

EZEGBISI CLEMENTINA ONYINYECHUKWU

400 Level

17/Eng04/027

Electronic Instrumentation (Digital)
EEE 471 Assignment

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29/12/2020

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

soln

1) Signal processing is an electrical engineering subfield that focuses on analysing, modifying, and synthesizing signals eg sound, images, and scientific measurements.

It is used to improve transmission, storage efficiency and subjective quality and to also emphasize or detect components of interest in a measured signal. That is signal processing involves techniques that improve our understanding of information contained in received ultrasonic data.

Signal processing is categorised into the following:

- 1) Analog
- 2) Digital
- 3) Discrete time
- 4) Continuous time.
- 5) Non-linear
- 6) Statistical.

Application of Signal Processing

- 1) Consumer electronics - HDTV, Cell phones, Cameras - etc.
- 2) Transportation - GPS, engine control, airplane tracking etc
- 3) Medical - imaging, monitoring (EEG, ECG) ---
- 4) Military - Target tracking, surveillance
- 5) Remote sensing - Astronomy, climate monitoring and weather forecasting.

⇒ Interfacing Technique ? The measurement of clearly formed interfaces between two liquids or product layers can be carried out by means of different, simple measuring arrangements. There are different ways to measure a clear interface.

Vessel geometry, accuracy requirements and economic aspects decide the selection of the arrangement.

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 through conventional procedural code.

Hence the expert systems are the computer applications developed to solve complex problems in a particular domain, at the level of extra-ordinary human intelligence and expertise.

Characteristics of Expert system include:

- 1) Reliable
- 2) Highly Responsive.
- 3) High performance.
- 4) Understandable

Components of Expert systems include

- 1) Knowledge Base
- 2) Inference Engine
- 3) User Interface

Application of Expert system.

- 1) Design Domain
- 2) Medical Domain
- 3) Monitoring Systems
- 4) Knowledge Domain
- 5) Finance / Commerce
- 6) Process Control System

Benefits of Expert systems.

- 1) Availability : They are easily available due to mass production of software
- 2) less production Cost : production Cost is reasonable. This makes them affordable.
- 3) Speed : They offer great speed. They reduce the amount of work an individual puts in
- 4) less Error Rate : Error rate is low as compared to human errors.
- 5) steady response : They work steadily without getting emotional, tensed or fatigued
- 6) Reduce Risk : They can work in the environment dangerous to humans.