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Letter to the Editor

Industry 5.0 and its expected applications in medical field

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Dear Editor,

Nowadays, customers are focused on the personalization of products having unique and special requirements. Industry 5.0 is known as a fifth industrial revolution where the personalized requirement of customers could fulfill. Previously, Industry 4.0 enabled mass customization, which was not enough. Nowadays, customer wants mass personalization having the human touch, so Industry 5.0 makes them move from mass customization to mass personalization. It provides a product to the customer as per their specific requirements. This industrial revolution refers to the interaction between people and machines to make work better and faster. There is an immense contribution of robots to perform work loading, unloading, painting, welding, etc. Industry 5.0 has interconnected machines which optimize productivity and human efficiency. The journey of this industrial revolution has begun which have great potential to customize what customers want. There is a massive increase in quality, safety, and waste reduction.[1]

The medical profession is working toward personalization where there is a requirement of a device which can fulfill personalized requirements such as measuring sugar level, blood pressure, and other body parameters. Wearable technologies provide doctors with patients' real-time health information, and these data can be put to individual medical records, helping data mining for both individual patients and groups. These intelligent devices can communicate among themselves, and doctors can provide proper medication as per the requirement of the individual patient. This revolution use different software to follow up routine and lifestyles of our daily life. It introduces artificial intelligence that is completely life changing to the humans and learns how our body is reacting. It automates the manufacturing process and is helpful in providing innovation to the medical field.[2]

Industry 5.0 can gain knowledge from big data to create symmetrical innovation. It creates digital knowledge network which provides proper medical information and vital patient record. It uses collaborative robots to improve accuracy and quality and can do what a human wants. Thus, collaborative robots are being used for performing unique surgery on the operating table. The surgeon can enjoy the benefits of this technology. Collaborative robotics is the automation process that also remains a significant hazard on the shop floor along with human co-worker.[3]

Industry 5.0 makes mass personalization into reality, which provides more specialized components in the medical field. These personalized components are used for the medical treatment for the patient to fulfill unique requirements and lifestyle. Personalized medical implants, artificial organs, body fluids, and transplants are manufactured precisely in this revolution using an enabling technology of Industry 5.0 that can perform the task just as natural. In this new world, a sensor with artificial intelligence analyses the data quickly. Machines are flexible to make a high-level decision according to individual need. In medical field, these technologies can measure and monitor the human body variable precisely as per the requirement of the patient. These help track the body response with improved performance. It makes possible health care–connected accurate information-sharing digitally. All machines are connected to the Internet to collect and share necessary data of the patient. It is an intelligent revolution for process optimization, quality improvement, and cost and waste reduction. It will provide higher speed with critical thinking capability to help make effective real-time decisions. It embraces the role of health professions. Fig. 1 shows the different driving technologies of Industry 5.0 in the medical field.

In the medical field, it will also introduce four-dimensional computed tomography (4D CT) and four-dimensional magnetic resonance imaging (4D MRI) to provide better information on body parts with specified motion. These techniques are quite useful for the manufacturing of smart medical parts using 4D printing. These scanning techniques are quite faster and accurate, which automatically track and analyze internal body movement. It can fulfill the requirement of smart material by which medical parts are manufactured and can further change the shape and grow in the human body. It applies for the manufacturing of smart, complex organs, cells, muscles, heart, kidney, liver, skin graft, and tissue to fulfill the unique requirement.[4]

Moreover, the internet of everything and big data artificial intelligence provides accurate information in health care. Electronic medical records (EMRs) are the digital version of paper charts in clinics, clinical offices, and hospitals. They note and provide information to health professionals during diagnosis and treatment. Another technology is the Google Glass used by few doctors to consult patients while a scribe does the typing work.

