

Biosignal sensors and converters

Digital Signal Processing (DSP) is an engineering discipline that enjoys many applications, including medicine. Biological signals are data registers that convey information about a biological process in a given period of time (i.e. a heartbeat). The interpretation of these signals is of significant value for diagnosticians, clinicians and researchers. DSP has been the basis on which many artificial intelligence and health-oriented technologies have found a way to establish a leading role in biomedical engineering's evolution.

Biosignal

Is a summarizing term for all kinds of signals that can be (continually) measured and monitored from biological beings. The term biosignal is often used to mean bio-electrical signal but in fact, biosignal refers to both electrical and non-electrical signals.

Sensor

Sensor only detects the presence of physical and biological signals. But we need the converter which can turn signals to be readable by an observer or by an electronic instrument.

Biosignal sensors

Is an analytical device for detection of a substance that combines the biological component and detector element physicist. A sensor (also called detector) measures a physical quantity and converts it into a signal .

The human body is a living source of many kinds of signals. Nerve and muscle cells generate electrical signals like an EEG (Electro Encephalograph). Blood flow and breathing produce biomechanical signals that provide information about respiratory and circulatory systems. Acoustic signals from a heart valve or a breathing process are also very useful for determining the state of a patient.

Bio-signals in the human body are very electrically weak. This makes them very susceptible to noise. Noise may come from the same electrical devices that are performing the signal acquisition and processing, and also from all the other signals that the human body is emitting. Muscles, neurons and organs are simultaneously working, so previous knowledge of the signal under analysis and its environment is mandatory.

Adequate hardware selection helps greatly to improve the quality of the signal. Depending on the signal to be analyzed, the sampling frequency of the Digital Signal Processor must live up to the working frequency of the signal. Sensor selection and sensitivity is important e.g: Flux sensors, microphones and heat sensors

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Bibliography

WIKIPEDIA - wikipedia.org
Digital Biomedical Signal Processing . (Pablo Deliyore)