The Online Home Security System: Ways to Protect Home from Intruders & Thefts

Pallavi S. Bangare, Ashwini Pote, Sunil L. Bangare, Pooja Kurhekar, Dhanraj Patil

Abstract— Now-a-days security has been a major issue where crime is increasing and everyone wants to take proper measures to prevent intrusions. Existing security systems are more towards providing passive security system, but this project is aimed at developing the security of home against intruders, fire and smoke. The main concern is home monitoring, appliances controlling, SMS notifications, sensors based alert system, door latches management from remote areas. Using this system, one can manage his home safely from remote places. One can see the present view of the home through the assigned site and can control home.

Keyword—Home security, intruder, monitoring, controlling, remote.

I. INTRODUCTION

The main aim behind development of the project is providing the security of home against intruders, gas leak and fire. If any one of the above three cases is met when the user is out of the home, then the system will automatically update the specific data on the website hosted on the virtual directory. Existing system for security are passive and costly. The Online Home Security System aims to provide security in such a way that user can monitor his home and at the same time can control for any bad situations occurring at home. The system makes use of a website which will be assigned a static IP address, so that it will be used for a dedicated purpose. This website will be hosted on a virtual directory. The main component use for the purpose of appliances controlling is relay circuit.

II. EXISTING SYSTEM

Some of the existing systems are:

A. Video-Registrar

This product allows saving images from webcam or other video capture device, starting on motion detection or constantly with given time interval. Possible to save the defined amount of shots after motion has been detected. The built-in viewer allows viewing cam shots in manual mode and conduct searching mode with given speed [5]. The first system i.e. Video Registrar just captures images when it detects any motion of objects. It is not possible to view the changes online. It can store the data which is possible to be retrieved only after you get back home and see it. It can be thought of like an 'answering machine' on telephone.

B. Net Video Spy

Video-surveillance system that allows to monitor remote locations using local network or Internet [5]. This system is an online system which shows surveillance on line. It is somewhat similar to Online Home Security System from the point of view of surveillance but it is dissimilar from the point of view of controlling the system. OHSS provides controlling online.

C. CSSS Video

CSSS is Computer Software Security System. After motion detection, program do many operation (play sound file (siren), record sound, video or camshot, call by telephone, by Skype, send emails) [5]. This system i.e. CSSS video does the work of monitoring but control measures provided are to inform the user via emails or telephone calls. It does not enable user to control online.

D. Security Alarm System

It Shows line alarm. It provides higher alarm sound [5]. This system i.e. alarm system just rings an alarm for the part of security such as in case of fire. It does not provide monitoring. As stated above, existing systems provide only surveillance as a part of security. Online Home Security System not only provides surveillance through web cam but also provides controlling of devices.

The remote PC, mobile or computer is connected to the home PC, which is our server, through modem. And the server is connected to the custom built circuitry. All the home appliances are connected to the circuitry. Through this circuitry, the appliances get operated. The monitoring of the home will also do from remote places without physical presence of the person.

III. SYSTEM ARCHITECTURE

Revised Manuscript Received on February 06, 2013.

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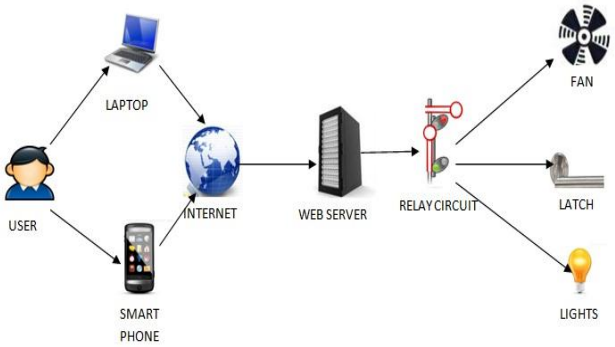

Fig. 1 Architecture of home security system

The proposed system layout is explained as below:

1) The user will enter the specified IP in any workstation like mobile, PC, and laptop.
2) The user will get access to the web server through the internet and the server is connected to the internet through modem.
3) The relay circuit which will do job of turning ON/OFF the appliances is connected to the server.
4) All the home appliances (fan, latches, bulb and lights) are connected to the relay circuit. As user will fire any ON/OFF command, the relay circuit will change its state and will function respectively.
5) The camera mounted on stepper motor will capture views of the room and it will be first stored in virtual directory of web server.
6) The streaming of the videos will be available to the user through this virtual directory depending on the need of the user.
7) Sensors will be installed for sensing temperature, smoke and fire. These sensors will sense the bad situations and will notify to the user about it through SMS.
8) The intrusion detection system will also add for the better security of home. It will detect the entry of intruder and will notify to the user through SMS.

