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1 Signal processing involves analysing, modifying and synthesizing signals such as sound, images and scientific measurements. Signal processing techniques can be used to improve transmission, storage, efficiency and subjective quality and to also emphasize or detect components of interest in a measured signal. Signal processing can be categorised into the following

i. Analog ~~digiti~~ signal processing
ii. Continuous-time signal processing
iii. Discrete-time signal processing
iv. Digital signal processing
v. Non-linear signal processing
vi. Statistical signal processing

i. Analog signal Processing: This is for signals that have not been digitized. This involves linear electronic circuit as well as non-linear ones. The former are for instance passive filters, active filters, additive mixers, integrators etc.

ii. Continuous time: This is for signals that vary with the change of continuous domain (without considering some individual interrupted points. The methods of signal proces include time domain, frequency domain and complex frequen domain.

Discrete time: This is for sampled signals defined only at discrete points in time and as such are quantized in time, but not in magnitude. Analog discrete-time signal processing is a technology based on electronic devices such as sample and hold circuits, analog delay lines and analog feedback shift registers. The concept of discrete time signal processing also refers to theoretical discipline that establishes a

mathematical basis for digital signal processing without taking quantization error into consideration.

iv. Digital: It is the processing of digitized discrete-time sampled signals. processing is done by general-purpose computers or by digital circuits such as ASICs, field programmable gate arrays or specialized digital signal processors.

v. Nonlinear: This involves the analysis and processing of signal produced from nonlinear systems and can be in the time frequency or spatio-temporal domains. Non linear systems can produce highly complex behaviours including bifurcations, chaos, harmonics and subharmonics which cannot be produced or analysed using linear methods.

vi. Statistical: This is an approach which treats signals as stochastic processes, utilizing their statistical properties to perform signal processing tasks. Statistical techniques are widely used in signal processing applications.

Applications

i. Image processing
ii. Video processing
iii. Audio signal processing
iv. Wireless communication
v. Control system
vi. Process control

2. An expert system is a computer system emulating the decision making ability of a human expert. Expert systems are designed to solve complex problems by reasoning through bodies of knowledge, represented mainly as "if-then" rules ~~rather than~~ rather through conventional procedural code. An expert system is divided into two subsystems:

i. The interface engine
ii. Knowledge base

The knowledge base represents facts and rules. The interference engine applies the rules to the known fact to deduce new facts. Interfacing engines can also include explanation and debugging abilities.