

## Definition of Signal Processing

Signal processing is the enabling technology for the generation, transformation, and interpretation of information. It comprises the theory, algorithms, architecture, implementation, and applications related to processing information contained in many different formats broadly designated as signals. Signal refers to any abstract, symbolic, or physical manifestation of information with examples that include: audio, music, speech, language, text, image, graphics, video, multimedia, sensor, communication, geophysical, sonar, radar, biological, chemical, molecular, genomic, medical, data, or sequences of symbols, attributes, or numerical quantities.

Signal processing uses mathematical, statistical, computational, heuristic, and/or linguistic representations, formalisms, modeling techniques and algorithms for generating, transforming, transmitting, and learning from analog or digital signals, which may be performed in hardware or software. Signal generation includes sensing, acquisition, extraction, synthesis, rendering, reproduction and display. Signal transformations may involve filtering, recovery, enhancement, translation, detection, and decomposition. The transmission or transfer of information includes coding, compression, securing, detection, and authentication. Learning can involve analysis, estimation, recognition, inference, discovery and/or interpretation.

Signal processing is essential to integrating the contributions of other engineering and scientific disciplines in the design of complex systems that interact with humans and the environment, both as a fundamental tool due to the signals involved and as a driver of new design methodologies. As such, signal processing is a core technology for addressing critical societal challenges that include healthcare, energy systems, sustainability, transportation, entertainment, education, communication, collaboration, defense, and security.

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Source: IEEE, Signal Processing Society

For an overview of applications and videos, see:  
<http://signalprocessingsociety.org/our-story/signal-processing-101>

