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Knowledge Discovery using Data Mining

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Abstract: - The fast developing computer science and engineering techniques has made the information easy to capture process and store in databases. Information or data are considered as elementary variable facts. Knowledge is considered as a set of instructions, which describes how these facts can be interpreted and use[1]. Data describes the actual state of the world; however knowledge describes the structure of the world and consists of principal and laws. How to gather, store and retrieve data is considered in database. Soft computing (SC) is an evolving collection of methodologies, which aims to exploit tolerance for imprecision, uncertainty, and partial truth to achieve robustness, tractability, and low cost. SC provides an attractive opportunity to represent the ambiguity in human thinking with real life uncertainty. Soft computing has recently been playing an important role in advanced knowledge processing. An advanced learning method using a combination of perception and motion has been introduced. Emergent, self-organizing, reflective, and interactive (among human beings, environment, and artificial intelligence) knowledge processing is considered by using soft computing and by borrowing ideas from bio-information processing [2].

Soft computing (SC)was proposed for construction of new generation artificial intelligence (high machine intelligence quotient (HMIQ), human-like information processing) and for solving nonlinear and mathematically unmodeled systems (tractability) (TR) [3].

Data mining is a field at the intersection of computer science and statistics, is the process that attempts to discover patterns in large data sets. It utilizes methods at the intersection of artificial intelligence, machine learning, statistics, and database systems. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use[4][5][6].

I. Introduction:

Due to the increasing use of very large databases and data warehouses, mining useful information and helpful knowledge from transactions is evolving into an important research area. Most of conventional data mining algorithms identify the relation among transactions with binary values. Transactions with quantitative values are, however, commonly seen in real world applications.

Through data mining, we can able to effectively extract data in the form of knowledge discovery which provides useful helping guide for information processing that can be utilized in varieties of applications. It is the most sought after field in recent scenario and its importance can not be ignored at all as effective data analysis outputs to extensive information utilization in almost all the fields and a proper data mining provides the appropriate and effective result. Different types of data mining techniques are augmented for powerful data mining applications that can ranges from Super market data to science, research, medical, media, web, entertainment and a lot of other fields which are implemented through data warehouses and Online Analytical Processing along with different data mining models. In this paper we have focused on data mining works with respect to current research approaches in variety of fields.

II. Steps of knowledge discovery using data mining:

The process of knowledge discovery is the process of information extraction from very large databases. Its importance is described along with several techniques and considerations for selection the most appropriate technique for extracting information from particular data set. We are using 5 steps for knowledge discovery:-

1. **Data Cleaning:-** This is the first step in which the noise, meaningless data and inconsistent data is removed. Only reliable and useful data is required.

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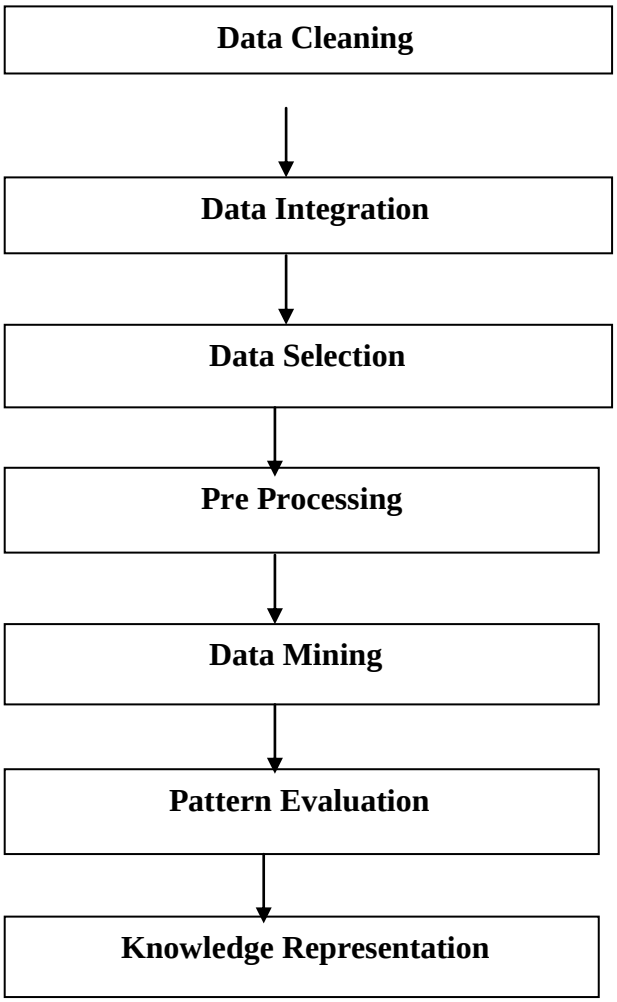
2. **Data Integration:-** Integration is an important step because in this step we have to combine or integrate data from different sources.
3. **Data Selection:-** It involves identification or extraction of relevant data for analysis. Data relevant to the analysis task are retrieved from the database.
4. **Pre processing:-** It involves preparing the data set by resolving problems like missing data, skewed data,

