

SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

**COURSE NAME :19EE603 IoT for Electrical Engineers
III YEAR /VI SEMESTER**

Unit 2-Sensors

Capacitive Sensor





Applications of Capacitive Sensors



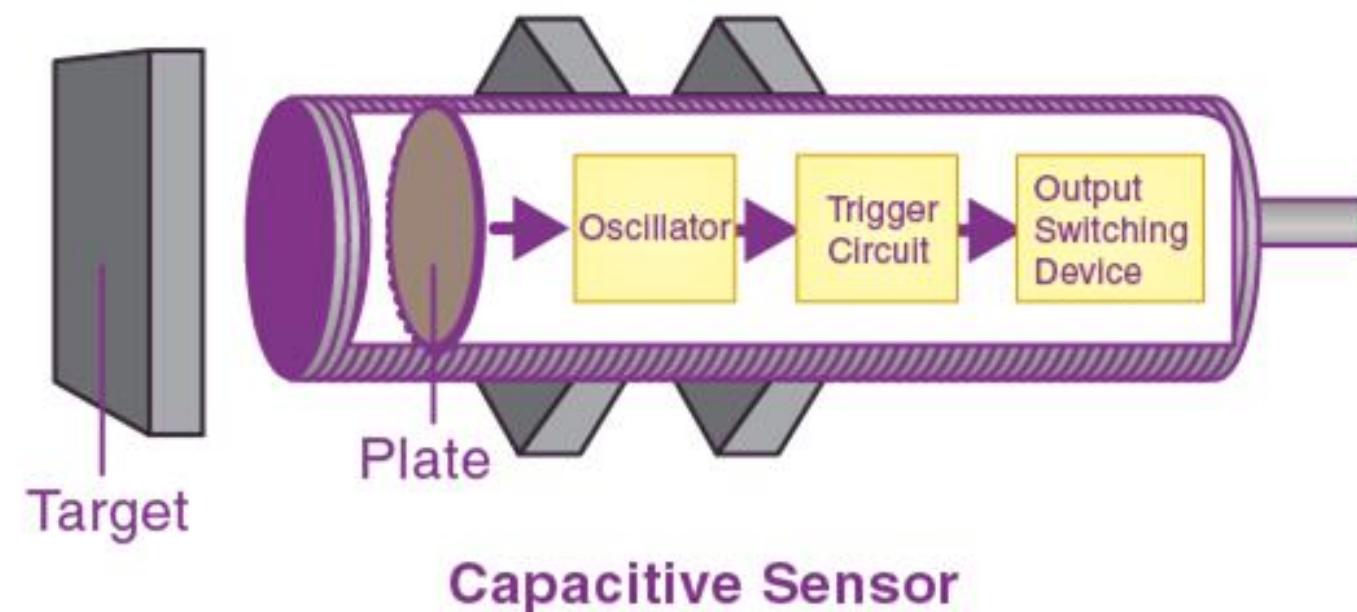
- Touchscreens
- Proximity Sensing
- Human Interface Devices (HID)
- Level Sensing
- Object Detection and Recognition
- Proximity Detection in Automotive
- Moisture Sensing
- Biomedical Applications
- Non-Destructive Testing (NDT)
- Consumer Electronics



What is Capacitive Sensor???

