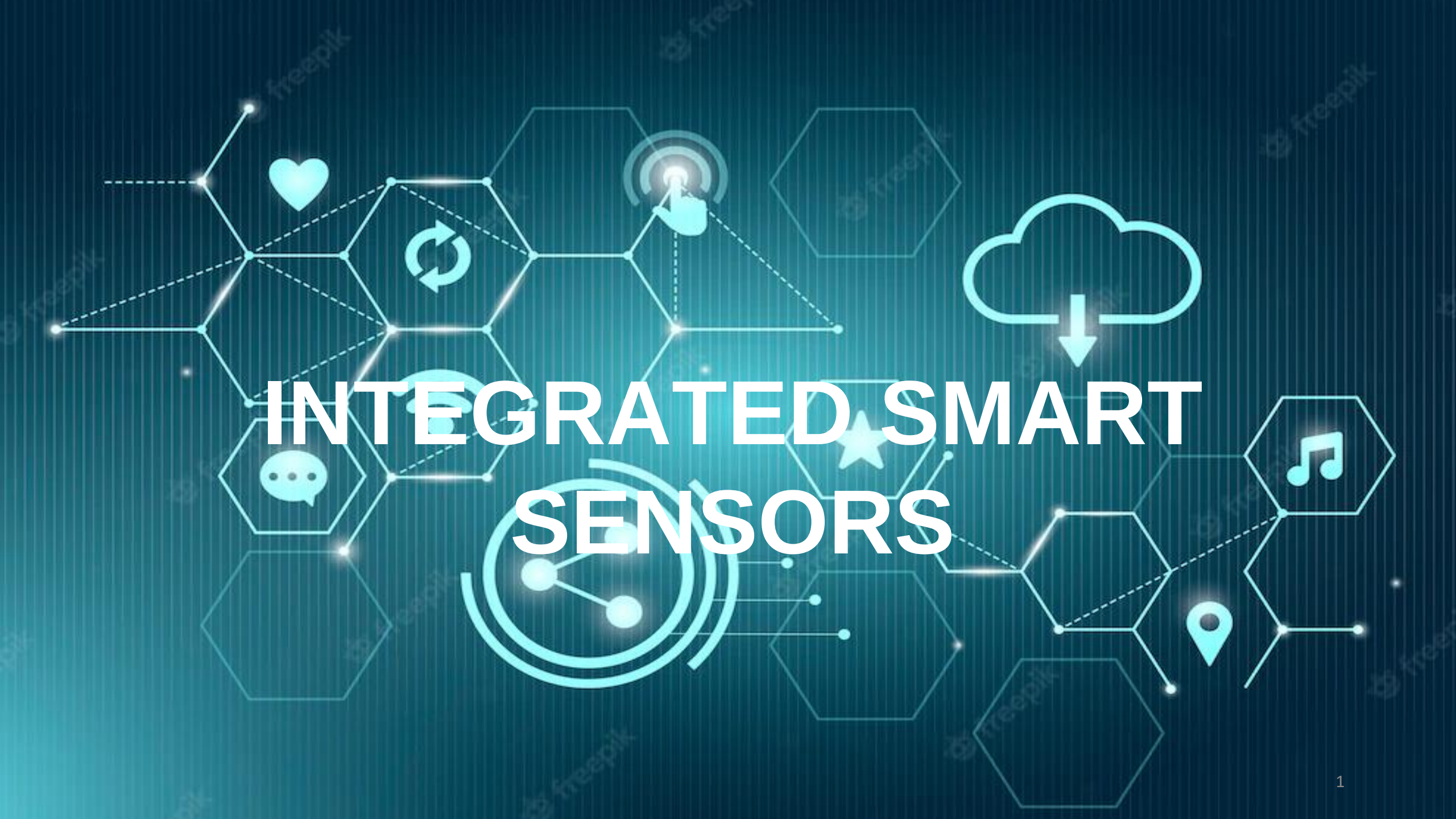
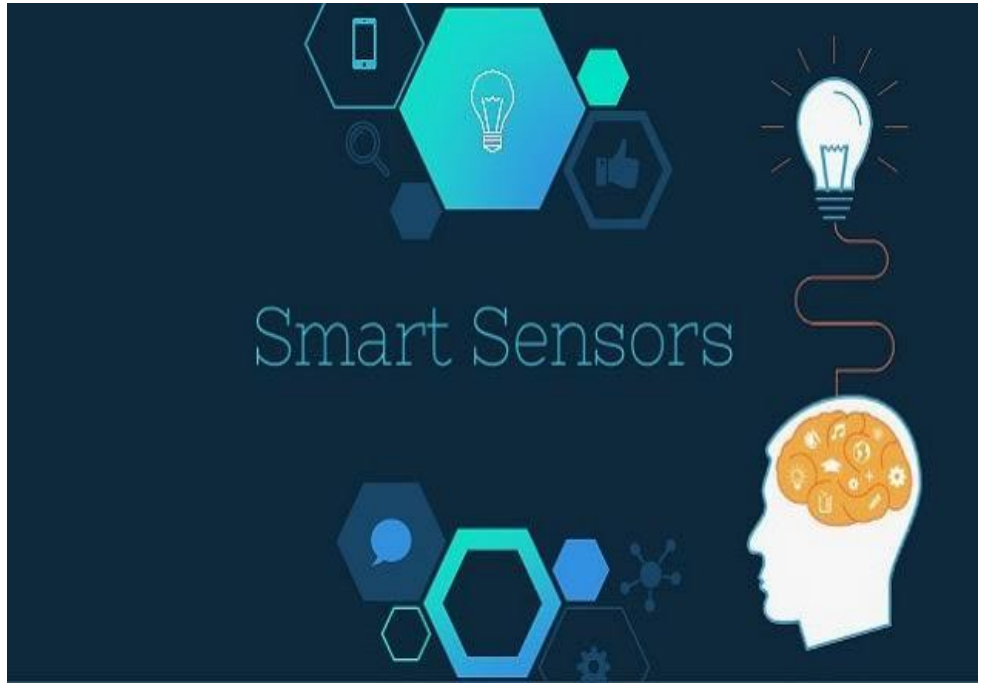

