Cloud-based Wireless Surveillance System (LCT2-13)

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Project Overview
The conventional CCTV system consists of security cameras connected to a monitor, a recording system, and an onsite video storage server. Such a system is not very economical as users need to purchase physical server hardware with sufficiently large capacity for storing the surveillance videos.

To solve this issue, we develop a cloud-based wireless surveillance system. In our system, all videos are saved in a cloud server. Users need only purchase our programmed USB camera and router. Afterwards, they can view the surveillance videos online by logging in to our website.

Methodology

Hardware Implementation
The router was installed with OpenWrt. With modifications through LuCI, LAN connection was set wireless while WAN connection was enabled to allow the router to get an internet connection through an Ethernet cable. A file named 'move' was created inside the router to transfer snapshots captured by the camera to the web server. Afterwards, the existing MJPG Streamer script had to be killed and a new MJPG-Streamer was executed. In this way, all camera’s snapshots can be transferred into the server for further processing. The diagram below illustrates the whole hardware implementation process.

Software Implementation
Our cloud server runs on Ubuntu 12.04 LTS OS. Various scripts written in PHP, Bash, and HTML-Javascript were created for video processing and website management. Upon signing up, each user was assigned a folder. Images sent by the router were stored here. After logging in, user can enter the date and time range of the period that he wants to see. Images with timestamps that lie within the specified time frame will be converted into a .mp4 video and displayed on the website. The whole software implementation process is provided in the diagram below.

Results

Hardware
USB camera
Amazon EC2
Micro Instance
cloud server
ffmpeg
OpenWrt
OpenWrt
MJPEG-streamer

Software
Amazon web services
PuTTY or MacOS Terminal

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