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Editorial Open Access

Real Time Applications of Soft Computing Techniques

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Editorial

It is certain to accept that many different soft computing techniques and its appropriate algorithms which in turn plays a very significant role for better evaluation and has been proven to have successful solution for practical complex optimization problems. Also, soft computing is committed to system solutions constructed on soft computing methods which acknowledges uncertainty, approximate reasoning, imprecision, and partial truth in order to mimic aspects of the remarkable human capability of making decisions in real-life and ambiguous environments. Additionally, soft computing encourages the integration of soft computing techniques and tools into both day to-day and advanced practical applications. By merging novel notions and techniques of soft computing with other diversified multidiscipline, a unifying platform that fosters comparisons, extensions, and new applications can be obtained in order to establish better outputs. The principal constituents of soft computing methods include fuzzy systems/logic, neural networks/computing, evolutionary algorithms/computation, genetic algorithms, ant colony optimization, particle swarm optimization/intelligence, machine learning, probabilistic reasoning, and especially hybrid systems combining techniques from these fields, with the latter subsuming belief networks, chaos theory and parts of learning theory which lead to successful output not only in industrial applications but also in business, management, economics, finance, engineering and technology and science etc. There are wide range of real time application areas concerned with soft computing which includes data analysis and data mining, optimization, fault diagnosis, control, pattern recognition, signal processing, image and video processing as well as traffic and transportation systems, parameter estimation, system identification, robust solution, adaptive system, self-organization and failure analysis, multi-objective optimization etc. It is known that by employing various soft computing techniques can lead to higher optimum of business decision-making, but generally in many other fields such engineering, technology, public services etc. However, the idea behind soft computing is to model cognitive behavior of human mind and it is a foundation of conceptual intelligence in machines.

It is well known that soft computing is an evolving collection of different methodologies, which targets to exploit tolerance for imprecision, uncertainty, partial truth to achieve robustness, tractability, and low cost. Furthermore, soft computing offers an attractive opportunity to represent the ambiguity in human thinking with real life uncertainty. Indeed the evolution of soft computing paradigms gave a breakthrough in engineering, science and technology disciplines because it can solve most of the complex problems that have not been able to be solved by conventional analytic techniques. Soft computing aims to surmount NP-complete problems and well suited for solving real world problems where ideal models are not available with reasonably lesser time. Soft computing works with partial truth, imprecise and obtains minimum cost solution but in contrast hard computing works with precise and accurate, high cost solution, requires full truth, frequently needs lot of computation time, requires precisely stated analytical model, not suitable for real world problems for which ideal model is not present. In addition, soft computing yields rich knowledge representation (symbol and pattern), flexible knowledge acquisition (by machine learning from data and by interviewing experts), and flexible knowledge processing (inference by interfacing between symbolic and pattern knowledge), which enable intelligent systems to be fabricated at less cost (high machine intelligence quotient). Aerospace industry (aircrafts and air traffic, space crafts), communications systems (date communications and communication networks), consumer appliances (cooling and heating, washing and food preparation), electric power systems (control and monitoring, operations, planning), manufacturing automation and robotics (hands and manipulators, mobile robots, multi agent robot, welfare robots, emotional pet robots, manufacturing technologies), power electronics and motion control, process engineering (motion control, welding, induction motor drives, switched reluctance motor drives, investors and convertors, diagnosis), and transportation (building transportation, road transportation, rail transportation), process engineering (chemical process engineering, paper process engineering, steel process engineering) are the areas of real time where soft computing techniques are employed successfully. Also, neuro-control was employed for the robot arms including space shuttle, chemical processes, continuous production of high-quality parts, and aerospace applications.

It is possible that soft computing can be extended to include computing not only from human thinking aspects (mind and brain) but also from bio-informatic aspects. Alternatively, cognitive and reactive distributed artificial intelligence can also be proposed and implemented to large-scale and complex industrial systems. Novel methodologies such as chaos computing and immune networks are also recently considered to a part of soft computing. More specifically, soft computing symbolizes an important model which made a breakthrough in the aim of computing. A breakthrough that reflects the fact of a human mind, unlike state-of-the-art computers, possesses a remarkable ability to store and process information, which is pervasively imprecise, uncertain, and lacking in categoricity. It is pertinent to note that, derivation of rapid, more accurate, part-time or fully automated decision making systems of soft computing techniques can be employed in order to save time, reduce wrong decisions, avoiding human failures, decrease costs that can lead to more profit, or reduce expenses in business and in other areas to compete the given task successfully. Moreover, the research must be focused on various diversified areas related to different applications in order to support decision making faster and more precise because processed amount of data are increasing exponentially nowadays. In near future it is always better to develop and build new paradigm or enhancing the existing

models in order to perform more and more decision making automatically without influence of human being thereby avoiding failures and become robustness. Pros and Cons always exists for all techniques but, in order to yield better successful results or to obtain optimal solution for any type of complex problem the end user must decide suitable valid parameters depending on the issues and with respect to situations.