Real-Time Video Surveillance System (BZ1-08)

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Overview

Surveillance system is the process of monitoring the behavior of people or objects for conformity to expected or desired regulations in various systems for security or social control. Typical example of surveillance system is a closed-circuit television (CCTV). Nowadays, people are concerned not only the security problems in public areas, but also security problems at their home or office. Therefore, a low-cost, user-friendly, sophisticated and high-quality real-time surveillance system is in high demand.

In this project, a real-time video surveillance system is being developed to enable people to monitor their own or distant places via the internet.

Methodology

There are 5 tasks to achieve project goal:

1. Video Capturing
   - A video camera is connected to a server PC via Ethernet.
   - The video stream is captured by the server and stored in a local file on the server.

2. Video and Audio Coding
   - The captured video stream is encoded using H.264 encoding.
   - The encoded video stream is then transmitted over the internet.

3. Video and Audio Decoding
   - The video stream is decoded on the client PC using a video player application.

4. Network Transmission
   - The video data is transmitted over the internet using UDP protocol.

5. Graphical User Interface (GUI)

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Result

Features:
- A to 4 camera support
- Video conferencing
  - Unlike the existing software, it is Point-to-Point access without a server in between.
- Motion detection
  - Motion alert will be displayed whenever motions are detected and it has different levels of sensitivity.
- Remote web cam
  - It can access web cam from different locations at the same time in the same window.
- Audio supported
  - Audio is synchronized with the video.
- H.264 encoding
  - Higher quality of video with limited bandwidth, compared with other encodings.
- Codec-free audio file playing
  - Play back the security video record made earlier.

Figure 1: Basic flow of our system

Figure 2: Video capturing process for four cameras

Figure 3: Video and audio encoding process

Figure 4: Video and audio decoding process

Figure 5: Network transmission process

Figure 6: Graphical user interface

Figure 7: Screen metastasis

Figure 8: Client interface (setting and main window)