

On the contribution of 5G Communications to Industry 4.0

Abstract: The Fourth Industrial Revolution, also known as Industry 4.0, is already deeply modifying different human areas, such as mobility, housing, teaching, health, economy and society. Using robots, artificial intelligence, big data, Internet of Things, Quantum Computing and Quantum Communications, the replacement of humans by machines will take place in a myriad of different areas. This will originate the disappearance of some jobs, and the appearance of others, requiring a great human adaptation to the new paradigm.

The fifth Generation of Cellular Communications (5G Communications), expected by 2020, will play an important role in the Fourth Industrial Revolution, as it will support Internet of Things (alongside with higher throughputs and very low latencies), Machine-to-Machine communications and car-to-car communications, generating huge amount of data (big data), that will be processed by artificial intelligence algorithms, supporting self-driving cars. 5G Communications will support millimeter waves, alongside with the conventional centimeter waves, which will enable much higher throughputs and facilitate the employment of hundreds or thousands of antenna elements, commonly referred to as Massive MIMO systems (Multiple Input Multiple Output). MIMO Systems tends to be associated to an increase of complexity and increase of signal processing, with an exponential increase with the number of transmit and receive antennas.