



CHAPTER 5

TYPES OF REMOTE MONITORING SYSTEM

5.1 Overview

There are three types of remote monitoring system.

- Using the computer network (LAN / WAN)
- Using dial up telephone modem
- Using the Internet

5.2 Using Computer Network for Remote Monitoring

Remote access enables viewing of live streaming video or images from any other computer within computer network (LAN / WAN) and print still frames from the recorded images. It also enables a remote computer to access images from other remote video cameras, which can be anywhere around the world, via the host computer. Figure 5.2 shows the process of transferring image from host computer to remote computer. The host computer will wait for the connection of remote computer. When the connection is established, the host computer will activate the CCTV camera that is physically connected and request for image.



The image that is received will be compressed and converted into files, which are normally the JPG format. This file will be divided into several smaller packages and then sent to the remote user until all packages are sent. This process will continue looping until it is disconnected by remote the user. Figure 5.3 shows the process of image requesting by Client computer from Host computer.

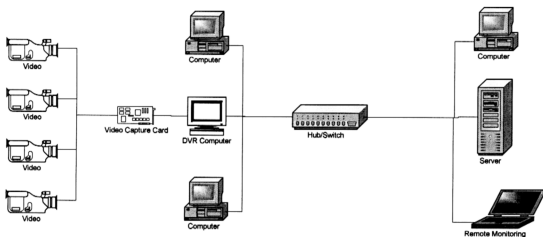
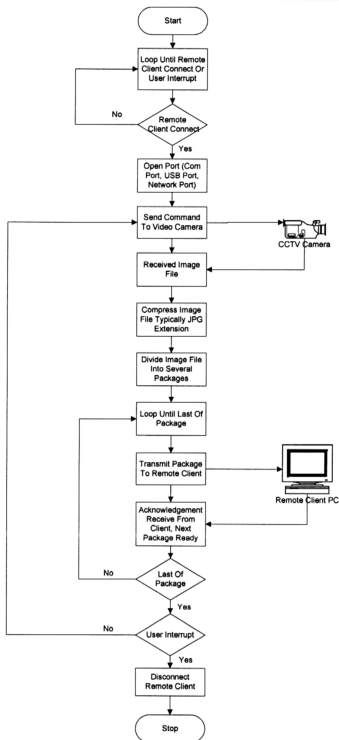
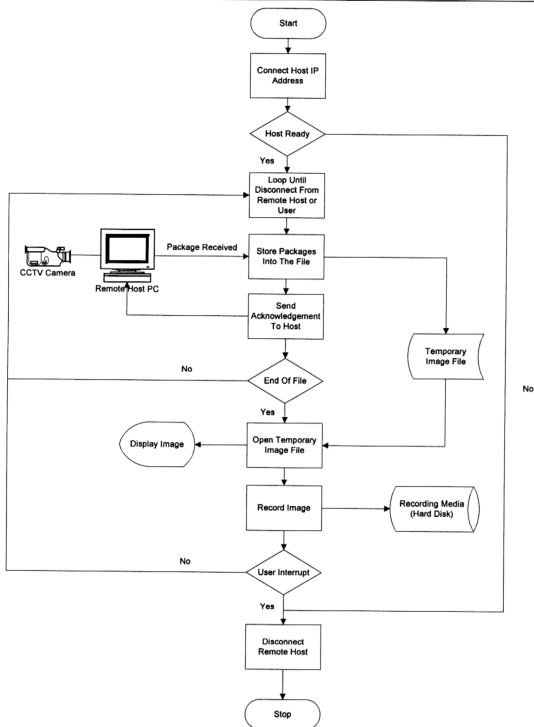


Figure 5.1 Structure of computer network



Host Computer Provide Service To Remote Client Over Computer Network

Figure 5.2



Client Request Service From Remote Host Over Computer Network

Figure 5.3



5.3 Using Dial Up Telephone Modem (Circuit Switching)

Using dial up telephone modem is simple yet flexible, whereby it does not rely on computer networks. In this method, remote clients use standard telephone line for remote monitoring anywhere in the world. It requires users to install modems on the client' and host' side.

Before data transmission, it has to run through the following steps:

1. Call set up

Dial up connection with access to host computer. If the host computer is ready to communicate, a dedicated path will be established between the client computer and the host computer.

2. Data transfer

Once the dedicated path is established, data transfer between the client computer and the host computer will occur and will be continued until the transmission is over.

3. Call termination

Once the data transmission is over and both parties agree to terminate the session, the call will be terminated. Once the call is terminated, the dedicated path will be released and can be used by another user.

