Design and Development of Real Time Video Streaming using Wi-Fi based Camera Interface with Android

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Abstract— Wireless technology is very most popular communication technology, now a days a verity of users of wireless network communication and the number of users is continuously growing. Wireless network communication system has various advantages, not only the accessibility and mobility of the devices within the environment. But verity of users wants to see the video wirelessly on the mobile phone and since android operating system is most popular we need to develop a system which can display the video wirelessly over the android phone.

Key words: Serial Driver Max232, Video Streaming, Video Quality, Wi-Fi Module, LCD 16x2, PIC18F4620, Serial Camera

I. INTRODUCTION

An application which is associated with wireless communication technology and a device ID (address) which transmits its data to the wifi network and another one is android applications which will get connect with the transmitting device. This is a system for android operating system which will received data from wireless network of Wi-Fi camera module and display it to android mobile. The advantages of wireless camera is that mobility of Wireless camera is easy and can be set at any location of the office, home or open area. And the user can easily mount it at any where they want as well as they can easily change position of the surveillance wireless camera. Installation of camera on a mobile robot for mobility is also easy and it can be move anywhere as according to command. Wireless camera can be mount on any moving robot vehicle.

II. BLOCK DIAGRAM

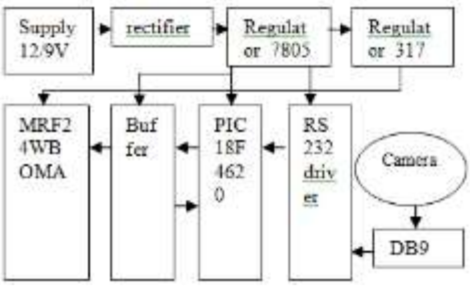

Fig. 1: Block Diagram of the system

Fig. 2: Flow chart of Transmission software system

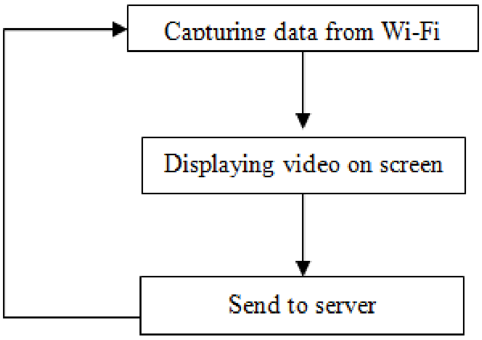

Fig. 3: Flow chart of receiving software system

III. HARDWARE DESCRIPTION

A. *Wi-Fi*

In this, The Wi-Fi APIs provide a means by which a transmitting device can transmit data and the receiver can receive it using Wi-Fi using the lower-level wireless stacks which provides Wi-Fi network access. Information from the camera device will be transmitted to the network and the android application will receive data from Wifi network and display the video on its screen.

B. *Advantage*

- Maintenance of a wireless camera is easy
- Mobility of camera throughout the area
- Wireless camera can be mount on any type of moving robot vehicle.

C. *Limitations*

- Range of Wi-Fi is limited
- Strength of Wi-Fi signal varying as per distance

The hardware section of the camera device includes the controller, camera and Wi-Fi module. 18F4620 is chosen to complete the control of receive and transmit; camera device is used to capture video and to transmit over Wi-Fi, The users can connect mobile through the camera device using Wi-Fi.

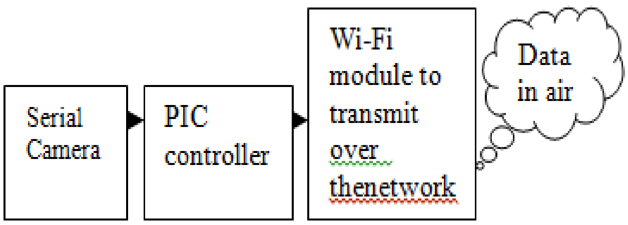

Fig. 4 Block Diagram of camera device

The system selected a microchip platform MPLAB to build the environment. And it have mainly video capture module, video compression module and video streaming module. The flow chart system software shown in figure 5.

