

IEEE Reviews in Biomedical Engineering

Special section on “Convergence of Automation Technology, Biomedical Engineering and Health Informatics”

CALL FOR PAPERS

The fourth revolution of industry (Industry4.0) is reshaping all the segments of industries. Pulled by grand social challenges, automation technologies are dramatically “spilling out” from the traditional scenarios such as factories and workshops to all the scenarios of our everyday life. The traditional research areas of biomedical engineering and health informatics for the aging population have gained unprecedented interests from the automation industry. Cross disciplinary synergy of expertise and deep convergence of the three subjects, the research landscape is being reshaped both in academia and industry towards the rapid development of health engineering, an emerging interdisciplinary field for the predictive, preventive, precise and personalized medicine. More powerful tools from process or factory automation such as distributed control systems (DCS) and robotics are penetrating into biomedicine and healthcare applications. For example the R&D on robotics for biomedicine and healthcare becomes more and more active in the recent years.

The goal of this special section is to critically review the advancement in the convergence of automation technology, biomedical engineering and health informatics, identify the gaps between the state-of-the-art of research and industrial demands, and envision the directions for future research. The application scenarios can cover single or multiple scenarios of health engineering such as primary care, preventive care, predictive technologies, hospitalization, home care, and occupational health. We focus on the cross disciplinary approaches, solutions, and initiatives rather than single disciplinary ones.

Topics include but are not limited to:

- Control theories and tools for modelling, simulating and optimizing healthcare processes
- Collaborative robots for laboratory, surgery, rehabilitation, emergency, and home care
- Flexible, wearable, and implantable robots for prognosis, diagnosis, treatment, and medication
- Automation systems aided by biomedical sensing devices for occupational safety and health
- Assistive technologies for ageing population in living spaces and working spaces
- Deterministic communications and controls in remote surgery and telemedicine
- Digital hospitals powered by advanced sensing, identification, tracking, communication and recognition
- Cyber-Physical-Systems approach in the engineering of high complexity medical instruments
- Cyber-Physical-Systems approach in pharmaceutical management and healthcare logistics
- Precision medicine powered by data analytics, unobtrusive monitoring and Artificial Intelligence

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Timelines:

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