Ultrasonic Signal Coding and PIR Sensors to Enhance the Sensing Reliability of an Embedded Surveillance System

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ABSTRACT

In this paper we design and implement an embedded surveillance system by use of ultrasonic signal coding of ultrasonic sensors with multiple pyroelectric infrared sensors (PIR) to detect an intruder in a home or a storehouse. The PIR sensors are placed on the ceiling, and the ultrasonic sensor module consists of a transmitter and a receiver which are placed in a line direction; however, ultrasonic sensors with the same frequency are subject to interference by crosstalk with each other and have a high miss rate. To overcome these disadvantages of the ultrasonic sensor, our design reduces the miss rate from the environmental interference by using an ultrasonic coding signal. Both ultrasonic sensors and PIR sensors are managed by the majority voting mechanism (MVM).

Keywords: Embedded Surveillance System; Majority Voting Mechanism; PIR Sensor; Ultrasonic Sensor.