EEE319 (Measurement and Instrumentation) Assignment

Electrical and Electronics Engineering

1. A Sensor converts a physical attribute to an electrical signal. Biomedical Sensors are used to gain the information on body and pathology, which is a branch of Biomedical Engineering. Biomedical Sensors are classified into;

- Physical Sensor
- Chemical Sensor
- Biosensor.

Meanwhile an actuator does the opposite. It changes an electrical signal to physical action. Actuators are used in manufacturing switches, pumps, motors etc

APPLICATION OF SENSORS

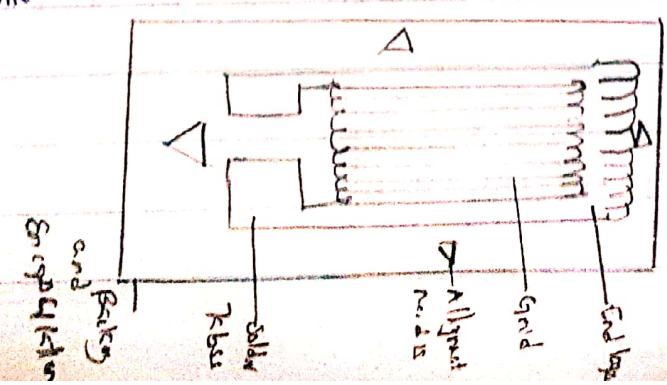
- Magnetic Sensors are used in automotive systems for the sensing of position, distance etc
- Digital Sensors are used in monitoring leaks in gas pipes using pressure Sensors
- Analog Sensors are used to detect discontinuities in metals etc.

APPLICATION OF ACTUATORS

- Linear actuators are used in packaging machines, medical equipments etc
- Actuators are used extensively to operate valves remotely
- Actuators are used in robotic welding machines.

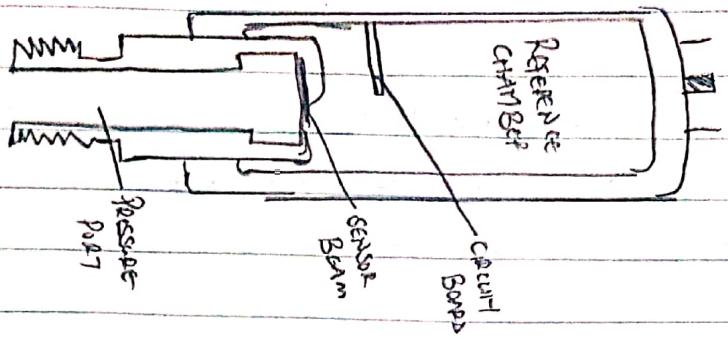
2. i STRAIN GAGE:

It consists of a very fine metallic foil etched in a grid pattern, which is bonded to a device and used to measure the strain, or amount of deformation of the device when weight is applied



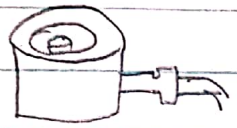
ii) Pressure Sensor :

Using strain gage, these pressure sensors are sensors that measure pressure as electric signals.



iii) Load cells :

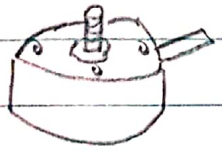
Minebea manufactures load cell that use strain gages to convert weight into electrical output



Button type load cell

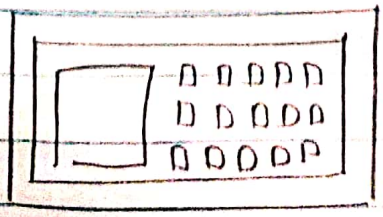
iv) Vector Sensors :

It is a sensor that detects the translation power in three directions. The sensor can miniaturize because of a simple structure and is the best for the usage of the gripping force detection.



v) Digital indicators

It is used in load cells, transducers and other measuring components



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3. A DIGITAL STADIOMETER:

A human has to stand erect while using a stadiometer it could be measured in centimeters and feet and inches. On average, males are taller than females. Several places such as medical centres, screening centres, military offices etc.

The concept of a stadiometer device is based on the measurement of distance with the use of an ultrasonic sensor device controlled by a microcontroller. The stadiometer device is to be placed at a fixed height. the microcontroller being received by an ultrasonic sensor device. The sensor emits ultrasound wave in a linear duration towards the obstacle and records the reception of echo to time t between the pulse emission and echo reception is being derived by the microcontroller on the time 0 module. the derived time 'T' is further divided by 2 because the time needed is the time it takes the pulse to hit the obstacle.

4. MEASUREMENT SCALE:

Scale measure how much an object weighs and they do it by measuring how much force they give you measurement of mass in Kilograms, Grams, Pounds etc. This can be a bit confusing but its acceptable because weight and mass are connected in a similar way and are often used interchangeably on our everyday use. there are two types of scales in the medical field:

- NOMINAL Scale:

It is the lowest level of measurement in which names or lables are assigned to objects and can be put into categories. We use normal scales in our everyday lives when we identify people as males or female.

- ORDINAL SCALES:

They are similar to nominal scale in that they consist of mutually exclusive and exhaustive categories but unlike nominal scales, each category of scale expresses different type.