the integration method in order to increase the power and versatility of the KDD systems. This versatility is achieved by searching for and getting the relevant prior knowledge according to the application and KDD task at hand. This integration method can be considered as a step toward a full automatic discovery (including KDD) systems in the future. All discoveries made by current computer programs have been characterized as human/computer discoveries because the discovery process is far from being completely automated [13]. As we see one area where the human component has been vital is in guiding the KDD systems based on the relevant prior knowledge. Here an algorithm designed under the framework of the proposed method. This algorithm uses the prior domain knowledge bases where the knowledge are represented in the form of propositional rules to create new ***k*** relevant attributes, not already present in the attributes originally exist, for KDD systems to use. This algorithm can be integrated with any inductive learning methodology to increase its autonomy and improve learning.

REFERENCES

1. Fayyad U., Piatetsky-Shapiro G. and Smyth P.,(1996). “The KDD process for extracting useful knowledge from volumes of data”, *CACM 39 11*, 27-34.
2. Piatetsky-Shapiro Gregory, (1991). "Knowledge discovery in real databases", *IJCAI-89 Workshop , AI Magazine,* 11.
3. Silberschatz A., and Tuzhilin A., (1995). “On subjective measures of interest-ingness in knowledge discovery”.
4. Fahrmeir L., Haussler W. and Tutz G.,(1984). “Diskriminanz analyse”, *Multivariate statistische Verfahren, Verlag de Gruyter, Berlin*.
5. Gorman R. P. and Sejnowski T. J.,(1988). “Analysis of hidden units in a layered network trained to classify sonar targets”, *Neural networks,* 1(1), 75–89.
6. Rosenblatt,F.,(1958).“The perceptron:a probabilistic model for information storage and organization in the brain”, *Psychological Review*, 65, 386-408.
7. Kirkwood, C., Andrews B. and Mowforth P., (1989). “Automatic detection of gait events: a case study using inductive learning techniques”, *Journal of biomedical engineering*, 511–516.
8. Witten I. H. and Frank E.,(2005). “Data Mining –Practical Machine Learning Tools and Techniques”, *Elsevier Inc*.
9. J. Cheng, “Relevant Reasoning As The Logical Bases of Knowledge Engineering,” In Proc., 4th World Congress on Expert Systems. Vol.1, 1998 pp. 449-456.
10. J. Han, Y. Fu, “Attribute-Oriented Induction in Data Mining,” In U.M. Fayyad, G.P. Shapiro, P. Smyth, R. Uthurusamy, editors, *Advances in Knowledge discovery and Data Mining* AAAI/MIT Press 1996, pp. 399-421.
11. W.M. Shen, **K.** Ong, B. Mitbander, C. Zaniolo, “Metaqueries for Data Mining,” In U.M. Fayyad, G.P. Shapiro, P. Smyth, R. Uthurusamy, editors, *Advances in Knowledge Discovery and Data Mining* AAAI/MIT Press 1996, pp. 375-398.
12. V. Cormble, J.G. Ganascia, “Discovery of The Causes of Scurvy: Could Artificial Intelligence have saved a few enturies?,” In *Knowledge Discovery in Databases:* Papers from the 1993 *AAAI* Workshop, *AAAI* Press 1993, pp. 70-80.
13. R.Valdes-Perez, “Some Recent Human-Computer Discoveries in Science and What Accounts for Them,” ***AI*** *Magazine,* Vol.16. No.3, pp. 37-44.

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