

Biosignal characteristics

The term biosignal refers to all the signals that are being generated in all living organisms. They can also be described as the spaces, time or the space-time records of a biological event inside the body such as the heart beating or the contraction of the muscles so all the electrical, chemical and mechanical activities that happen during these events produce signals which can be measured and analysed. These signals are so useful to understand the biological events of the body which can help in medical diagnosis.

Physiological origins of biosignals

According to the physiological origins there are six kinds:

Bioelectric signals

Are generated by nerves and muscle tissues as the result of the changes in the electric currents which are produced by the sum potential differences across the tissues and organs. Best known example is the Electrocardiography.

Biomagnetic signals

Different organs such as heart, lungs, brain generate weak magnetic fields. It is measured from activities which are linked to electric fields from an organ. Example: magnetocardiography.

Biochemical signals

Signals contain information about the changes in concentration of various chemical agents in the body. For example, it determines the level of glucose.

Biomechanical signals

Produced by the mechanical functions of biological signals such as motion and displacement, pressure. Example: blood pressure measurements.

Bioacoustic signals

They are a special subset of biomechanical signals that involve vibration basically motion. Example: respiratory system and muscles generate this kind of signals.

Biooptical signals

They are generated by the optical or light-induced attributes of biological systems. They may occur naturally or be induced.

Biosignal characteristics

Biosignals can be classified according to various characteristics:

Waveform shape

It is the shape of a signal. The waveform represents the variation of a voltage or current of a signal over time in a graph.

Statistical structures of the signals

Temporal properties

They are the changes in the signals according to time.

Two broad classes of biosignals

Continuous Signals

Defined over a continuum of time or space and are described by continuous variable functions. They are produced by biological phenomena:

- Voltages measurements from the heart

- Arterial blood measurements
- Measurements of electrical activities from the brain

Discrete signals

Discrete signals define only at subset of regularly spaced points in time and-or space. Continuous signals from human body are converted to discrete signals by a process called sampling and they can be analyzed and interpreted by a computer.

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