

SMART CCTV CAMERA MONITORING SYSTEM USING IOT

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ABSTRACT

Safety and security are major concerns in modern day era. People employ security mechanisms safe guard their property be it home or a company. Present security systems involve the use of various sensors for motion detection and cameras for video surveillance i.e, Perimeter Intrusion Detection Systems. This project aims at providing one such idea to ensure safety and security of one's own property. In this paper we propose to provide a Smart CCTV Surveillance system with intrusion detection. Multiple USB cameras are installed different locations for live streaming and monitoring purposes. This system performs face recognition authentication procedure and alerts the owner when an unknown face is detected by sending an email with the snapshot of unknown face and a SMS. Live feed from multiple cameras can be viewed through smartphones, computer. Closed circuit TV systems have recently become an indispensable part of daily life. Cameras are of vital importance as significant elements of security systems in different buildings such as houses, stores and shopping malls. IP technology contributed to the development of security systems which witnessed rapid improvements in terms of smart image analysis Recent security camera systems with smart video analysis deserve a vital purpose. This study focuses on designing a smart security camera system.

I. INTRODUCTION

The project Smart CCTV camera skinter system is to enhance the CCTV camera based security systems, which presently exist in different places. The Project Security System by using CCTV Camera is designed using wireless technology. The use of a system for image and motion detection is becoming more important. An embedded system is frequently used in the home office or factory for image processing of the system and also for traffic monitoring but this configuration requires a high performance core, which works against some advantages of embedded systems, such as low power consumption and low cost. Some designs propose the use of different sensors to track the sequence of the human body movement. Other researchers construct an external signal to trigger the embedded surveillance system by means of a PIR sensor, which is triggered when an intruder enters the monitoring area. The project basically consists of surveillance unit and control unit. This project will works in two modes: Manual mode and automatic mode. In automatic mode PIR sensor will detect person movement and will give signal to the microcontroller to start the CCTV camera by using relay. IR sensor will track the person movement and give the signal to micro controller. Accordingly stepper motor will be actuated to rotate the CCTV assembly. And in manual mode we will use keypad for the movement of CCTV camera in manual mode Control unit consist of micro controller, LCD to see the messages, buzzer and LED for indication, Keypad will be used in manual mode for the controlling movement of the CCTV camera will be used for voltage conversion between RF module and microcontroller. There are two challenges need to be careful respect. Our first challenge of this project is that the address of every device should be stored and second task will be records storing, as a large number of plans were joining a information will essential to store used for which huge storing capacity is mandatory. Later information has been together himself or herself essential to kind definite that safety rules were in dwelling like extra as well as additional individual data would be linked since device which not able to come to be broken as well as information shall not able to come to be in fingers of cuts. A solution to stop burdening of the server works is making an image recording devices that would record such image when it is needed. The web camera will record image when intruder is entering a room, in this case the web camera will be detects and captures the motion.

II. LITERATURE REVIEW

CCTV based surveillance has developed from simple systems comprising a camera connected directly to a viewing screen with an observer in a control room, watching for incidents of crime or vandalism or searching for targeted individuals, to complex multi camera systems with many computers.

The project Smart CCTV camera surveillance system is to enhance the CCTV camera based security systems, which presently exist in different places. The Project Security System by using CCTV Camera is designed using wireless technology. For the object detection no need of multiple camera only single camera cover large area. As the number of camera increases also the cost increases therefore in this project single camera is used for cost effectiveness.

The objective of this project is to develop a system that monitors the area in which it is being implemented. An Intelligent Monitoring Sensor is applicable in the area where no one is permissible to enter, also where we need to detect if any motion has been done. Camera used here is not movable. it is fixed in the monitoring area also the camera is continuously on.

In this project in automatic mode PIR sensor will detect person movement and will give signal to the microcontroller to start the CCTV camera by using Relay. IR sensor will track the person movement and give the signal to micro controller. Accordingly stepper motor will be actuated to rotate the CCTV assembly.

