# TABLE OF CONTENTS

## PARADIGMS FORK: ALL MUST JOIN

There is great danger in a furious rate of change. Anyone who has witnessed vorticity developing from apparently innocuous initial conditions will agree. Anyone who has watched the programs evolve over the past ten years will agree emphatically. Our world has changed to the point where a minor revolution occurs twice a decade and, in effect, significant evolution can be recorded within the year. Now this process is cumulative and destroys the continuity some would fondly cherish. Developments are so fast, so chaotic that one has every reason to be in fear of the flapping of a butterfly's wings, knowing that it can unleash a hurricane a few days hence and half a globe away.

The two major contributions in this issue provide testimony to a possibly chaotic rate of evolution in the programs that are the source and aim of this *Journal*. Reviewing ten full years, Fürnkranz has extremely pertinent considerations to offer on the eternal theme of learning. Do not be surprised at the persistence of this notion: by its nature, learning never ceases. What seems unchanged since Skiena (1986) is rote learning, say as in a stored opening book. The lack of change is only apparent: since the magnitude of the rote base has gone up by some critical factor, say from kbytes to Mbytes in their hundreds and beyond, we have an amount of knowledge which is qualitatively different through sheer force of being quantitatively expanded. To stress the difference, we should note that the material is now indexed infinitely better. Who could have dreamed of NIC as an ongoing concern?

By happy coincidence, this issue offers a review of searching techniques by Brockington, also looking back to the mid-1980s. Taking again 1986, we see Marsland providing an overview of search algorithms applicable, of course, to a single processor. In the ten years intervening, there has been a shift to searching in parallel. None of the 1986 results have been invalidated; it is just that they have become largely irrelevant through the pressing necessity of exploiting a parallelism almost unheard of ten short years ago.

What the articles have in common is that they exhibit such a radical departure from their predecessors that one is forced to postulate a change of paradigm. What was necessarily learned by rote can now be acquired by query, to offer but one example. What was explored on a single-engine track, may now be searched in a shunting-yard providing room for many parallel machines. We cannot and should not anticipate the results our authors present, but we do note the paradigmatical consequences. Even those who will oppose AI now find themselves naturally tending to use the universe of discourse that is typically that of Artificial Intelligence. It is hardly possible to avoid the use of terms, such as "neural networks" and "genetic algorithms"; these objects merit serious applicative study. Nor can one avoid "search overhead" and "communication overhead" stemming from the realm of parallelism.

The combination of learning and parallelism is a heady mixture, with a potential still hardly touched upon. Due to this potential of the new paradigms we cannot even be sure we have not already entered the era in which, by any objective criterion, the World Champion will be a parallel computer, able and willing to learn. It is our considered opinion that this will not constitute a break in continuity, but that it will be a simple consequence of the new paradigm: many processors acting together, intelligently to all intents and purposes.

There is still an ultimate challenge: learning in parallel, requiring, we believe, yet another change of paradigm. It is fascinating but premature to speculate whether this paradigm is among those conceivable at all.

<div align="right">

Bob Herschberg
Jaap van den Herik

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**CHANGE OF ADDRESS**

As of September 1, 1996 the University of Limburg has changed its name to **Universiteit Maastricht**. As a consequence the email address of the University now reads @cs.unimaas.nl.

Contributions and correspondence by email should, therefore, be sent to: **icca@cs.unimaas.nl**.

Contributions and correspondence by postal mail should be addressed to:

Prof.dr H.J. van den Herik
Universiteit Maastricht
Faculty of General Sciences
Department of Computer Science
P.O. Box 616
6200 MD Maastricht / The Netherlands

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