

FINAL EMBEDDED SYSTEM SUMMER ITI TRAINING PROJECT

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❖ Project name

- **IR Sensor To Detect Obstacles**

❖ Project Definition

- The 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.

Working Principle Of 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

Components

- 1-Atmega32
- 2-IR Sensor
- 3-LM016L
- 4-Logic State
- 5-LCD
- 6-Power
- 7-GND

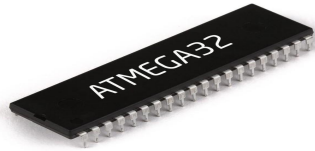
❖ Devices

LM016L



- ✓ The most commonly used LCDs found in the market today are 1 Line 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers ,Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections). Pin description is shown in the table below

- Atmega32



- ✓ is a **low-power microcontroller** based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega32 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

LCD



- ✓ LCDs are great for showing info from your microcontroller. A serial adapter is inexpensive, uses only one I/O, and is easy to connect and to use.

- PIR Sensor



- ✓ Connecting PIR sensors to a microcontroller is really simple. The PIR acts as a digital output, it can be high voltage or low voltage, so all you need to

do is listen for the pin to flip high(detected) or low (not detected) by listening on a digital input on your Arduino

✓ Applications

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.

✓ -Schematic Diagram