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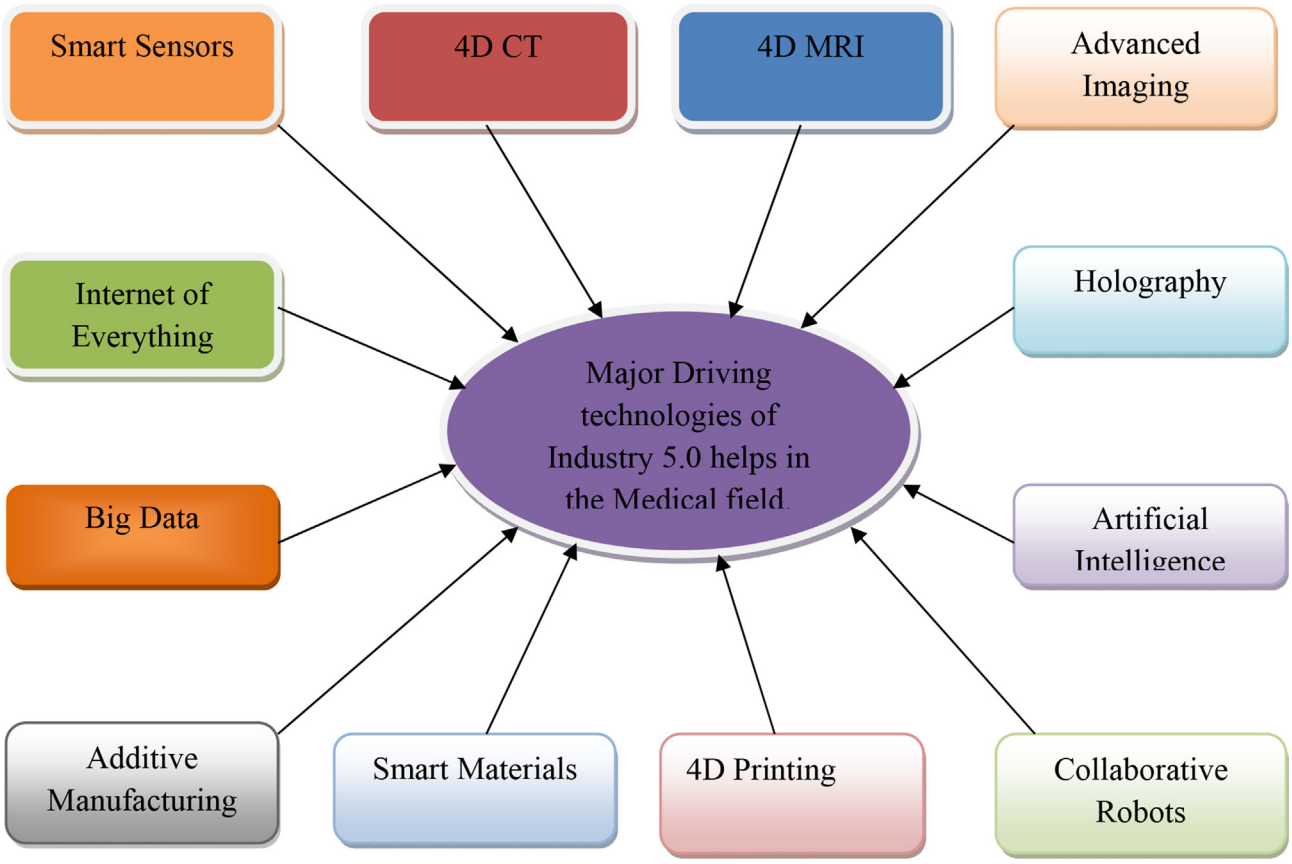

Fig. 1. Driving technologies of Industry 5.0 in the medical field. 4D CT, four-dimensional computed tomography; 4D MRI, four-dimensional magnetic resonance imaging.

In health care, this revolution provides patient-centric health care for providing a better quality of life. It has an excellent capability to provide information for the manufacturing of personalized implants, tools, and devices. It digitally monitors all activities regarding health through the integration of digitally design, manufacturing, and information technologies with support software. There is no doubt that the pace of this revolution will increase. This emerging revolution will be the combination of big data, artificial intelligence, specialized software, machine learning, and intelligent algorithm connected to the Internet to change everything.[5]

In future, Industry 5.0 will be available to handle the necessary medical processes with lesser doctor/surgeon/technician intervention, whereas doctors would be doing a higher level of jobs. Industry 5.0 will digitally assist the customer to manage repetitive tasks to follow-up. This new revolution strongly encourages for manufacturing of high-quality medical component to meet the personalized demand of the patient. The collaborative robots are introduced to perform precise and complicated surgery to the patient in an efficient manner, which was not possible previously.

Industry 5.0 is used to fulfill the highly personalized requirement with better efficiency. Advanced machines and information technologies are used to create a virtual environment. Medical professionals are to move ahead and take up different challenges such as handling of complex cases, medication, treatment, teaching, research, and development. It plays a vital role in detecting diseases and in better treating patients easily. It is used to manufacture smart medical parts, implants, biomodels, scaffolds, prosthetics, tools, and instruments. In future, it will be helpful to suggest appropriate material for the medical field, which creates a faster recovery of the patient. This revolution will improve the overall health-care experience for patients and help doctors provide better, more efficient care.

Conflict of interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cmrp.2019.07.002.

References

1. Haleem A, Javaid M. Industry 5.0 and its applications in orthopaedics. *J Clin Orthop Trauma*; 2019 (in press). https://doi.org/10.1016/j.jcot.2018.12.010.
2. Kowalkiewicz M. *Health 5.0: The Emergence of Digital Wellness. Chair in Digital Economy*; 2017. https://medium.com/qut-cde/health-5-0-the-emergence-of-digital-wellness-b21fdff635b9.
3. Rossi B. *Manufacturing Gets Personal in Industry 5.0*. Reconteur; 2018. https://www.raconteur.net/technology/manufacturing-gets-personal-industry-5-0.
4. Haleem A, Javaid M. Expected role of four-dimensional (4D) CT and four-dimensional (4D) MRI for the manufacturing of smart orthopaedics implants using 4D printing. *J Clin Orthop Trauma*; 2019 (in press). https://doi.org/10.1016/j.jcot.2019.01.020.
5. Ozkeser B. Lean innovation approach in Industry 5.0. *Eurasia Proc Sci Technol Eng Math (EPSTEM)*. 2018;2:422–428.

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