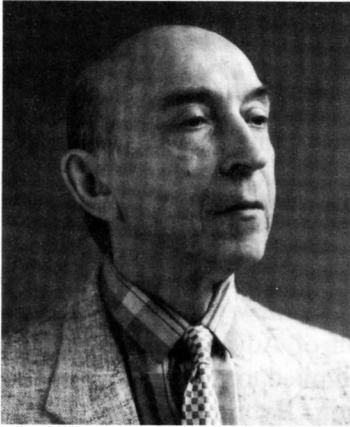


Greetings from Honorary Editor

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The publication of the International Journal of Advanced Computational Intelligence (JACI) is an important milestone in the advancement of our understanding of how intelligent systems can be conceived, designed, built, and deployed.

When one first hears of computational intelligence, a question that naturally arises is: What is the difference, if any, between computational intelligence (CI) and artificial intelligence (AI)? As one who has witnessed the births of both AI and CI, I should like to suggest an answer.

As a branch of science and technology, artificial intelligence was born about four decades ago. From the outset, AI was based on classical logic and symbol manipulation. Numerical computations were not welcomed and probabilistic techniques were proscribed. Mainstream AI continued to evolve in this spirit, with symbol manipulation still occupying the center of the stage, but not to the degree that it did in the past. Today, probabilistic techniques and neurocomputing are not unwelcome, but the focus is on distributed intelligence, agents, man-machine interfaces, and networking.

With the passage of time, it became increasingly clear that symbol manipulation is quite limited in its ability to serve as a foundation for the design of intelligent systems, especially in the realms of robotics, computer vision, motion planning, speech recognition, handwriting recognition, fault diagnosis, planning, and related fields. The inability of mainstream AI to live up to expectations in these application areas has led in the mid-eighties to feelings of disenchantment and widespread questioning of the effectiveness of AI's armamentarium. It was at this point that the name computational intelligence was employed by Professor Nick Cercone of Simon Fraser University in British Columbia to start a new journal named Computational Intelligence -- a journal that was, and still is, intended to provide a broader conceptual framework for the conception and design of intelligent systems than was provided by mainstream AI.

Another important development took place. The concept of soft computing (SC) was introduced in 1990-91 to describe an association of computing methodologies centering on fuzzy logic (FL), neurocomputing (NC), genetic (or evolutionary) computing (GC), and probabilistic computing (PC). In essence, soft computing differs from traditional hard computing in that it is tolerant of imprecision, uncertainty and partial truth. The basic guiding principle of SC is: Exploit the tolerance for imprecision, uncertainty, and partial truth to achieve tractability, robustness, low solution cost, and better rapport with reality.

More recently, the concept of computational intelligence had reemerged with a meaning that is substantially different from that which it had in the past. More specifically, in its new sense, CI, like AI, is concerned with the conception, design, and deployment of intelligent systems. However, unlike mainstream AI, CI methodology is based not on predicate logic and symbol manipulation but on the methodologies of soft computing and, more particularly, on fuzzy logic, neurocomputing, genetic(evolutionary) computing, and probabilistic computing. In this sense, computational intelligence and soft computing are closely linked but not identical. In basic ways, the importance of computational intelligence derives in large measure from the effectiveness

of the techniques of fuzzy logic, neurocomputing, genetic (evolutionary) computing, and probabilistic computing in the conception and design of information/intelligent systems, as defined in the statements of the aims and scope of the new journal of Advanced Computational Intelligence.

There is one important aspect of both computational intelligence and soft computing that should be stressed. The methodologies which lie at the center of CI and SC, namely, FL, NC, genetic (evolutionary) computing, and PC are for the most part complementary and synergistic, rather than competitive.

Thus, in many applications, the effectiveness of FL, NC, GC, and PC can be enhanced by employing them in combination, rather than in isolation. Intelligent systems in which FL, NC, GC, and PC are used in combination are frequently referred to as hybrid intelligent systems. Such systems are likely to become the norm in the not distant future. The ubiquity of hybrid intelligent systems is likely to have a profound impact on the ways in which information/intelligent systems are conceived, designed, built, and interacted with.

At this juncture, the most visible hybrid intelligent systems are so-called neurofuzzy systems, which are for the most part fuzzy-rule-based systems in which neural network techniques are employed for system identification, rule induction, and tuning. The concept of neurofuzzy systems was originated by Japanese scientists and engineers in the late eighties, and in recent years has found a wide variety of applications, especially in the realms of industrial control, consumer products, and financial engineering. Today, we are beginning to see a widening of the range of applications of computational intelligence centered on the use of neurofuzzy, fuzzy-genetic, neurogenetic, neurochaotic and neuro-fuzzy-genetic systems.

The editors-in-chief of Advanced Computational Intelligence, Professors Fukuda and Hirota, have played and are continuing to play majors roles both nationally and internationally in the development of fuzzy logic, soft computing, and computational intelligence. They deserve our thanks and congratulations for conceiving the International Journal of Advanced Computational Intelligence and making it a reality. International in both spirit and practice, JACI is certain to make a major contribution in the years ahead to the advancement of the science and technology of man-made information/intelligence systems -- systems that are at the center of the information revolution, which is having a profound impact on the ways in which we live, communicate, and interact with the real world.

Lotfi A. Zadeh Berkeley, CA, July 24, 1997