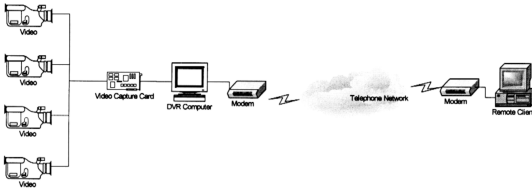
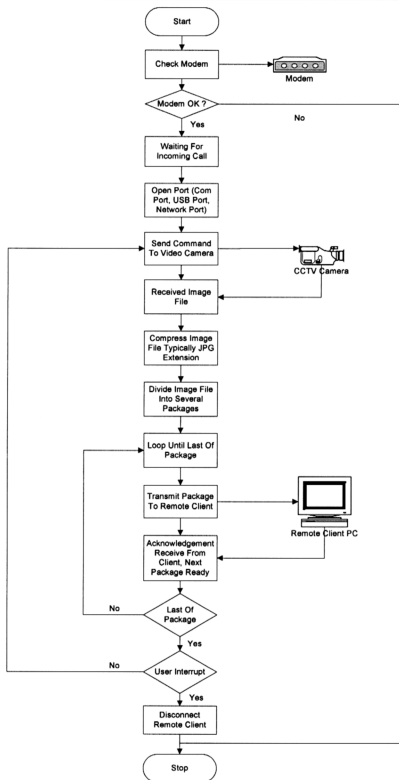


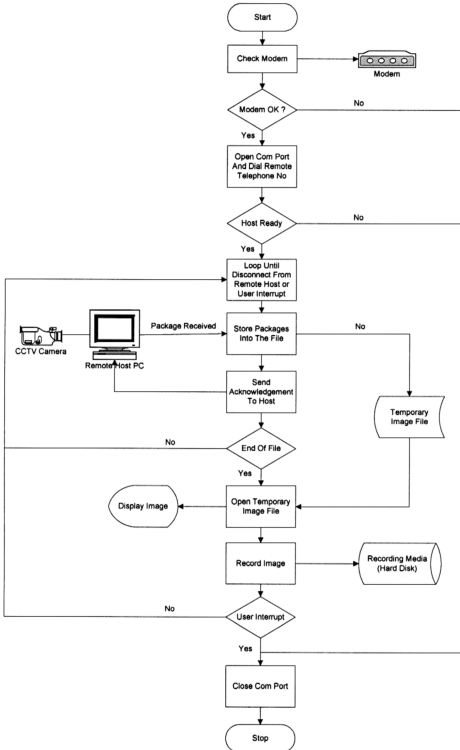
Figure 5.4 Data transmission between host computer and remote computer using modem

Figure 5.5 shows the process of transferring image from the host computer to the remote computer. The host computer will wait for the remote computer to be connected. Then the host computer will activate the CCTV camera that is physically connected to and request for images. The image that is received will be compressed and converted into the JPG format. This file will be divided into several packages and sent to the remote user until all packages are sent. This process continues looping until the remote user disconnects it. Figure 5.6 shows the process of requesting image by the client computer from host computer.



Host Computer Provide Service To Remote Client Over Telephone Line

Figure 5.5



Client Request Service From Remote Host Using Dial Up Telephone Line

Figure 5.6



In order for the remote client to function effectively, a DSL, Cable Modem or a faster mode of connection is recommended. Theoretically, these systems can be operated on a 33.6k or 56k dial-up connection but it is not recommended. This method of remote monitoring connection is definitely more flexible and relatively cheaper, however the data transmission is slower than the other types of remote monitoring system, as its speed depends on the telephone line bandwidth. The normal bandwidth of the telephone line is small whereby the standard telephone line can only support 19.2k out of the 33.6k or 56k on long distances.

5.3.1 Understand modem command

In order to develop the system, there are some of the modem commands that the developer should understand. The modem commands are required in order to establish the communication with the modem.

Below are some of the common commands that user should understand

- ❑ ATV1Q0 – Check the modem; the modem will respond “OK” when it is ready.

- ❑ ATDT + Phone no – Use this command; followed by the telephone no to dial up the connection.



- ATA – Pickup the telephone; Use this command to pickup the telephone when the phone is ringing, after you have pickup the phone, the modem will then receive the incoming data.
- ATH – Hang up the telephone; Use this command to terminate the call.