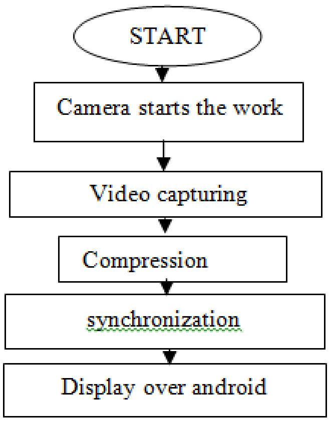

Fig. 5 Flow chart of system

D. Android Phone

In recent day's an application of android phone is most popular because of its GUI and ease of access graphical interface and easy to familiar with, and so the best part of android application is, it is easy available in market. And as result the video available on android phone is a best option for user. Android is designed primarily for touch screen mobile devices so it is again easier to adopt the system.

E. PIC18F4620 (microchip)

The controller is selected because of its Flash, RAM and two UART and the low cost in group. It is available in 40pin DIP package and has a hardware SPI bus too.

F. Quad-buffer 74HCT125

74HCT125 buffer is a quad buffer driver as well as line driver with 3-state output controlled by the output enable input (nOE). A HIGH is (1) on nOE causes the outputs to assume a high impedance OFF-state that is (0). Inputs include clamp diodes, which enables the use of current limiting resistances to interface inputs to voltages in excess of VCC.

- Working temperature(in range) : -40° C to +85° C & : -40° C to +125° C
- Power supply (voltage): 0.5V to +7 V

G. Serial Driver

MAX232 a serial driver integrated circuit which is used to convert the logic level from TTL/CMOS logic levels to RS232 logic levels during serial communication and is used during communication of microcontroller with serial Camera'.

IV. RELATED WORK

MPEG-2 provide flexibility of compression. Encoders are vary considerably depends upon the application and operating system, so it is necessary to transmit details of the encoding scheme along with the data, so the decoder can reconstruct the signal. The next steps is for JPEG compression the Discrete Cosine Transformation (DCT) and a quantization function is used as the compression; this process helps to reduces the spatial redundancy (referring to human visual perception).

In the streaming technique, the data traffic rate is adjusted There are two basic types of streaming techniques depending on whether the adaptivity is controlled by client that is receiver or the server that is Transmitter. After obtaining the correct and permitted client or say good input our android phone will start capturing the video just after the instruction provided through the android phone.

Quality for the individual-oriented technique is used to adjust the quality of experience for individual user according to the user's device capacity and network strength. So, each individual user's can have different quality of experience. The user has the authority that they want to receive the video or not.

V. SETTING OF ANDROID APPLICATION

Data processing can be allowed by selecting the name, device ID, User name and password. It is the important parameter for the device to be connect. Android application is written in a programming language. Use of the android is very common now a days. So there is need of the android setup for the device.

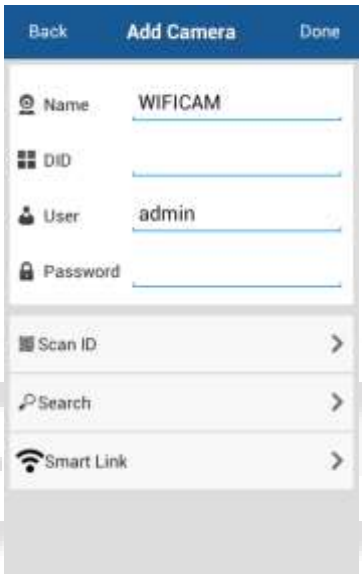

Fig. 6 setting page of the android application

VI. VIDEO ON ANDROID AND RESULT DISCUSSION

Wi-Fi captured video on android phone.

Fig. 7: captured video from Wi-Fi Camera device

Fig. 8 interfacing with hardware

VII. CONTENT PREPARATION

Client must pass the command whether they want to receive video on the android phone or not.

VIII. CONCLUSION

In this design and develop an application for android operating system which will collect the data from wifi interface of camera which will display on the screen of the android. It is real time video streaming in which the real time video streaming is send to android. In this system there is two basic parts one is the board which is capturing video processing it using PIC microcontroller and finally transmitting over Wi-Fi network. Second part of the system is displaying video, it is done using android mobile phone which is connected with the first part using Wi-Fi technology, it receives data from first part and displaying it over android phone.

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