Motion Sensor Surveillance Cam with Data Compression Technique

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Abstract: **The Basic Idea Behind "Smart Web Cam Motion Detection Surveillance System" Is To Stop The Intruder To Getting Into The Place Where A High End Security Is Required.Surveillance is becoming a need in any public or private area to cope up with increasing number of threats. In this paper we incorporate advantages of both technologies(motion sensing and data compression) to build up a smart surveillance system. PIR based security system which saves the power consumption and Data compression technique using winzip which saves memory space of the recording system has been proposed. After detection of motion by PIR sensor the webcam will be turned on. Software was developed and installed in the computer to capture and record the video when the webcam gets turned ON.The software detects the webcam connection; it will start to record and save the video. Once the intruder moves out of detection range of the sensor, the webcam gets turn OFF. The recorded data is then compressed using compression algorithm before saving to the memory.**

Keyword-Microcontroller,Motionsensor(PIRsensor) ,Winzip.
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I. INTRODUCTION

Motion sensor surveillance cam with data compression technique is a device which is useful to overcome the cons like wastage of power and storage space.After analyzing the requirements of theft detection and the changes occure while it takes place,It can be easily observed that only variation in the image captured during idle environment resulting in unnecessary wastage of power and storage space.So this demands the use of motion sensing technology for surveillance .In this we are using Motion sensor for detecting realtime motion due to which the device is only on when there is motion resulting in power saving.

The data compression technique which is going to be used also results in reduced data storage space.Some of the other features like motion alarm and security sms are also introduced for increasing the security aspects of the device.
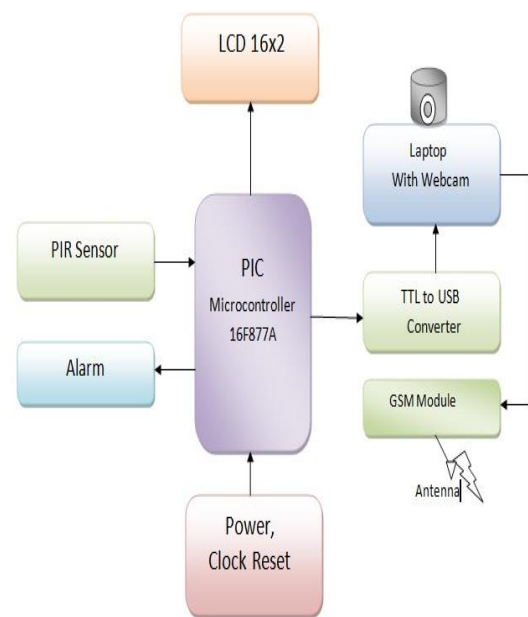
II.SYSTEM ARCHITECTURE

FIGURE.1 System block diagram

PIC16F877A which is a 40 pin microcontroller is used in above diagram. The power supply along with clock and reset are used for initialization of microcontroller. In PIC Vcc is connected to 5 V .The microcontroller requires a crystal oscillator of 11.0592 MHZ. The PIC microcontroller basically has 4 ports.

The port 1 is connected to PIR (Passive Infrared Sensor) .It requires 5V power supply. It has Fresnel lens. The maximum range of PIR sensor is about 10-15 feets .It is an electronic device which measures infrared light radiated from objects in its field of view. The main function of PIR sensor is that it senses the infrared radiations due to variation in temperature and heat. It provides quick response as compared to microwave sensor.When any moving object enters in range of PIR sensor it detects the motion and sends signal to microcontroller. Microcontrollen then sends send signal to computer to turn on the Webcam.When there is no motion for specific type then PIR sensor again sends signal to microcontroller and microcontroller to computer to activate standby mode for Webcam.

The port 2 is connected to LCD display. The LCD display is interfaced with microcontroller. The Vcc is connected to 5 V supply and a resistor of 10K is used to maintain contrast of the display. In our project we use a two line LCD display with 16 characters each. Liquid crystal Display (LCD) displays temperature of the measured element when moving object enters in PIR sensor range, which is calculated by the microcontroller. CMOS technology makes the device ideal for application in hand held, portable and other battery instruction with low power consumption.

The port 3 is connected to TTL to USB (acts like serial port). The Tx and Rx pins of microcontroller are connected to Rx and Tx pins of TTL to USB module. Further TTL to USB module is connected to the computer .The computer (Laptop) basically consist of webcam .We are using Visual Basic 6 language in our project. Visual Basic 6 is among the top 3 languages in today's world. The language not only allows programmers to easily create simple GUI applications, but also has the flexibility to develop fairly complex applications as well. Programming in VB is a combination of visually arranging components or controls on a form, specifying attributes and actions of those components, and writing additional lines of code for more functionality. We can also achieve data compression by using visual Basic 6.

