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An Artificial Intelligence for Data Mining

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Abstract :*Data mining is a new and rapidly growing field. It draws ideas and resources from multiple disciplines, including machine learning, statistics, database research, high performance computing and commerce. This explains the dynamic, multifaceted and rapidly evolving nature of the data mining discipline. While there is a broad consensus that the abstract goal of data mining is to discover new and useful information in data bases this is where the consensus ends and the means of achieving this goal are as diver seas the communities contributing. The foundations of all data mining methods, however, are in mathematics. Any moderately sized treatment of data mining techniques necessarily has to be selective and maybe biased towards a particular approach. Data mining techniques are used to find patterns, structure or regularities and singularities in large and growing data sets.*

Artificial neural network ANN are gross simplification of real networks of neurons . The paradigm of neural network which began during the 1940's promises to be a very important tool for studying the structure-function relationship of human brain. Due to the complexity and incomplete understanding of biological neurons. Various architecture of artificial neural network have been reported in the literature. The aim neural network is to mimic the human ability to adopt to changing in circumstances and the current environment.
In this paper I will Discuss about Neural networks are useful for data mining and decision-support applications.

Keyword :*ANN, AI, Data mining , Data Models, ,Pattern .*

I. INTRODUCTION

Data mining is proving to be a great tool for exploring new avenues to automatically examine, visualize, and uncover patterns in data that facilitate the decision-making process.data mining identifies trends within data that go beyond simple analysis. Modern data mining techniques (association rules, decision trees, Gaussian mixture models, regression algorithms, neural networks, support vector machines, Bayesian networks, etc.) are used in many domains to solve association, classification, segmentation, diagnosis and prediction problems.A artificial neural network is developed with a systematic step-by-step procedure which optimizes a criterion commonly known as the learning rule. The input/output training data is fundamental for these networks as it conveys the information which is necessary to discover the optimal operating point. In addition, a non linear nature make neural network processing elements a very flexible system. One representative definition is pivoted around the comparison of intelligence of computing machines with human beings . Another definition is concerned with the performance of machines which is historically have been judged to lie within the domain of intelligence.

II. WHAT IS AN ANN?

An artificial neuron network (ANN) is a computational model based on the structure and functions of biological neural networks. Information that flows through the network affects the structure of the ANN because a neural network changes - or learns, in a sense - based on that input and output.
ANNs are considered nonlinear statistical data modeling tools where the complex relationships between inputs and outputs are modeled or patterns are found. An ANN can be viewed as a system that generates a desired response to an input stimulus. The pattern of connectivity in an ANN (i.e., the strengths of the connections between various processing units) defines the causal relations between the network's processors, and is therefore analogous to a program in a conventional computer

An ANN is typically defined by three types of parameters:

1. The interconnection pattern between different layers of neurons
2. The learning process for updating the weights of the interconnections
3. The activation function that converts a neuron's weighted input to its output activation.

III. GENERAL PROBLEM SOLVING APPROACHES IN AI

To understand what exactly artificial intelligence is, we illustrate some common problems. Problems dealt with in artificial intelligence generally use a common term called 'state'. A state represents a status of the solution at a given step of the problem solving procedure. The solution of a problem, thus, is a collection of the problem states. The problem solving procedure applies an operator to a state to get the next state. Then it applies another operator to the resulting state to derive a new state. The process of applying an operator to a state and its subsequent transition to the next state, thus, is continued until the goal (desired) state is derived. Such a method of solving a problem is generally referred to as state space approach. We will first discuss the state-space approach for problem solving by a well-known problem, which most of us perhaps have solved in our childhood.

Example: Consider a 4-puzzle problem, where in a 4-cell board there are 3 cells filled with digits and 1 blank cell. The initial state of the game represents a particular orientation of the digits in the cells and the final state to be achieved is another orientation supplied to the game player. The problem of the game is to reach from the given initial state to the goal (final) state, if possible, with a minimum of moves. Let the initial and the final state be as shown in figures 1(a) and (b) respectively.

Fig.: The initial and the final states of the Number Puzzle games

where B denotes the blank space. We now define two operations, blank-up (BU) / blank-down (BD) and blank-left (BL) / blank-right (BR), and the state-space (tree) for the problem is presented below using these operators. The algorithm for the above kind of problems is straightforward. It consists of three steps, described by steps 1, 2(a) and 2(b) below.