IV. DESIGN COMPONENTS

A. Software Components

1) **ASP.Net:**ASP.net is fastest, most efficient, most reliable and best supported way to create interactive web applications available today. Combined with the development tools available from Microsoft, it is incredibly easy to create websites that looks great and performs well. Best of all, most of the "plumbing"(security, data access, lay out and so on) is taken care of by the .net framework.
2) **MySql Server 2005:** For to save the login details and temperature of the rooms and etc, the database is needed. MySql server is one of the best database server. The stored details can be used in future also, so storing is main part of any project.

B. Hardware Components

1) **Stepper Motor:** It is a brushless DC electric motor that divides a full rotation into a no of equal steps. Stepper motors effectively have multiple toothed electromagnets arranged around a central gear-shaped piece of iron. The electromagnets are energized by an external control circuit such as microcontroller. This motor is used for to rotate the webcam so that all views of the room can be captured.[3]
2) **Webcam**: For keeping eye in the home, the camera is used. Web camera will capture all the views of the home as it will rotate in 360˚. The webcam is installed on stepper motor. The captured views will display on users remote workstation when he will enter the IP.
3) **Electromagnet:** The electromagnets are used in the latches. The electromagnet has north and south poll. When the latch is close, the electromagnet poll will get attracted to each other and when the circuitry moves, the doors automatically get opened.
4) **Relay Circuit:** A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used [7].
5) **LDRs**: LDR is Light Dependant Register is useful in light sensor circuit. When the light level is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Consequently the LED does not light. The LDRs are going to use in intruder detection module for detecting the intruder.
6) **Modem:** It is a communication device which allows computer to communicate with other computers over a communication link. The modem receives the command signals sent to the local server from the remote PC. The modem is directly connected to the local server & acts as a connection between the local sever & the internet. The modem used in the system can either be a wired or a wireless modem [5].
7) **Local Home PC Server:** The home PC will act as a server. The server will store all the captured videos and the photos. When the user will enter specified IP on his workstation then the captured videos will get display on workstation. The monitoring and controlling will also be done by this server.
8) **Mobiles/ Workstations:** Workstations can be any device which user is using for remotely accessing the assigned IP or website. The workstation can be mobile, laptop, PC or etc.
9) **Home Appliances:** The home appliances must be connected to the main power supply for turning on/off. The appliances can be anything like fan, light; bulb and etc the more appliances can easily be got added and worked.

V. MODELS

There are five modules in this project. They are

1) Home Monitoring Using Camera: The above is the general model of the system that is going to be developed. This is the home model. In the centre of the home, one webcam is installed on stepper motor which will rotate in all the way. The computer/ web server is kept in home in one private room where it is impossible to play with server. The relay circuit which is the main circuitry of the project is also connected to the web server. The user who wants to watch live streaming of the home will first access the web server through the static IP allocated. In this way, the connection will be established between the

user and the home. The cameras are continuously saving the video streaming of the home in the virtual directory. When user tries to access live footage, he is able to see this streaming through web server and internet.

2) Appliances Controlling: Appliances will be controlled online through relay as shown in the above architecture. The appliances are connected to the relay circuit and to the power supply. The relay circuit which is the main component for controlling appliances is connected to the web server. The user selects the option for controlling appliances on the web site hosted. After selecting the option of appliances controlling, the command is passed to the web server via internet. The user has to select which appliance is to be controlled. Depending on the choice of the user, the web server forwards commands to switch that particular device ON/OFF to the relay. The relay circuit acts as an electrical switch. As a result, the state of the electronic device is changed as per the user's command. Each device will be connected to an independent relay circuit [6].