The GSM modem is also connected to the computer. The GSM modem requires 12 V supply. We have to insert a sim card within the GSM module. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem sends security sms on respective number as it gets signal from microcontroller through computer.

The port 4 is connected to Relay. It requires 12 V power supply. The simplest relay,is the Single Pole, Single Throw (spst) relay. It is nothing more than an electrically controlled on-off switch. It's biggest property, is the ability to use a very small current, to control a much larger current. This is desireable because we can now use smaller diameter wires, to control the current flow through a much larger wire, and also to limit the wear and tear on the control switch. Finally the relay circuit is connected to alarm (buzzer).When microcontroller gets motion detection signal from PIR sensor it sends signal to relay to be in On state and as the alarm is connected to it ,the alarm turns on. This alarm produces a high intensity sound which is very useful for security purposes.

A.Data compression Unit
In this unit we use compression algorithm to compress the video feed which is going to be saved.This helps to achieve the goal of saving the data storage space.The deflate algorithm is the most commonly used compression which compresses the data without decreasing the quality of video or image.WINZIP is a compression software which uses deflate algorithm for compression hence in this unit we use Winzip which is interfaced with the help of Visual Basic for compressing the video feed
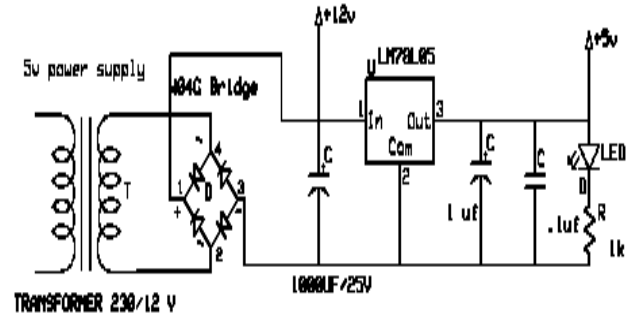
B.Power Supply Unit

FIGURE 2 Power supply unit

In our project we are using a power supply which converts 230 V A.C supply into 12 V by the means of step down transformer. The main functional blocks of power supply are step down transformer , rectifier unit ,filter circuit and voltage regulator. Rectifier unit is a circuit which converts A.C. into pulsating D.C. Generally semi-conducting diode is used as rectifying element due to its property of conducting current in one direction only. Filter circuit is used which removes (or filters out) the A.C. components reaching the load. Obviously a filter circuit is installed between rectifier and voltage regulator. In our project we use capacitor filter because of its low cost, small size and little weight and good characteristic. Capacitors are connected in parallel to the rectifier o/p because it passes A.C. but does not pass D.C. at all. A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level. It may use an electromechanical mechanism, or passive or active electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages

C.MICROCONTROLLER(PIC16F877A)
The 16F877A is one of the most popular PIC microcontrollers and it's easy to see why - it comes in a 40 pin DIP pinout and it has many internal peripherals. The 40 pins make it easier to use the peripherals as the functions are spread out over the pins. This makes it easier to decide what external devices to attach without worrying too much if there enough pins to do the job. One of the main advantages is that each pin is only shared between two or three functions so its easier to decide what the pin function (other devices have up to 5 functions for a pin). A disadvantage of the device is that it has no internal oscillator so you will need an external crystal of other clock source.

D. PIR SENSOR
A Passive Infrared sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from

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objects in its field of view. PIR sensors are often used in the construction of PIR-based motion detectors .Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with another temperature, such as a wall .All objects above absolute zero emit energy in the form of radiation. Usually infrared radiation is invisible to the human eye but can be detected by electronic devices designed for such a purpose.

E.Winzip

It is a software used for compressing(zipping)the file as well as unzipping it.when a file is added to this software it Zips that file and stors at specific location and in this way saves disk storage space. Zip files (.zip or .zipx) are single files, sometimes called "archives", that contain one or more compressed files. The Zip format is the most popular compression format used in the Windows environment, and WinZip is the most popular compression utility.

Compression algorithms used: The .ZIP File Format Specification documents the following compression methods: stored (no compression), Shrunk, Reduced (methods 1-4), Imploded, Tokenizing, Deflated, Deflate64, bzip2, LZMA (EFS), WavPack, PPMd. The most commonly used compression method is DEFLATE

III. CONCLUSION

To meet a common demand of prevation of theft and other malpartices Also the problem excess power consuption and requirement of excess data storage space can be tatically eliminated by our project . This can contritube although with little steps to the global crisis of power shortage due to unequal consumption .

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