Algorithm for solving state-space problems

Begin

1. state: = initial-state; existing-state:=state;
2. While state ≠ final state do

   Begin
   - a. Apply operations from the set {BL, BR, BU, BD} to each state so as to generate new-states;
   - b. If new-states ∩ the existing-states ≠ φ

Then do

- Begin state := new-states – existing-states;
  - Existing-states := existing-states – {states}
  - End;

- End while
- END

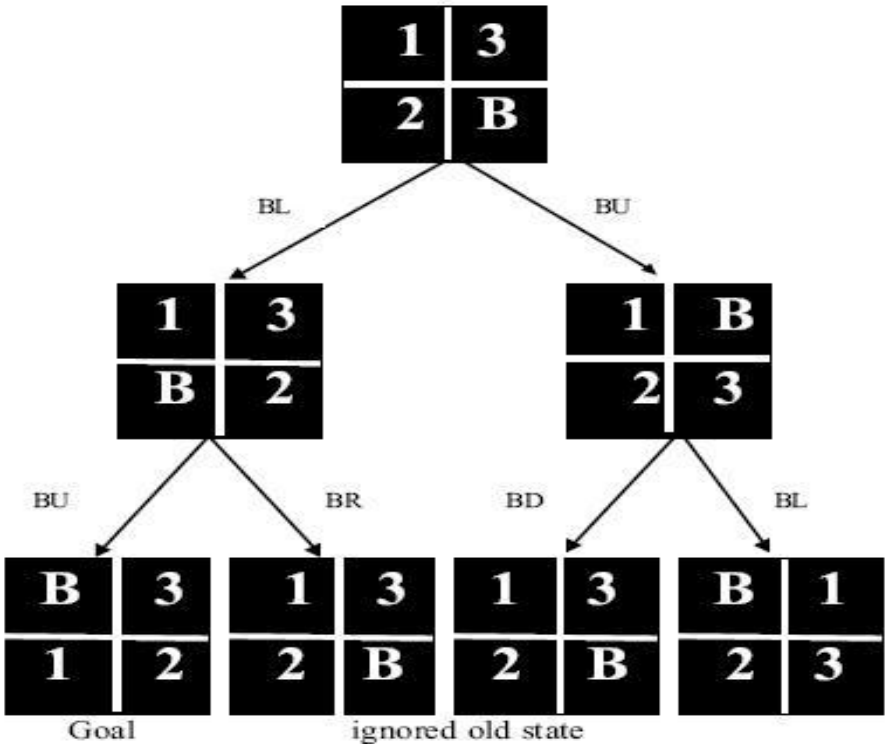

Fig.: The state-space for the Four-Puzzle problem.

It is thus clear that the main trick in solving problems by the state-space approach is to determine the set of operators and to use it at appropriate states of the problem. In given a starting and a goal state, one cannot say prior to execution of the tasks the sequence of steps required to get the goal from the starting state. Such problems are called the ideal AI problems.

IV. STRENGTHS AND WEAKNESSES OF NEURAL NETWORK MODELS

Neural networks exhibit robust flexibility in the face of the challenges posed by the real world. Noisy input or destruction of units causes graceful degradation of function. Depending on the nature of the application and the strength of the internal data patterns you can generally expect a network to train quite well. This applies to problems where the relationships may be quite dynamic or non-linear. Neural networks are universal approximates, and they work best if the system you are using them to model has a high tolerance to error. However they work very well for capturing associations or discovering regularities within a set of patterns, where the volume, number of variables or diversity of the data is very great, the relationships between variables are vaguely understood & the relationships are difficult to describe adequately with conventional approaches. It specially useful for large amount of example data is available and it is difficult to specify a parametric model for the data. There are potentially stable patterns in the data that are slight or deeply hidden. Iterative use of the data is required to detect pattern. ANN having good features still it has several limitations It learn by many passes over the training set so that the learning time of NN is usually long. A NN can not expose its knowledge as symbolic rules.Available domain knowledge is rather difficult to be incorporated to a NN.