Below is an example of code written in Ms Visual Basic of how to check the status of the modem; the modem will reply "OK" when it is ready. You must include ActiveX component (Microsoft Comm Control 6.0) in the Visual Basic Library.

```
*****
Private Sub CmdConnect_Click()
Dim Buffer

MSComm1.Settings = "9600,n,8,1" 'Set the communication baud Rate
MSComm1.CommPort = 1 'Assume modem is in port 1
MSComm1.PortOpen = True
MSComm1.Output = "ATV1Q0" & vbCrLf
Do
    Buffer = Buffer & MSComm1.Input 'Receive data from modem
    DoEvents
Loop Until InStr(1, Buffer, "OK") 'Wait until modem response OK
End Sub
*****
```



5.4 Using Internet for remote monitoring

This method requires a web server for publishing the image on the Internet. It can be monitored by any computer that can run a standard Web browser (Internet Explorer, Netscape Navigator). It is simple and can be monitored by any other remote computers. However, this method only allows remote users to view the time-lapsed image instead of the real time image. Normally the application is used for subway, railway, traffic control, tourism spot visuals and weather information.



Figure 5.7 Picture captured by remote monitoring through Internet

Real time viewing of road traffic situations, allow people to prevent themselves from being caught in the traffic jam. Figure 5.8 shows the live video of traffic information from Manhattan, New York.



Figure 5.8 Live video traffic information. Manhattan, New York

Figure 5.9 show the data transmission process between the web browser and remote computer using Internet.

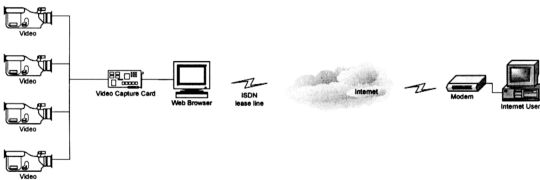
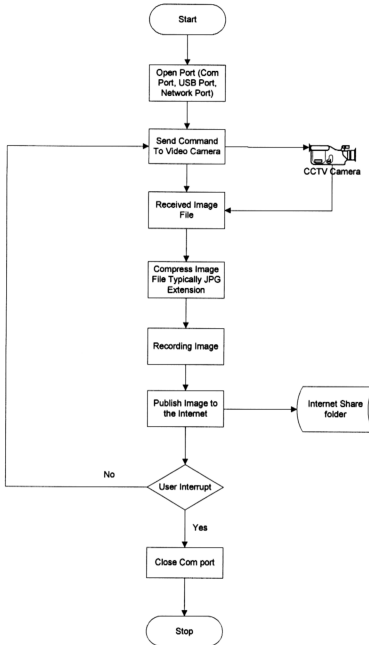


Figure 5.9 Data transmission between Web browser and remote computer using Internet



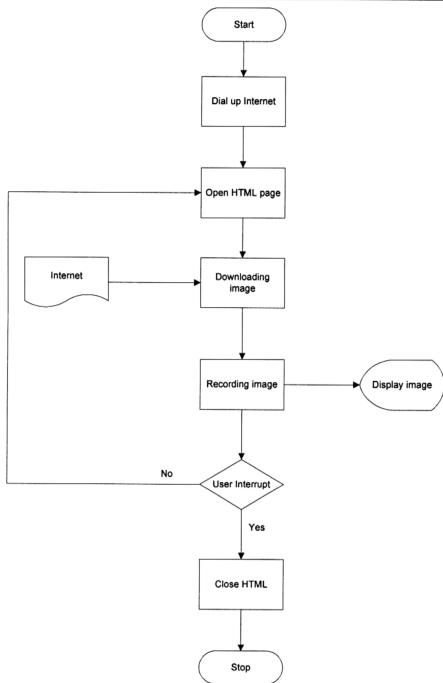
Figure 5.10 shows the process of capturing the image from the CCTV camera, recording and publishing the image on the Internet.

Figure 5.11 on the other hand, shows the process of retrieving image from web browser via the Internet.



Host Computer Provide Service To Remote Client Over Internet

Figure 5.10

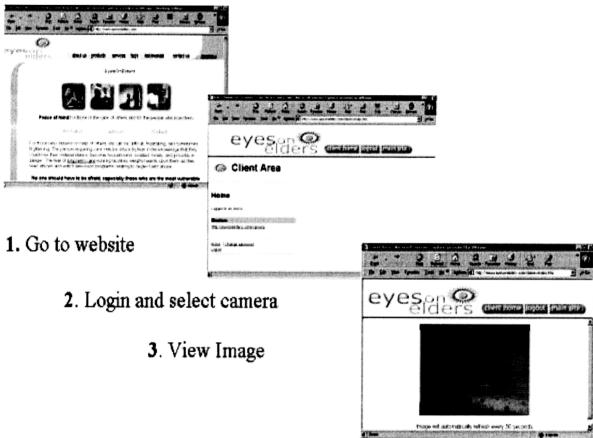


Client request service from remote host using Internet

Figure 5.11



Example of remote monitoring using Internet



1. Go to website
2. Login and select camera
3. View Image

Figure 5.12 Example of remote monitoring using Internet