3) Automated Latching: The electromagnets are used in the latches. This feature also uses relays for it's working. When the user selects the option for closing the latch, the electromagnetic field is activated. The electromagnet has north and South Pole. On the activation of electromagnetic field, the north and south pole try to attract each other and hence the latch is closed. When the latches have to be opened, the user switches OFF the relay circuit. The electromagnetic field is deactivated and as a result, the magnets try to repel each other and hence the latch is opened.

4) Sensors Based Alert System: For sensors based alert system we are using readymade sensors which are easily available in market. But instead of blowing alarm in the home, the notification will get send to user on his mobile indicating fire, smoke alerts.

5) Intruder Notification: The intruder detection system has LDRs and LEDs. As shown in below fig, the LDR is placed in one of the corner of home. And we are using the laser torch and mirrors for passing the rays to all over the home. When any intruder is entered, the rays beam will get disconnect and the LDR will give signal that some intruder has entered inside so it will blow its alarm. In this way the intruder detection will get done. Instead of this circuitry, we can use the LDRs in the four corners of the house for more safety purpose.

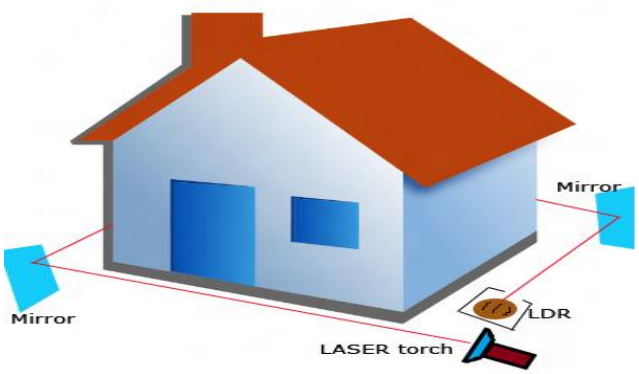

Fig 2. Sample model of the system

VI. ADVANTAGES

- **Cheaper Cost:** The components used for development of this project are comparatively cheaper. Hence this makes the project of lower cost.
- **More Security:** The security systems which are available in the market at this cost provide limited features i.e. they either provide monitoring or controlling. This project provides both features combined as it is possible to monitor and control at the same time.
- **Controlling From Remote Places:** It is possible to exercise control over the security system at home when user is at the remote places. A user just needs to have a smart phone or laptops with internet connection. Hence it provides convenience to the user.

VII. LIMITATIONS

- **Need of Internet Connection:** One of the basic limitations is that the system needs internet connectivity at the client side and the server side. If the system fails to connect to the internet then it is not possible to monitor and control the security system.
- **Need of Power Supply:** Another important limitation is power supply at the place where security system is installed. The entire system (web server, relay circuit, appliances etc) is completely dependent on power supply for it's working. Thus the system will fail if power supply is cut even for a short time. This limitation can be overcome through the use of generators and inverters.

VIII. APPLICATIONS

- **Monitoring:** The online surveillance that can be seen from remote areas is the main aim of the project.
- **Appliances Controlling:** Various appliances at home can be switched on and off through the system. The addition of any appliances to the project is easy.
- **Help for the Disabled:** If any of the disabled i.e. old people, children or pets are locked into any room, the remote user can watch it and unlock the doors from their location without physical presence.
- **Energy Saving:** This is an added advantage to the system. Any electronic appliance that is left ON can be switched OFF through workstations. This helps in saving energy.

IX. CONCLUSION

The basic vision of the system is to provide a convenient & secure system to the user, which would aid the high degree of mobility & control, people aim to achieve nowadays. The system can be made efficient by modularizing each and every component of the system hence ensuring that it can be integrated with a varied range of devices.

ACKNOWLEDGMENT

This work is supported by S.T.E.S.'s Sinhgad Academy of Engineering. We are thankful to Dr. A. G. Kharat, Principal, Col. Prof. O. P. Misra & Dr. C. B. Bangal, Vice Principal, Prof. A. N. Adapanawar, HOD-IT for their support and guidance.

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