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I. APPLICATION AREAS FOR AI

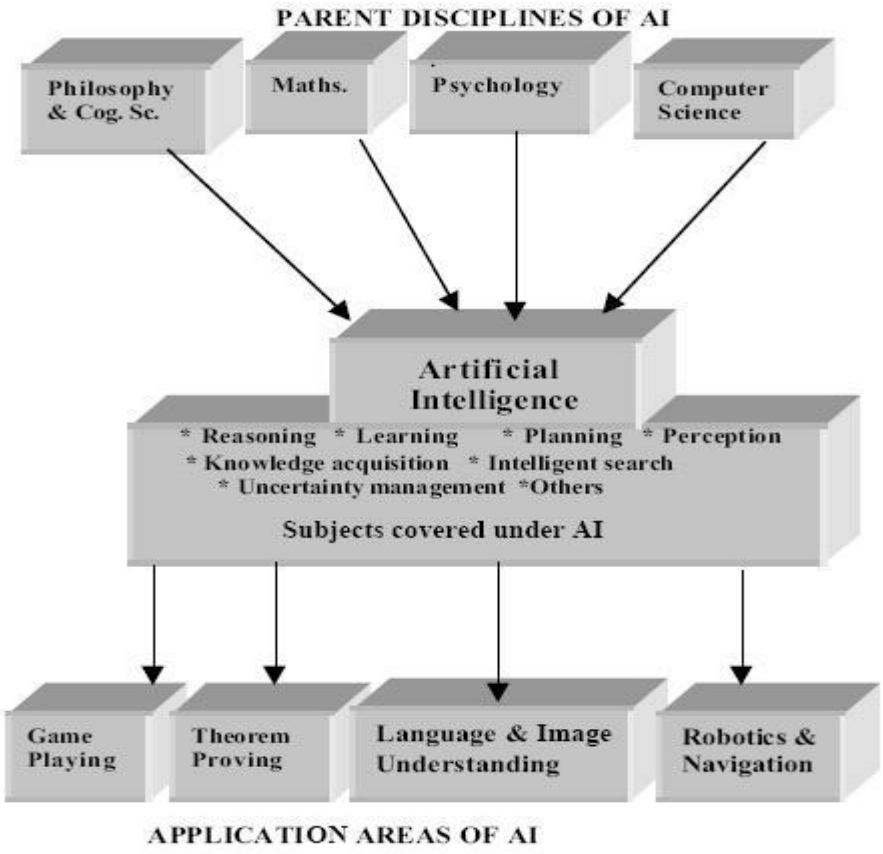

Fig.: AI, its parent disciplines and application areas.

V. HOW ANN USEFUL IN DATA MINING?

Data mining techniques are mostly based on statistics, as well as machine learning while the patterns may be inferred from different types of data. Methods used in data mining, such as machine learning, belong to the field of artificial intelligence. Data mining is an AI powered tool that can discover useful information within a database thatcan then be used to improve actions. Data mining powered by AI algorithms is also proving to be a "great tool" for exploring new avenues to automatically examine, visualize and uncover patterns in data. Data mining or knowledge discovery is becoming more important as more and morecorporate data is being computerized. Intelligent applications, such as neural networks and geneticalgorithms are ideal for finding trends and unknown information from the vast quantities ofcomputer data. Artificial Intelligence (AI) can help to convert all these data into structured, usableformats.Neural networks are useful for data mining and decision-support applications, People are good at generalizing from experience.Computers excel at following explicit instructions over and over. Neural networks bridge this gap by modeling, on a computer, the neural behavior of human brains.

VI. CONCLUSION

The field of specific applications are aimed to extract specific knowledge. The domain experts by considering the user's requirements and other context parameters guide the system. The intelligent interfaces and intelligent agents up to some extent make the application generic but have limitations. The domain experts play important role in the different stages of data mining. The

decisions at different stages are influenced by the factors like field and data details, aim of the data mining, and the context parameters.

Ann offers a powerful and distributed computing architecture, with significant learning abilities and they are able to represent highly nonlinear and multivariable relationships. However, ANN are not appropriated for any DM problem and the selection of a network architecture for a specific problem has to be done carefully.

ANN are useful especially when there is no a priori knowledge about the analyzed data. Efforts in artificial intelligence leading to valuable new services and applications

REFERENCES :

[1] Introduction to Data Mining and Knowledge Discovery, Third Edition ISBN: 1-892095-02-5, Two Crows Corporation,10500 Falls Road, Potomac, MD 20854 (U.S.A.), 1999.
[2] M. W. Craven and J. W. Shavlik. Using neural networks for data mining. Future Generation Computer Systems, 13:211–229, 1997.
[3] H. Lu, R. Setiono, and H. Liu. Effective data mining using neural networks. IEEE Trans. Knowl. Data Eng., 8(6):957–961, 1996.
[4] S. Mitra, Pal S. K., and Mitra P. Data mining in soft computing framework: a survey. IEEE Trans. Neural Networks, 13(1):3–14, 2002.
[5] A. N¨urnberger, W. Pedrycz, and R. Kruse. Neural network approaches. In W. Kl¨osgen and J. M. ˙Zytkow, editors, Handbook of Data Mining andKnowledge Discovery, pages 304–317. Oxford University Press, 2002.
[6] O. Parsons and G. A. Carpenter. ARTMAP neural network for information fusion and data mining: map production and target recognition methodologies. Neural Networks, 16:1075–1089, 2003.
[7] A. Davidson J. Schaeffer, D. Billings and D. Szafron. The challenge of poker. Artificial Intelligence Journal, 134(1-2):201–240, 2002.
[8] Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach.Pearson Education, second edition, 2003.

[9] Muller, B., Reinhardt, J. and Strickland, Neural Networks: An Introduction Physics of Neural Networks Series, Berlin: Spring M. T. (1995)

[10] Davis, J.T., A. Episcopos (2001). "Predicting Direction Shifts on Canadian–U.S. Exchange Rates with Artificial Neural Networks," International Journal of Intelligent Systems inAccounting, Finance and Management,Vol. 10, No. 2.
[11]Dutta, S., and S. Shakhar. (1988, July 24–27). "Bond- Rating: A Non-Conservative Application of Neural Networks" Proceedings of the IEEE International Conference on Neural Networks, San Diego.
[12] Collins, E., S. Ghosh, C.L. and Scofield. (1988). "An Application of a Multiple Neural Network Learning System to Emulation of Mortgage Underwriting Judgments," IEEE International Conference on NeuralNetworks.