Fuzzy Logic Neural Networks And Soft Computing

Neural network (machine learning) A neural network consists of connected units or nodes called artificial neurons In machine learning, a neural network (also artificial neural network or neural net, abbreviated ANN or NN) is a computational model inspired by the structure and functions of biological neural networks. model inspired by the structure and functions of biological neural networks 1c244148e4

Infinite-valued logic Traditionally, in Aristotle's logic, logic other than bivalent logic was abnormal, as the law of the excluded middle precluded more than two possible values (i. e. Modern three-valued logic (trivalent logic) allows for an additional possible truth value (i. , "undecided") and is an example of finite-valued logic in which truth values are discrete, rather than continuous. e. Infinite-valued logic comprises continuous fuzzy logic, though fuzzy logic in some of its forms can further encompass finite-valued logic. Infinite-valued logic comprises continuous fuzzy logic, though fuzzy logic in some of its forms can further encompass finite-valued logic. For example, finite-valued logic can be applied in Boolean-valued modeling, description. , "true" and "false") for any proposition. For example, In logic, an infinite-valued logic (or real-valued logic or infinitely-many-valued logic) is a many-valued logic in which truth values comprise a continuous range 1c244148e4

Soft computing During this period, revolutionary research in three fields greatly impacted soft computing. Typically, traditional hard-computing algorithms heavily rely on concrete data and mathematical models to produce solutions to problems. Finally, evolutionary computation is a term to describe groups of algorithm that mimic natural processes such as evolution. Next, neural networks which are computational models influenced by human brain functions. Fuzzy logic is a computational paradigm that entertains the uncertainties in data by using levels of truth rather than rigid 0s and 1s in binary. numerous industries and research fields: Soft computing fuzzy logic and neural networks help with pattern recognition, image processing, and computer vision Soft computing is an umbrella term used to describe types of algorithms that produce approximate solutions to unsolvable high-level problems in computer science. Soft computing was coined in the late 20th century 1c244148e4

Fuzzy concept Yet it is not unclear or meaningless. In: Communications of the ACM, Volume 37, Issue 3, March 1994, pp. 77-84; "Artificial neural networks: A fuzzy concept is an idea of which the boundaries of application can vary considerably according to context or conditions, instead of being fixed once and for all. It has a definite meaning, which can often be made more exact with further elaboration and specification — including a closer definition of the context in which the concept is used. This means the idea is somewhat vague or imprecise. "Fuzzy logic, neural networks, and soft computing" 1c244148e4

Fuzzy logic is based on the observation that people make decisions based on imprecise and non-numerical information. Fuzzy models or fuzzy sets are mathematical means of representing vagueness and imprecise information (hence... 1c244148e4 The term fuzzy logic was introduced with the 1965 proposal of fuzzy set theory by mathematician Lotfi Zadeh. Fuzzy logic had, however, been studied since the 1920s, as infinite-valued logic—notably by Łukasiewicz and Tarski. 1c244148e4

Fuzzy logic By contrast, in Boolean logic, the truth values of variables may only be the integer values 0 or 1. It is employed to handle the concept of partial truth, where the truth value may range between completely true and completely false. artificial intelligence and fuzzy logic are, when analyzed, the same thing—the underlying logic of neural networks is fuzzy. A neural network will take a variety Fuzzy logic is a form of many-valued logic in which the truth value of variables may be any real number between 0 and 1 1c244148e4

Neuro-fuzzy Neuro-fuzzy hybridization results in a hybrid In the field of artificial intelligence, the designation neuro-fuzzy refers to combinations of artificial neural networks and fuzzy logic. intelligence, the designation neuro-fuzzy refers to combinations of artificial neural networks and fuzzy logic 1c244148e4

The colloquial meaning of a "fuzzy concept" is that of an idea which is "somewhat imprecise or vague" for any kind of reason, or which is "approximately true" in a situation. The inverse of a "fuzzy concept" is a "crisp concept" (i.e. a precise concept). Fuzzy concepts are often used to navigate imprecision in the real world, when precise information is not available... 1c244148e4

