A Remote Industrial Surveillance System Using Multiple Ultrasonic Sensors

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ABSTRACT

In this paper we design and implement an Industrial surveillance system based on an embedded system with multiple ultrasonic sensor modules to enhance the system's reliability. Each ultrasonic sensor module includes a transmitter and a receiver, and the modules are placed in a line direction. The aim of this paper is to develop and implement an affordable low cost web-camera based surveillance system for remote security monitoring. User can access to their monitoring system remotely via the internet with the use of Windows-based Remote Desktop program. This surveillance system consists of ultrasonic sensors and a web-camera that attached to a rotating platform, which can rotate to all four directions. When intruder detected by ultrasonic sensors, the web-camera will start recording the video stream and save it into memory storage, use of ultrasonic sensors will increase reliability of the overall system.case, an event that leads to the loss, theft, access, transmission or other use may be called into question to answer who, what, when, where, why, and how. In the mentioned situations, computer forensics comes to the light in order to search, find, and protect system logs or application logs. This is because information regarding the location of the actual data or information relating to the actual data is very valuable in various instances. Computer Forensics, thanks to the ever increasing use and dependence on computers, is becoming a growing and valuable field. Computer Forensics refers to "the use of analytical and investigative techniques to identify, collect, examine and preserve evidence/information which is magnetically stored or encoded" [1]. There are many instances of where crimes involving a computer need to be investigated. Lately the use of a surveillance system for image detection is becoming more important. An embedded surveillance system is frequently used in the home, office or factory for image processing of the surveillance system and also for traffic monitoring but this configuration requires a high performance core, which works against some advantages of embedded systems, such as low power consumption and low cost. Some designs propose the use of different sensors to track the sequence of the human body movement Other researchers construct an external signal to trigger the embedded surveillance system by means of a PIR sensor, which is triggered when an intruder enters the monitoring area. However, a PIR sensor has a high miss rate when the intruder walks at a slow speed. Hence, to solve this problem, we use ultrasonic sensors to implement an embedded industrial surveillance system. In addition, because a single receiver can be influenced by refraction and reflection, we use several sensors to receive the ultrasonic transmissions in order to enhance the reliability of the system.