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Robots in Industry: A Shift towards Autonomous and Intelligent Systems in the Digital Age

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Robotics and autonomous systems (RAS) are playing an increasingly important role across a wide range of industries and applications. Certainly, the definition of robots have expanded drastically and is no longer used to describe only traditional preprogrammed manipulators that have been commonplace in many manufacturing areas. The world is beginning to shift to an era where robots possess higher levels of autonomy, intelligence and adaptability, enabling them to cope with dynamic and challenging environments. This has created an excellent opportunity for smarter robotic systems to be exploited for applications in industrial environments. In this note, we discuss the emerging shift of robotics and its implications in the digital age. We focus particularly on applications within industrial settings, giving our perspectives on future advancements with people and automation working together as an underlying theme.

Much work exists in literature that may be transferred and implemented in the real-world, particularly in an industrial setting. The oil and gas sector, for example, is an area in which aspects of health, safety and environment (HSE) are paramount. The oil spill in the Gulf of Mexico have alerted the importance of the early detection of faults in oil and gas infrastructure, yet it is not an easy task due to the scale of these assets and the environmental conditions in which they reside. A variety of robots in the form of ground vehicles, unmanned aerial vehicles, wall-climbing robots and in-pipe robots have been deployed to assist with these activities [1]. Looking beyond the aspects of HSE, robots are cost-effective solutions, particularly as systems for long-term deployment are being developed and continually improved. An interesting area of robotics that have emerged in recent years is collaborative robots. These robots have begun to appear in manufacturing environments where robots operate interactively with humans in a shared workspace [2]. Intelligence and machine learning play critical roles in these systems as manufacturing robots are shifting from the preprogrammed machines to more autonomous systems which are capable of adapting to a dynamic and unstructured environment with regular changes to its tasks. Looking towards the future, we foresee a continuing shift towards more intelligent and autonomous robots in the coming decade. Currently, most robotic systems still rely upon human operators to perform cognitive decision-making tasks, but as technology continues to advance, we anticipate the deployment of truly autonomous robots capable of intelligent decision-making while working safely together with humans in an integrated environment [3].

References

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