

IR Sensor To Detect Obstacles

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1-Intro About IR Sensor

1-Infrared Obstacle Avoidance Sensor has a pair of infrared transmitting and receiving sensors. The infrared LED emits Infrared signals at certain frequency and when an obstacle appears on the line of infrared light, it is reflected back by the obstacle which is sensed by the receiver.

2-Depending on the strength of the reflected light, the sensor will know how far or close an object is. The stronger the reflected signal, the closer the object. The weaker the signal, the farther the object is

2-Working Principle Or IR Sensor

Detailed working principle of an IR sensor for obstacle detection

When the IR emitter emits infrared radiation, it forms an invisible beam or field

If there is no obstacle, the receiver does not detect the emitted radiation

When an obstacle is present, it reflects or blocks the emitted radiation

The receiver detects the change in the received radiation, indicating the presence of an obstacle

3-Advantages Of IR Sensor

Highlighting the advantages of using IR sensors for obstacle detection:

Cost-effective and widely available

Suitable for both indoor and outdoor applications

High detection accuracy and reliability

Non-contact sensing, avoiding physical contact with objects

Can detect a variety of materials and objects

4-Disadvantages Of IR Sensor

Limited range, support a shorter range.

The transmission data rate is low.

Can be affected by environmental conditions such as rain, fog, dust, pollution, sunlight, smoke, etc.

Infrared waves at high power can damage eyes.

5-Component Of IR Sensor

Explanation of the components of an IR sensor:

IR emitter: Emits infrared radiation (usually an IR LED)

IR receiver: Detects the reflected or emitted IR radiation (usually a photodiode or phototransistor)

Signal conditioning circuit: Amplifies and processes the output signal from the receiver

Output interface: Provides a digital or analog output indicating the presence or absence of an obstacle

6-Apps Of IR Sensor

Various applications of IR sensors in obstacle detection systems:

Robotics: Obstacle avoidance in autonomous robots and drones

Automotive: Proximity sensors for parking assistance and collision avoidance systems

Industrial automation: Detecting objects on conveyor belts, monitoring presence in assembly lines, etc.

Security systems: Intruder detection, door/window opening detection, etc.

7-Tools Used In Project

1-Proteus Simulation

2-Microchip Studio

3-Electronics [IR-LOGIC STATE-LCD-ATMEGA32-LM016L]

8-Referances

1-[SGBOTIC](#)

2-[ALASQ](#)

3-[ARTICLES](#)

4-[GOOSOURCES](#)