

Question

- 1) Explain briefly the signal processing and interfacing techniques in measuring instruments.
- 2) Explain briefly the expert system instrumentation.

Answers

2) 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 through conventional procedural code. The first expert systems were created in the 1970s and then proliferated in the 1980s. They were among the first truly successful forms of artificial intelligence (AI) software.

An expert system is divided into two subsystems which are:
- the inference engine and;
- the knowledge base.

The inference engine applies the rules to the known facts in order to deduce new facts. ~~They~~ It can also include explanation and debugging abilities while the knowledge base represents the facts and rules.

1) Signal processing condenses measurements to extract information about some distant state of nature. It can be described from different perspectives; like to an acoustician, it is a tool to turn measured signals into useful information. To a sonar designer, it is one part of a sonar system while to an electrical engineer, it is often restricted to digitization, sampling, filtering, and spectral estimation.

A modern underwater acoustic signal processing system can

include the following:

- Digitization (sampling in time and quantizing in amplitude)
- Beamforming (spatial filtering)
- Bandpass and base-band filtering
- Detection, classification, localization, and tracking
- Matched filtering and/or incoherent integration.

Although measurements are typically acquired jointly in space and time, signal processing is usually partitioned to combine signals across ~~space first, then~~ space first and then time.