

IoT-sensors for real-time quality control in the manufacturing process

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Statement of the Problem: Industry 4.0 is a new industrial revolution that is largely based on new emerging technologies that can transform the entire logic of production and current business processes, leading to a profound change in organizations.

Nowadays, the concept of intelligent manufacturing is being introduced, based on the integration of smart devices called smart sensors. The IEEE 1451 standard defines smart sensors as “sensors with small memory and standardized physical connection to enable the communication with processor and data network”.

These Smart sensors are very useful in our daily life, they can provide safety, insure healthcare, wellness, monitoring environment...etc. They can be considered as a basic element of the fourth industrial revolution where several types of them can be adopted together.

With Internet of Things (IoT), the most common objects in the smart factories will be equipped with smart sensors; thus, connected objects will be intelligent objects (digital machines, people, computing devices...).

The importance of quality control in any manufacturing process has always been recognized. It is a key requirement in order to manufacture companies to remain competitive in the digital age.

Methodology & Theoretical Orientation : Real-time quality control that usually comes with Industry 4.0 technologies enables to extract data points and other relevant statistics at every stage of the production or manufacturing process. It helps to figure out the changes in facility conditions that affect product quality.

Findings: The findings of the recent study challenges are formed by the three key characteristics of Industry 4.0 which are horizontal, vertical and end-to-end manufacturing integration.

Conclusion & Significance: Many new techniques for real-time quality control can be proposed based on the use of IoT-sensors. They will be used to send real-time information to the global big data system and locally at the smart machine level, which will be able to analyze and make proper decisions accordingly to avoid defects, system failure or downtime. All these Industry 4.0 aspects contribute to better product quality.

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Biography

Karima AKSA has completed his PhD at the age of 34 years from El Hadj Lakhdar (Actually Batna 2) University and postdoctoral studies from Batna 2 University. She is affiliated to the Automatic and Production Laboratory (LAP, Laboratoire d'Automatique et de Productique). She is currently a senior lecturer and researcher in the same University. She has published 3 books in the field of wireless sensor network (WSN) and more than 15 papers between national, Maghrebian and international journals and conferences.