

The Exhilarating Journey from Industrial Electronics to Industrial Informatics

IF WE HAD a look at the industrial developments that took place in the 20th century, the first half could be said to be hardware dominated in the sense that the improvements in productivity and product quality were mostly due to improvements in “the hardware.” The operational speed and the accuracy of the industrial machinery steadily increased, mostly due to the improvements in the precision of the mechanical parts.

Along the same lines, the early second half could be said to be software dominated. It was the software used in microprocessor based control systems that enabled a production line to operate faster and more accurately. Even the improvements in industrial machinery (the hardware) were due to the possibilities offered by Computer-Aided Design and Manufacturing. The era of industrial electronics got started around this period, industrial automation in the form of mechanical controls and switches, slowly giving way to electronic controls and signal processing.

The last few decades of the century, on the other hand, are characterized by the fusion of different technologies, the first example of which may be (going back almost to the start of the century) electromechanics, then optoelectronics, then mechatronics, then telematics, then bioinformatics, and so on. As a result of this, the boundaries between industrial sectors and academic disciplines have eroded very rapidly. In the new millennium, it is very difficult to put clear boundaries between industrial sectors, between products and services, between producers and users, between IT, communications, media, consumer electronics and even between IT and non-IT industries.

The area of industrial automation and control has had its share of the changes too. It is easy to see how dominant IT has become in industrial

electronics if one considers the changes in time spent by an engineer in designing a controlled drive system¹:

- Before the 1960s: 80% for designing a control system with mechanical switches.
- After the 1960s: 80% for designing power electronics converters.
- After the 1980s: 80% for designing digital hardware and software.
- Currently: 90% for software and IT!

It is due to this paradigm change from industrial electronics to industrial informatics that IEEE Industrial Electronics Society has decided to focus a part of its attention on industrial applications of IT. The IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS is one of the outcomes of the efforts in this direction. Our thanks are due to a group of leading experts from industry and academia who have jointly contributed to its conception and birth. My special thanks go to Dr. George Fodor who took a leading role in our efforts and acted as the Founding Editor-in-Chief. A hand-over of the flag has taken place and the responsibility of the journal now rests upon me, which is very honorable but also onerous. I am however relieved by the fact that I am starting on solid foundations in the form of a very strong Editorial Board. It is my sincere hope that the contents of this journal will be beneficial to both the industry and the academia, as is meant to be.

OKYAY KAYNAK, *Editor-in-Chief*
Bogazici University
Istanbul, 34342 Turkey
o.kaynak@ieee.org

¹I would like to acknowledge that these figures were provided by the Editor-in-Chief of the IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, Prof. Marian Kazmierkowski, for inclusion in the documents used in the proposal stage of this journal.

Digital Object Identifier 10.1109/TII.2005.849513



Okyay Kaynak (SM'90–F'03) received the B.Sc. degree with first class honors and Ph.D. degrees in electronic and electrical engineering from the University of Birmingham, UK, in 1969 and 1972 respectively.

From 1972 to 1979, he held various positions within the industry. In 1979, he joined the Department of Electrical and Electronics Engineering, Bogazici University, Istanbul, Turkey, where he is presently a Full Professor. He has served as the Chairman of the Computer Engineering and the Electrical and Electronic Engineering Departments and as the Director of Biomedical Engineering Institute at this university. Currently, he is the UNESCO Chair on Mechatronics and the Director of the Mechatronics Research and Application Centre. He has held long-term (near to or more than a year) Visiting Professor/Scholar positions at various institutions in Japan, Germany, the U.S., and Singapore. His current research interests are in the fields of intelligent control and mechatronics. He has authored three books and edited five and authored or coauthored more than 200 papers that have appeared in various journals and conference proceedings.

Dr. Kaynak is a Fellow of the IEEE. He has served as the President of the IEEE Industrial Electronics Society (2002–2003) and as an Associate Editor of both the IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS and the IEEE TRANSACTIONS ON NEURAL NETWORKS. He is now the Editor-in-Chief of the IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS. Additionally, he is on the Editorial or Advisory Boards of a number of scholarly journals.