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Editorial Note

Editorial Note: Biomedical Engineering and Medical Devices

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EDITORIAL NOTE

The engineering division that deals with problem solving in biology and medicine is Biomedical Engineering (BME). The field of biomedical engineering is developing quickly. Biomedical engineers will play a major role in life sciences research and the development of devices for healthcare delivery quality. Biomedical engineering ranges from bionanotechnology to assistive tools, from genetic and cellular engineering to surgical robotics, and from artificial lungs to neuromuscular systems. The values outlined in this text will help prepare biomedical engineers to work in this varied area.

Current developments in this field of biomedical engineering are therefore based on the design and creation of intelligent methods containing elements of artificial intelligence, enabling clinical knowledge to be collected, categorized and optimized from different medical data. Such approaches greatly facilitate the workload of medical professionals and, at the same time, act as decision-making mechanisms to provide clinicians with effective input. Such smart methods are used for data smoothing, extraction of features, segmentation, recognition, and classification. Today, many major factors are driving the implantable medical device market, including the ever-increasing elderly population and the associated rise in the prevalence of chronic degenerative diseases. Although many implantable medical devices are aimed at older people, the needs of younger demographics whose lifestyle and standard of living drive the lucrative demand for cosmetic implants are often integrated into new technologies. Implantable pacemakers, cochlear implants, drug infusion pumps, pressure sensors, and stimulators are some instances. In the future, all monitoring and therapy will likely be integrated with medical implants so that all modalities function together to achieve tailored and personalized closed-loop therapy that is guided by the need of the patient.

This is not a new concept; decades ago, cardiovascular implants were designed with the capacity to sense physiological parameters and provide timely electrical stimulation pulses. The bulk of medical devices, however, are still mostly open-loop. Recent developments have been made in designing closed-loop therapies for neurostimulation applications.

The processing of medical images is one of the challenging tasks because the collection and classification of health records requires both security concerns and hence the need for specialists to provide time-consuming data. One is to collect additional data in all unique resolution forms, such as mass sourcing data or exploring existing diagnostic information. Another approach is to examine how else to increase the efficacy of a small dataset that is very important, whereas a large dataset analysis would apply the study experience.

In various biomedical applications, wearable and implantable devices or electronics have rapidly entered the field of digital health, including monitoring, tracking and recording the vital signs of people with the goal of improving their health and that of their families. In the form of accessories like smart watches, armbands, and glasses, some of these technologies are becoming part of our lives.

There are also two types of data transmission specific to medical devices, based on the type of implant and the sensors that are integrated. The first is short-range communication between the system and an external controller to monitor the status and output of the device and send commands to change the operation. The second is remote control through the transfer of data between the system and a network located on the internet.

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