

Recent Advances in Systems Engineering and Singularity Re-Visited

Okyay Kaynak

UNESCO Chair on Mechatronics, Bogazici University, Turkey

In the first half of this presentation, the profound technological changes that have taken place during the last 2 decades will be discussed. It will be stressed that the main characteristics of the changes are erosion and convergence. The recent advances in systems engineering will then be reviewed, especially the role that AI plays in systems technology.

The second part of the presentation will focus on technological singularity. It was more than a decade ago, in 2005, that a non-fiction book, titled “Singularity is Near” was published and soon became very popular. Its author; the futurist Ray Kurzweil, defined technological singularity as “a time when machines will have and be able to make other machines with intelligence comparable to human beings.” His prediction at that time was that this would happen by 2045, i.e. about 25 years later.

AI is considered to be the basis of an intelligent machine. This presentation will discuss the recent hype on AI. Presently, mind-confusing terms like AI, G(General)AI (or AGI) and EI (Extended I) are all floating around, DARPA adds to the confusion by “XAI (Explainable AI).” Is there an Unexplainable AI? What indeed is AI? Presently some forms of deep learning? And tomorrow what?

The presentation will conclude, pondering whether “Singularity,” as was defined 15 years ago, will meet the same fate as the “Thinking Machines.”

Short Biography of Okyay Kaynak

Okyay Kaynak 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 currently a Professor Emeritus, holding the UNESCO Chair on Mechatronics. He is also a 1000 People Plan Professor at University of Science & Technology Beijing, China. He has hold long-term (near to or more than a year) Visiting Professor/Scholar positions at various institutions in Japan, Germany, U.S., Singapore and China. His current research interests are in the broad field of intelligent systems. He has authored three books, edited five and authored or co-authored more than 400 papers that have appeared in various journals and conference proceedings.

Dr. Kaynak has served as the Editor in Chief of IEEE Trans. on Industrial Informatics and IEEE/ASME Trans. on Mechatronics as well as Co- Editor in Chief of IEEE Trans. on Industrial Electronics. Additionally, he is on the Editorial or Advisory Boards of a number of scholarly journals. He recently received the Chinese Government’s Friendship Award and Humboldt Research Prize (both in 2016).

Dr. Kaynak is active in international organizations, has served on many committees of IEEE and was the president of IEEE Industrial Electronics Society during 2002-2003. He was elevated to IEEE fellow status in 2003.