
PIR Sensors with Drones

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ABSTRACT

In this paper, we will be focusing on Pyro-electric Infrared sensors with Drones.

This paper will include working of Pyro-electric Infrared sensors and Drones.

The Researchers are also focusing on the various aspects of PIRs with drones which includes but not limited to Cost, Working Environment, & Feasibility study .

We have included the various Advantages and Drawback of the PIRs with Drones.

We are also focusing on various customer based requirement specific and need based applications of PIRs with Drones.

We have also researched about the various future scope of this device on how it can be used by customers depending upon the specific requirements.

Keywords:

PIRs , DRONES , MOTION DETECTION, SENSOR, PROXIMITY, WORKING, APPLICATIONS, ADVANTAGES.

INTRODUCTION

A Pyroelectric Infrared (PIR) Sensor is a pyroelectric device that can sense in-fared (IR) radiation changes within its viewing range. In other words, these sensors are sensitive to moving objects radiating IR light. A PIR sensor creates temporary electric potential whenever a change of IR radiation occurs on the viewing range of the sensor, but the electric potential generated is very small in amplitude and must be amplified significantly. Hence PIR sensors can not be used alone, instead they become one of the key components of a passive infrared device (PID) with some other circuitry. The basic structure of a PID contains four main structures: A Fresnel lens, a PIR sensor, an amplifier circuit and a comparator plus time delay circuitry.

A passive infrared sensor (PIRs) measures infrared light emitted from objects that generate heat, and therefore infrared radiation, in its field of view. Crystalline material at the center of a rectangle on the face of the sensor detects the infrared radiation. The sensor is actually split into two halves so as to detect not the radiation itself, but the change in condition that occurs when a target enters its field. These changes in the amount of infrared radiation on the element in turn change the voltages generated, which are measured by an on-board amplifier. When motion is detected the PIR sensor outputs a high signal on its output pin, which can either be read by an MCU or drive a transistor to switch a higher current load.

A **drone**, in a technological context, is an unmanned aircraft. **Drones** are more formally known as unmanned aerial vehicles (UAVs) or unmanned aircraft systems. Essentially, a **drone** is a flying robot.

WORKING

Basic PIR Working

PIR stands for Pyro-electric InfraRed. The “motion sensing” feature on most lights (and security systems) is a passive system that detects infrared energy. These sensors are therefore known as PIR (passive infrared) detectors or pyroelectric sensors. Instead of emitting a beam of light or microwave energy that must be interrupted by a passing person in order to “sense” that person, the PIR is simply sensitive to the infrared energy emitted by every living thing. When an intruder walks into the detector’s field of vision, the detector “sees” a sharp increase in infrared energy.

A PIR sensor light is designed to turn on when a person approaches, but will not react to a person standing still. The lights are designed this way. A moving person exhibits a sudden change in infrared energy, but a slower change is emitted by a motionless body. Slower changes are also caused by gradual fluctuations in the temperature of the environment. If the light were sensitive to these slower changes, it would react to the sidewalk cooling off at night, instead of the motion of a burglar.

No motion detection system is perfect, but PIR sensors are by far the most sensitive and advanced option. PIR sensor lights are ideal additions to any home security system.

Basic Drone Working

A typical unmanned aircraft is made of light composite materials to reduce weight and increase maneuverability. Drones are equipped with different state of the art technology such as infra-red cameras (military UAV), GPS and laser (military UAV). Drones can be controlled by remote control system or a ground cockpit.

Drones come in a wide variety of sizes, with the large drone mostly used for military purposes such as the Predator drone, other smaller drones which can be launched by hand, to other unmanned aircraft which require short runways. An unmanned aerial vehicle system has two parts, the drone itself and the control system.

The nose of the unmanned aerial vehicle is where all the sensors and navigational systems are present. The rest of the body is complete innovation since there is no loss for space to accommodate humans and light weight. The engineering materials used to build the drone are highly complex composites which can absorb vibration which decreases the noise produced.

Using PIR In Drones.

Drones Designed and manufactured these days are heavily dependent on GPS for tracking the position of the user except a few which can track the user but are unable to control their altitude. To overcome this drawback Researchers have added the PIR sensor so that the drone will be able to maintain altitude control along with direction control.

For a Quadcopter, there will be 5 sensors placed all around the drone. 4 of the sensors will be on the end of the Booms & one will be at the bottom of the drone.

Using the PIR sensors the drone (when in follow me mode) which direction to move and how to much to move.

APPLICATION OF PIRS

Automatic Doors: For Opening & closing of the doors in malls.

PIRs also used for building security alarm systems and motion detectors: For detecting burglary in buildings.

Lift Lobby: For Opening & Closing of Lift Doors.

Smart Homes: For Detecting the presence of human in the room to turn on the Lights & the Air-Conditioner.

For Basement or Covered Parking Area: Tracking Cars Humans.

For garden lights: Automatically controlling the lights in the presence & Absence of any Person.

ADVANTAGES OF DRONES

Inspecting hazards systems

Useful in providing better and unique viewing angle in disaster areas

Supply delivery in disaster areas (during floods)
Increase the effectiveness of disaster responders
Helping in rescue operations like flooded areas
Searching for the human life on fire disaster areas
3D mapping of Local Areas
Content Creators (Film Production)
Sports like Cricket (Aerial view + helping for correct decision for umpires)
Automatic Pollination of field of crops
Search and rescue operations
Traffic monitoring

FUTURE ENHANCEMENT OF DRONES

USING PIR SENSORS

Earthquake Warning Networks
Hurricane Monitoring arms
Tornado Warning Systems
Hail Preventer/Sound Cannons
Avalanche Preventer/Sound Cannons
Impending Flood Alert Systems

CONCLUSION

Based on the research done the on the above topic we summarize that the improvement on current drones can be done in various fields which include but not limited to safety and working.

PIRs play a major role in drones as they ensure that drones while operations are determined to give 100% efficiency and safety is assured at the same time.

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