Capacitive Sensor

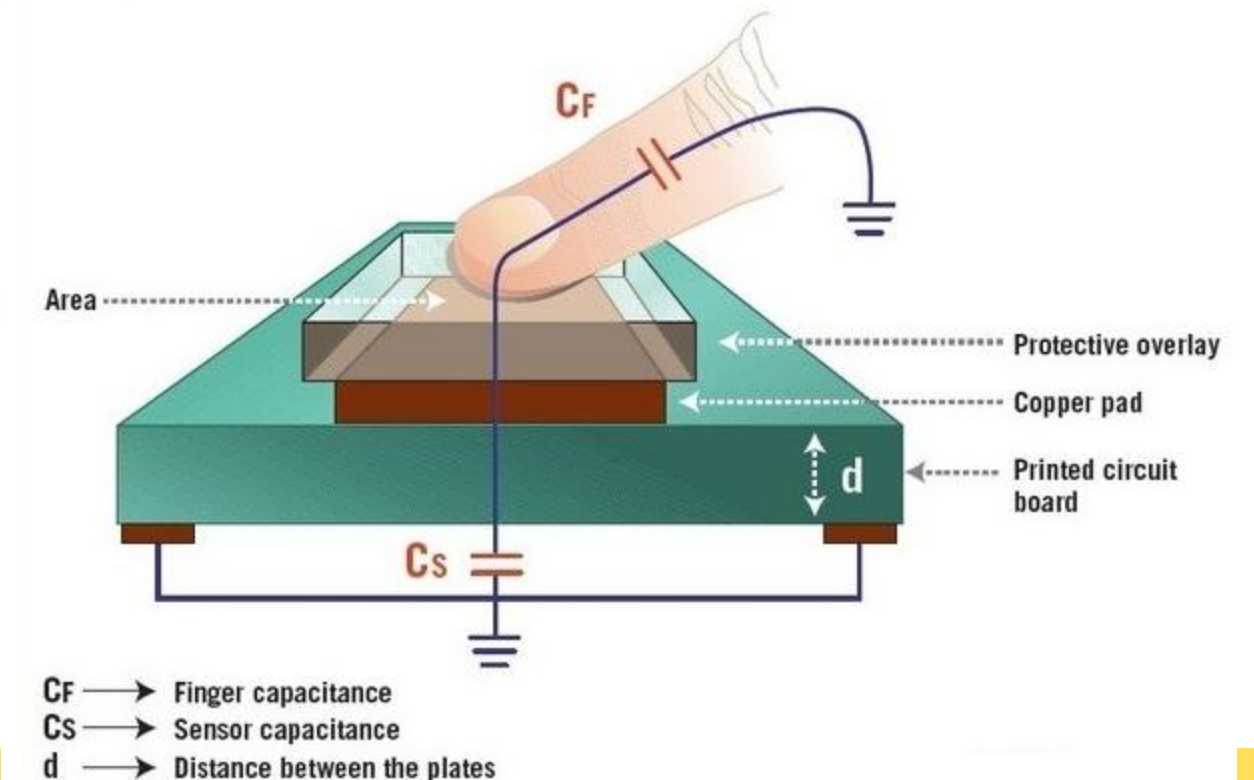
- The non-contact device that can detect or sense the presence or absence of any object virtually irrespective of its material is known as a capacitive proximity sensor.
- They use the alteration of capacitance based on the change in the electrical field and the electrical property of capacitance and everywhere around the active face of the sensor.
- Capacitive sensors can sense anything.
- The object should have a dielectric different from that of air, or it must be conductive; the only conditions for the detection by capacitive sensing.



Working Principle of a Capacitive Sensor

- Along with a sensing surface formed by two metal electrodes, the capacitive proximity sensor involves a high-frequency oscillator.
- When an object comes near the sensing surface, it changes the capacitance of the oscillator by entering into the electrostatic field of the electrodes.
- Due to this, the oscillator circuit begins to oscillate and variates the output state of the sensor when it reaches a certain amplitude.
- The oscillator's amplitude decreases as the object moves away from the sensor, switching the sensor back to its initial state.

The principles of capacitive touch sensing.





Major Characteristics of Capacitive Proximity Sensor



- Non-metallic targets can be detected using capacitive proximity sensors.
- Mechanical limit switches that are unable to detect lightweight or small objects can be detected using capacitive proximity sensors.
- In object counting applications, the capacitive proximity sensors provide a high switching rate for rapid response.
- Capacitive proximity sensors can help to detect liquid targets through non-metallic barriers.
- With a virtually limitless number of operating cycles, capacitive proximity sensors have a long operational life.



Assessment



Identify the types of sensor





References



- Hanes David , Salgueiro Gonzalo , Grossetete Patrick , Barton Rob, “IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things”, Cisco Press, 2017.
- Patranabis, D., “Sensors and Transducers”, PHI Learning Private Limited, New Delhi, 3rd Edition, 2009.
- Raj Kamal, “Internet of Things: Architecture and Design Principles”, McGraw Hill Education (India) Private Limited, Chennai, 2017.
- Tripathy, B.K., Anuradha, J., “Internet of Things (IoT): Technologies, Applications, Challenges and Solutions”, CRC Press, 2018.