III. SYSTEM ENGINEERING

3.1 EXISTING SYSTEM

- CCTV (CLOSED – CIRCUIT –TELEVISION) is a monitoring system comprised of recording devices that are not publicly distributed . Surveillance camera are directly connected to private monitors and recording devices for immediate viewing and storage. The primary use is for home or office security.
- Disadvantages of CCTV is the cost. Cameras , monitors , recording devices , and other equipment cost start to add up.
- One has to monitor in screen what happening around the surveillance.

3.2 DISADVANTAGES OF EXISTING SYSTEM

- Privacy is an issue
- It can be a costly affair
- They can be vulnerable

3.3 PROPOSED SYSTEM

IoT in peoples be in this world had numerous benefits assisting personals, big business as well as on ordinary source. IoT in peoples be in this world had numerous benefits assisting personals, big business as well as on ordinary source. This could be precise advantageous to combine IoT into safety schemes besides the purpose of the project is to combine IoT in safety structures to notice gesture, like every day when himself or herself were at activity you would be capable to observe then got warnings condition some action occurs at his or her house. Every operator who is knowledgeable in the existing system may deliberate of a system that may add more flexibility plus run with some common applications such as android. This work is aimed in such a way to escape the disadvantages of the existing system. The proposed arrangement supports more elasticity, relaxation capacity and protection. The further most important benefit i.e. here arrangement would had above the additional exists i.e. it will form the handlers arrangement not heavy. Here system in view is not at all requiring having machineries next to mutually finishes toward acquire the wanted result. Therefore aimed at house handlers the arrangement will be shown on the way to stay of significant usage like that one devours less power utilization besides too originates by a small charge. This development purposes to make simpler indication finding as well as the crossing point to be there customer approachable, whichever will show result in notices once indication be present noticed. The library has than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and IOT . These algorithms can be used to detect and recognize faces, identify objects, more classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database,

remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc. OpenCV has more than 47 thousand people of user community and estimated number of downloads exceeding 18 million. The library is used extensively in companies, research groups and by governmental bodies. It has C++, Python, Java and MATLAB interfaces and supports Windows, Linux, Android and Mac OS. OpenCV leans mostly towards real-time vision applications and takes advantage of MMX and SSE instructions when available. A full-featured CUDA and OpenCL interfaces are being actively developed right now. There are over 500 algorithms and about 10 times as many functions that compose or support those algorithms. OpenCV is written natively in C++ and has a templated interface that works seamlessly with STL containers.

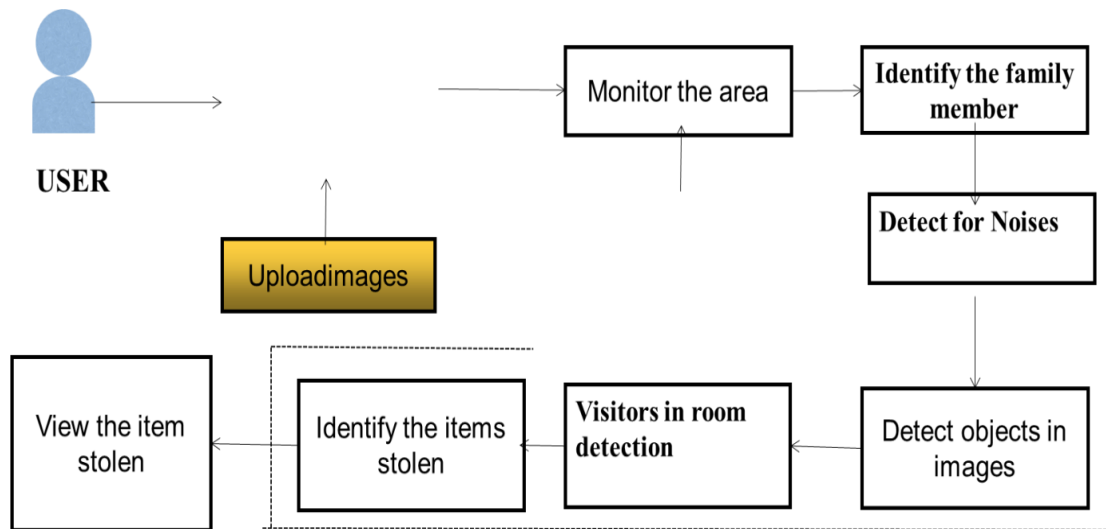
- A stand alone computer which will capture real time stream of images through web cam .
- A background program continuously running to capture the images.
- Capture any change detection.
- Categorize change detection.