Lateral computing [citation needed] Lateral-computing sometimes arrives at a novel solution Lateral computing is a lateral thinking approach to solving computing problems. efficiently solved by the use of fuzzy logic (which is a lateral computing technique) 1c244148e4

CI approaches primarily... 1c244148e4 Its inference system corresponds to a set of fuzzy IF–THEN rules that have learning capability to approximate nonlinear functions. Hence, ANFIS is considered to be a universal estimator. For using the ANFIS in a more efficient and optimal way, one can use the best parameters obtained by genetic algorithm. It has uses in intelligent situational aware energy management system. 1c244148e4

Adaptive neuro fuzzy inference system Takagi–Sugeno fuzzy inference system. The technique was developed in the early 1990s. Since it integrates both neural networks and fuzzy logic principles An adaptive neuro-fuzzy inference system or adaptive network-based fuzzy inference system (ANFIS) is a kind of artificial neural network that is based on Takagi–Sugeno fuzzy inference system. Since it integrates both neural networks and fuzzy logic principles, it has potential to capture the benefits of both in a single framework. The technique was developed in the early 1990s 1c244148e4

Type-2 fuzzy sets and systems The answer to this question was provided in 1975 by the inventor of fuzzy sets, Lotfi A. From the beginning of fuzzy sets, criticism was made about the fact that the membership function of a type-1 fuzzy set has no uncertainty associated with it, something that seems to contradict the word fuzzy, since that word has the connotation of much uncertainty. Zadeh, when he proposed more sophisticated kinds of fuzzy sets, the first of which he called a "type-2 fuzzy set". So, what does one do when there is uncertainty about the value of the membership function. A Type-2 fuzzy sets and systems generalize standard type-1 fuzzy sets and systems so that more uncertainty can be handled. A type-2 fuzzy set lets us incorporate uncertainty about the membership function into fuzzy set theory, and is a way to. Expert system Fuzzy control system Fuzzy logic Fuzzy set Granular computing Perceptual Computing Rough set Soft set Vagueness Random-fuzzy variable L 1c244148e4

Lateral thinking has been made popular by Edward de Bono. This thinking technique is applied to generate creative ideas and solve problems. Similarly, by applying lateral-computing techniques to a problem, it can become much easier to arrive at a computationally inexpensive, easy to implement, efficient, innovative or unconventional solution. 1c244148e4 The traditional or conventional approach to solving computing problems is either to build mathematical models or to use an IF- THEN -ELSE structure. For example, a brute-force search is used in many chess engines, but this approach is computationally expensive and sometimes may arrive at poor solutions. It is for problems like this that lateral computing can be useful to form... 1c244148e4 A neural network consists of connected units or nodes called artificial neurons, which loosely model the neurons in the brain. Artificial neuron models that mimic biological neurons more closely have also been recently investigated and shown to significantly improve performance. These are connected by edges, which model the synapses in the brain. Each artificial neuron receives signals from connected neurons, then processes them and sends a signal to other connected neurons. The "signal" is a real number, and the output of each neuron is computed by some non-linear function of the totality... 1c244148e4

Computational intelligence Nature-analog or nature-inspired methods play a key role, such as in neuroevolution for Computational Intelligence. 2558778. "Fuzzy Logic, Neural Networks, and Soft Computing". Zadeh, Lotfi A. These concepts and paradigms are characterized by the ability to learn or adapt to new situations, to generalize, to abstract, to discover and associate. doi:10 In computer science, computational intelligence (CI) refers to concepts, paradigms, algorithms and implementations of systems that are designed to show "intelligent" behavior in complex and changing environments. 37 (3): 77–84. Communications of the ACM. These systems are aimed at mastering complex tasks in a wide variety of technical or commercial areas and offer solutions that recognize and interpret patterns, control processes, support decision-making or autonomously manoeuvre vehicles or robots in unknown environments, among other things. ISSN 2333-942X. (April 1994) 1c244148e4