
Editorial

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Biographical notes: Tuğrul Özel is Full Professor of Industrial and Systems Engineering and the Director of Manufacturing & Automation Research Laboratory (MARLAB) at Rutgers University. He received his PhD degree in Mechanical Engineering from The Ohio State University in 1998. His current research interests include advanced manufacturing, precision machining processes, additive metal manufacturing, micro/nano manufacturing sciences, mechatronics and automation. He has extensive experience in teaching and researching about manufacturing processes and manufacturing automation. He advised over 70 graduate students in their master's theses, projects, and dissertations. He has published over 175 refereed articles in international journals and conferences. He has been editor, guest editor, reviewer, and editorial board member for several international journals and member of scientific committee for many international conferences.

This special issue of the *International Journal of Mechatronics and Manufacturing Systems (IJMMS)* includes six research papers related to various aspects of applications of artificial intelligence in advanced manufacturing processes and systems.

The traditional definition of Artificial Intelligence (AI) can be given as the “ability of computational platforms to perform various cognitive functions related to human thinking and decision making, such as perceiving, reasoning, learning, and problem solving”. Due to the recent advances in computational capabilities, computer vision, machine learning, and deep learning tools, the AI techniques are well positioned to provide a unique opportunity to gain further insight on the system-machine-operator-material-process-property-quality relationship as an important enhancement towards process understanding, machine/process control, resource efficiency, product quality, system reliability and overall productivity. Nowadays, the literature is full of rich examples which are presented in over the past several decades.

This special issue brings researchers together to explore the latest progress in the field of the current use of AI tools and techniques and their potential for addressing further challenges and opportunities in manufacturing processes, machining systems, forming, welding processes, additive manufacturing and 3D printing systems, and improvements on process monitoring, sensing, and control across multiple platforms.

In this special issue, various aspects of manufacturing process understanding issues are covered ranging from artificial neural network models for tool condition monitoring and hardness based properties in welding, machine learning methods towards developing digital twin in machining systems, autonomous system for emulating bone drilling to investigation of process and thermal effects in machines and development of

measurement systems using artificial intelligence techniques as presented by several articles from leading research groups.

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