irrelevant fields, removal of outlying points etc[7][8]. This step consisting of two steps, like data cleaning and data integration. Data cleaning consists of some basic operations like normalization, noise removal etc. Data integration includes integrating multiple, heterogeneous data sets generated from different sources

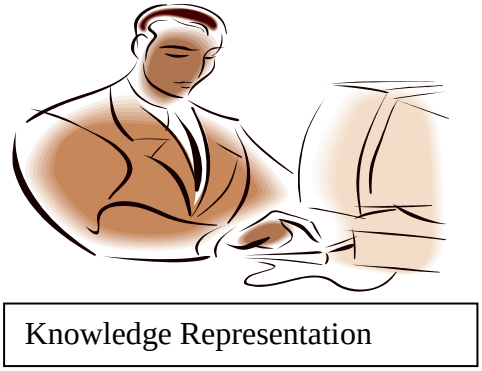
5. Data mining: It involves application of knowledge discovery algorithms to the cleaned , transformed data in order to extract meaningful patterns from the data. In this intelligent methods are applied in order to extract data patterns.

6. Pattern Evaluation: In this step evaluation of pattern has been done.

7. Knowledge Representation:- This step involves representation of discovered knowledge in proper format.



III. Steps of knowledge Discovery



IV. Methods of Data Mining:

I will use two steps Methodology:-

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a. **Pre Processing**
b. **Genetic Algorithm**

a. **Pre-processing:-** Pre-processing is combinations of 3 methods:-
   i. Data Cleaning:- **DATA CLEANING** - a two step process including ***DETECTION*** and then ***CORRECTION*** of errors in a data set. Every dataset contains some errors, and every analyst experiences a rite of passage in wasting days drawing wrong conclusions because the errors have not been first rooted out. Up to half of the time needed for analysis is typically spent in "cleaning" the data. This time is also, typically, underestimated. Often, once a clean dataset is achieved, the analysis itself is quite straightforward.
   ii. Data Reduction:- Obtains reduced representation in volume but produces the same or similar analytical results. It reduces amount of data or we can say it is used to remove unwanted data.
   iii. Data Integration:- It combines data from multiple sources into a coherent data store as in data warehousing. These sources may include multiple databases, data cubes or flat files.

b. **Genetic Algorithm:-** After pre-processing I will use genetic algorithms as second step of my methodology. Genetic algorithms were formally introduced in the United States in the 1970s by John Holland at University of Michigan. The continuing price/performance improvements of computational systems has made them attractive for some types of optimization. In particular, genetic algorithms work very well on mixed (continuous *and* discrete), combinatorial problems. They are less susceptible to getting 'stuck' at local optima than gradient search methods. But they tend to be computationally expensive.

To use a genetic algorithm, you must represent a solution to your problem as a *genome* (or *chromosome*). The genetic algorithm then creates a population of solutions and applies genetic operators such as mutation and crossover to evolve the solutions in order to find the best one(s). The three most important aspects of using genetic algorithms are:

(1) Definition of the objective function.

(2) Definition and implementation of the genetic representation.

(3) Definition and implementation of the genetic operators.

V. Conclusion:

Our aim is to reduced time complexity with the help of genetic algoritm for data with quantitative values.
Secondary objective is achieving prediction of the data-item sets.
Third objective is to find the frequent pattern of data- items sets.
Fourth objective is to eliminate the unwanted data-item with the help of genetic algorithm.

The goal of data mining is to discover the important associations among items such that the presence of some items in a transaction will imply the presence of some other items and also some kind of predictions from data sets. For achieving this purpose I will collect data from different sources then I will use several genetic algorithms to find optimal results. They decomposed the mining process into two phases. In the first phase, we have to represent a solution of problem as a genome or chromosome. In the second phase, the genetic algorithm then creates a population of solutions and applies genetic operators such as mutation and crossover to evolve the solutions in order to find the best one.

The proposed model is more objective and reasonable in determining the object oriented queries with genetic algorithms and focuses in the most important linguistic term for reduced time complexity. With the help of this we can also perform the prediction of any given data sets. This is used to find optimal result.

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