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Interactive Robotics & Automation in Industry 4.0 (IRAI4.0)

Scope and Purpose:

Currently, we live in the midst of the fourth industrial revolution where the new information and communication technologies such as the Internet of Things, artificial intelligence, automation and interactive robots are reshaping many industries, including manufacturing. Traditional industries face a lot of challenges that include but are not limited to marginal productivity, inefficient management of resources, disoriented productive processes and lack of coordination. Industry 4.0, also known as the connected industry, paves the way for the collective use of collaborative robots and automation to facilitate various industrial processes. This enables an effective working environment where the humans and the robots can safely interact and share information to optimize processes that assist in better decision making.

On the other hand, automation has the potential to bring the necessary agility to the production process. It can drive greater efficiency by either increasing production capacity or reducing costs. Automation technology can employ machines to reduce the amount of work that humans have to perform. Interactive robots powered by intelligent algorithms benefit industrial workers by protecting them from repetitive, mundane and dangerous tasks. This approach of replacing the human workforce facilitates workplace safety and the reduction of labour costs. Interactive robots and automation can accomplish a wide range of tasks such as assembly, wielding. Furthermore, it also facilitates faster cycle times as it overcomes human limitations.

It is a wider known fact that these technologies provide several benefits that help companies remain competitive in the global economy. Nevertheless, certain issues need to be addressed. An AI-enabled interactive robot is great at implying specific knowledge programmed into its systems. However, these systems needed to be programmed to learn from their environment and experience and build on their capabilities. In order to execute the functions seamlessly, the robots have to be trained with intelligent algorithms. Furthermore, training and testing algorithms for industrial automation are essential to produce precise and reliable execution of manufacturing processes. Industrial automation may give rise to a certain level of rigidity. This situation may lead to difficulty in modifying workflows, which is essential in responding to changing conditions. Besides technical limitations of automation, there are rising concerns about the rapid disruption of the work lives in the industries. Understanding these issues and addressing those with novel methods and state of the art approaches may pave the way for the future of this cutting-edge advancement in the industrial sector. It adds additional benefits such as flexibility, connectivity, and intelligent automation. This special issue investigates the effectiveness of interactive robots and automation in Industry 4.0. Further, continuous research and development in this stream will enable the application of interactive robots and automation systems across various industrial fields and sectors.

List of potential topics of the special issue includes, but is not limited to:

- Role of interactive robots and automation in industry 4.0
- Advances in artificial intelligence for interactive robots in the context of smart manufacturing
- Intelligent design and manufacturing with interactive robots and automation
- Emerging advances in industrial automation and robotics
- Interactive robotics for Safety, Security and Risk Management in industry 4.0
- Smart manufacturing networks and systems with interactive robots and automation
- Challenges and opportunities of interactive robots and automation for industry 4.0
- IoT enabled automation services for smart manufacturing

- ❖ State of the art approaches to develop intelligent algorithms for robot perception and awareness to perform various industrial processes
- ❖ Hybrid strategies and methodologies for industrial automation

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Important Dates:

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