802.11b-based Home Security System

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Overview

Wireless technology has become a hot issue around the world. Wireless products are becoming as common as those with wire, for example, PDA, mobile phones and notebooks. It is very convenient to carry your devices anywhere without any physical connection.

The aim of the project is to build a monitoring server in a wireless system, which can provide an updated image of the monitoring target, so that the user can keep track of it everywhere by using any computers that can access the internet. The final product will be a stand-alone embedded system, which is Linux-based, with different security functions.

The objective of the project is to setup the server on a Linux-based computer and embedded system. The server and client programs must be compatible with the embedded system we are going to implement. Besides compatibility, speed and stability are also necessary for a system to provide security.

Features

Server side
> Linux OS-- Fedora 4 with GUI interface, which is installed in a laptop to do testing.
> Apache server/BOA—A program which setup a web server.
> Camera driver
> Capturing program
> C programming--featuring motion detection, SMS alarm triggering and image recording.
> Embedded System

Client side
> Java Applet Program
Methodology and Result

The embedded system is a wireless stand alone system which is connected with a webcam. The system can be placed anywhere for monitoring propose. The program in the embedded server will capture a picture periodically based on users’ settings. When the user log in the system’s web site, the updated picture will display on browser and the user can monitor home condition. When there is a possible danger happened at home, an alarm will be triggered and image will be recorded.

This project was developed based on the
1. Server Programming written in C featuring motion detection, SMS alarm trigger and image recording.
2. Java applet for client side monitoring interface.

Discussion and Conclusion

The frame rate is not high enough for image transfer. The user will see the motion image not smooth enough. It is because the BMP to JPEG process cannot achieve 30 fps for PC. There is no relation on frame to frame compression. For further improvement, MPEG 4 compression is recommended. It is a frame to frame related compression. The frame rate will be higher for real time image transfer.

The overall result of the project is satisfied. A significant improvement was made compare to the previous projects. The stability of the system is guaranteed. There is no more hang up of the system. Most importantly, a real full time security system is built. The specific location is secured by the home security system in 24 hours a day fully automatically. A stand alone embedded system is also built which provided a cheap, user friendly home security solution for the user. The project is successful.