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## From Industry 4.0 to Agriculture 4.0: Current status, enabling technologies, and research challenges

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## Abstract

The three previous industrial revolutions profoundly transformed agriculture industry from indigenous farming to mechanized farming and recent precision agriculture. Industrial farming paradigm greatly improves productivity, but a number of challenges have gradually emerged, which have exacerbated in recent years. Industry 4.0 is expected to reshape the agriculture industry once again and promote the fourth agricultural revolution. In this paper, first, we review the current status of industrial agriculture along with lessons learned from industrialized agricultural production patterns, industrialized agricultural production processes, and the industrialized agri-food supply chain. Furthermore, five emerging technologies, namely, the Internet of Things, robotics, Artificial Intelligence, big data analytics, and blockchain, toward Agriculture 4.0 are discussed. Specifically, we focus on the key applications of these emerging technologies in the agricultural sector and corresponding research challenges. This paper aims to open up new research opportunities for readers, particularly industrial practitioners.