INTEGRATED SMART SENSORS

SMART SENSORS



A **smart sensor** is a device that takes input from the physical environment and uses built-in compute resources to **perform predefined functions** upon detection of specific input and then process data before passing it on.

INTEGRATED SMART SENSOR

- ✓ An Integrated smart sensor is the core technology of a sensor without the package.
- ✓ It allows for multiple sensor technologies to be combined or "integrated" into a single plug-and-play assembly.

How are smart sensors different from base sensors?

- ✓ Smart sensors include an **embedded Digital Motion Processor (DMP)**, whereas base sensors don't.
- ✓ A DMP is, essentially, just a microprocessor that is integrated into the sensor.
- ✓ It enables the sensor to perform **onboard processing** of the sensor data.
- ✓ This might mean normalizing the data, filtering noise or performing other types of signal conditioning.

USES OF SMART SENSORS IN INDUSTRIES

- ✓ Increase productivity
- ✓
- ✓ Minimise downtime with continuous process and diagnostic data.
- ✓
- ✓ Enable faster product change-overs
- ✓
- ✓ Speed-up machine commissioning
- ✓
- ✓ Enable smarter machines that are in

APPLICATIONS OF SMART SENSORS

Smart sensor technologies have been used for monitoring and control mechanisms in a wide variety of environments including,

- ✓ Smart grids
- ✓ Flood and water level monitoring systems
- ✓ Environmental monitoring
- ✓ Traffic monitoring and control
- ✓ Energy saving in artificial lighting
- ✓ Remote system monitoring and equipment fault...

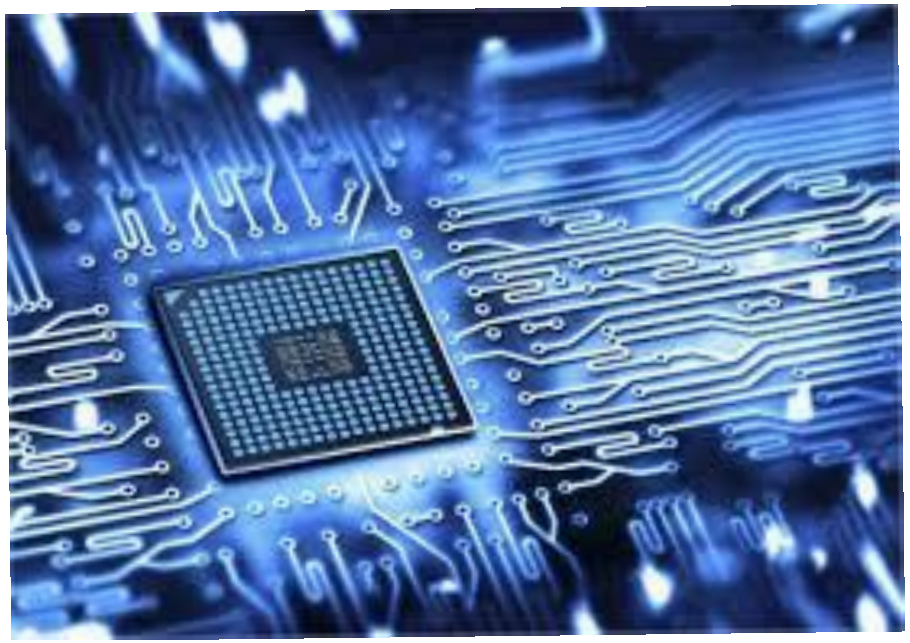
SENSING ELEMENT

- ✓ Any device that receives a signal or stimulus (as heat or pressure or light or motion etc.) and responds to it in a distinctive manner are called as Sensing Elements.
- ✓ The primary sensing element transfers the measurand to variable conversion element for further processing.

INTERFACE ELECTRONICS

- ✓ Interface electronics should be transparent i.e. should not impair sensor performance
- ✓ An error budget for key specs should be made :
- Resolution
- Accuracy
- Bandwidth
- Dynamic range etc

INTERFACE ELECTRONICS DESIGN METHODOLOGIES



1. Do no harm!
2. Do system design!
3. Digitize early!
4. Be dynamic!


Thank
you