3.4 ADVANTAGES OF THE PROPOSED SYSTEM

- Add Security & Safety to Each Corner
- Consistently Monitor Activities & Movement
- Make Correct, Evidence Driven Decisions
- Stay in Control

IV. SYSTEM DESIGN

4.1 SYSTEM ARCHITECTURE



4.2 SYSTEM REQUIREMENTS

4.2.1 Software Requirements

- python interpreter
- operating system-windows/ubuntu/Linux
- technology used: python
- libraries (open cv)

4.2.2 Hardware Requirements

- 12MB RAM
- processor i3
- hard disk- 10GB

4.3 MODULES

- Human Motion detection
- Change detection

4.3.1 Human motion Detection

- In my project, various algorithm in 1 is implemented for change detection.
- Once change is detected than segmented image is moved to second part that is human motion detection.
- Further than various algorithm in 56 will be used to categorize the motion of human and identify that change is occurred due to human only or not.

4.3.2 Change Detection

- Change Detection comprises of online detecting of any change taking place.
- Change Detection must be luminous invariant background, false change detection invariance.
- Change detection is done in static web camera if someone moves web cam than it can lead to false change detection.

V. SYSTEM ANALYSIS

5.1 INTRODUCTION

Design is a meaningful engineering representation of something that is to be built. It is the most crucial phase in the developments of a system. Software design is a process through which the requirements are translated into a representation of software. Design is a place where design is fostered in software Engineering. Based on the user requirements and the detailed analysis of the existing system, the new system must be designed. This is the phase of system designing. Design is the perfect way to accurately translate a customers requirement in the finished software product. Design creates a representation or model, provides details about software data structure, architecture, interfaces and components that are necessary to implement a system. The logical system design arrived at as a result of systems analysis is converted into physical system design.

5.2 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. we believe that once our device is implemented, it will be well accepted by the society. Economic feasibility analysis is the most frequently used method for evaluating the effectiveness of a new or proposed system. More commonly known as cost/benefit analysis, the procedure is to determine the benefits and savings that are expected from a candidate system and compare them with the costs needed to be spending for implementation and operation. In case, Economic feasibility analysis is the most frequently used method for evaluating the effectiveness of a new or proposed system. More commonly known as cost/benefit analysis, the procedure is to determine the benefits and savings that are expected from a candidate system and compare them with the costs needed to be spending for implementation and operation. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential. Three key considerations involved in the feasibility analysis are

- Operational Feasibility
- Economic Feasibility
- Technical Feasibility

VI. FUTURE ENHANCEMENTS

This system has a wide range of uses in various fields, such as banking, forensic department, etc. Reason this system is quiet useful is due to the fact that it is highly compact and it provides human motion and change detection and an instant notification about the same through email. In addition to this change to the recognition can also be tried in future. Recognition is the main part of any security system. Usually for a best recognition system, we require a well-trained database, which can provide the base for our recognition. So to obtain the database, first collect the images of the subject individual for the recognition. Once we obtain and train our system, we can provide human motion detection recognition.

VII. CONCLUSION

The Project Smart CCTV camera Monitoring system is designed using wireless technology. This project is basically design for providing a security in different areas like the literary, banks, and industries etc and also save the power, memory required for the CCTV and CCTV footage respectively.

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