Remote Authenticated System based on A Wi-Fi Controlled Robot using Raspberry Pi

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Abstract **-** Computer Vision is the emerging technologies now days. To reduce the man power for security aspects in this project a Surveillance system has been implemented using a single board computer i.e. Raspberry Pi 3 which will act as the CPU in which we will do the coding part using Python and a module named Open Source Computer Vision (OpenCV). A local database of the authorized person is been made which has the images of all the persons who are authorized to enter that security area. A Remote Control robot is used to detect the person who enters the area, camera will act as the computer vision which will automatically take the image of the person compare with the local database if the person matches it display authenticated and if the person is unauthorized then it will give an alert and the image of the unauthorized person is displayed on the web page. Also a webpage is made which will show the unauthorized person image. This image will be stored in the apache server where we have our web page.
In this project OpenCV module of python plays a key role to recognize the person if the person the authorized or unauthorized

Keywords - Raspberry pi3, Open CV

I. INTRODUCTION

Computer vision is a field of computer science that works on enabling computers to see, identify and process the images in the same way that human vision does and then provide appropriate output. It is like importing human intelligence and instincts to a computer.
In reality though, it is a difficult task to enable computers to recognize images of different objects. Computer Vision and Image Processing are like cousins, but they have quite different aims. Image Processing techniques are primarily used to improve the quality of an image, convert it into another format (like a histogram) or otherwise change it for further processing. Computer Vision, on the other hand, is more about extracting information from images to make sense of them. So, you might use Image Processing to convert a color image to gray scale and then use Computer Vision to detect objects within that image.
If we look even further up the family tree, we see that both of these domains are heavily influenced by the domain of Physics, specifically Optics. On the Other side like other great technological shifts throughout history, the Internet of things is changing the way we work, the way we play, the way we learn and the way we organize societies. It has the potential to make us better informed, healthier, more productive, and more connected; and it introduces new challenges for privacy, safety and regulation.
Apart from causing tragic loss of lives and valuable natural and individual properties including thousands of hectares of forest and hundreds of houses, fires are a great menace to ecologically healthy grown forests and protection of the environment. Every year, thousands of forest fires across the globe cause disasters beyond measure and description. This issue has been the research interest for many years; there are a huge amount of very well studied solutions available out there for testing or even ready for use to resolve this problem.

II. BLOCK DIAGRAM

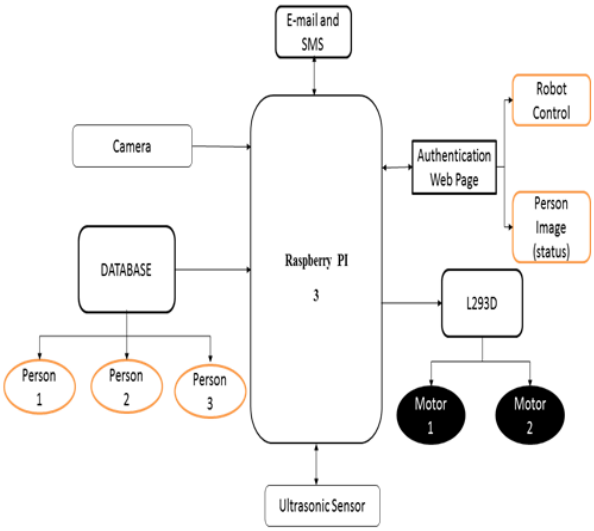


Figure 1: System block diagram

System Overview - The above block diagram explains the hardware additives used in this undertaking. Right proper right here a unmarried board pc i.e. Raspberry pi 3 is used acts as a CPU with a pace 1.2GHz of ARMv8 (BCM2837) microprocessor with 1GB of RAM. So you'll be programmed with the python software program application. The use of the virtual camera a database is made for the authentication purpose, L293D riding strain circuit is used to stress the robot automobiles. An net internet web page authentication is advanced to govern the robot wirelessly and to expose the picture (recognition) on the internet page.
A motor controller is also attached to the Pi to control the movement of the RC car. A web interface was created to

provide both live video streaming and RC controller panel for the user. Via this interface, the user is able to watch the live video while navigating the area by remotely controlling the car's movement. For power supply, the Pi is connected with a 37wh power bank that delivers 5v and 2.1amper, while the RC car is powered up by 3 AA batteries.

A. Hardware - The Raspberry Pi hardware has superior via several versions that feature versions in memory capability and peripheral-tool help. This block diagram Describes version B and B+; model A, A+, and the Pi zero are similar, However lack the Ethernet and USB hub additives. The Ethernet adapter is internally related to a further USB port. In version A, A+, and the Pi zero, the USB port is attached proper away to the tool on a chip (SoC). At the Pi 1model B+ and later models the USB/Ethernet chip consists of a 5-element USB hub, of which four ports are to be had, at the identical time as the Pi 1 model B awesome gives . At the Pi 0, the USB port is likewise associated right away to the SoC, however it makes use of a micro USB

B. Processor - Broadcom BCM2835 SoC used within the first technology Raspberry Pi is as an possibility equal to the chip carried out in first current-day generation smart telephones (its CPU is an older ARMv6 form), which includes a seven hundred MHz ARM1176JZF-S processor, video middle IV images processing unit (GPU), and RAM. It has a degree 1 (L1) cache of sixteen KB and a level 2 (L2) cache of 128 KB. The extent 2 cache is used basically thru manner of the usage of the GPU. The SoC is stacked under the RAM chip, so amazing its element is visible.

C. Operating Systems - The Raspberry Pi foundation recommends using Raspbian, a Debian-based totally absolutely certainly Linux taking walks device. Considered certainly one of a type 0.33-party on foot systems to be had through the dependable net internet page encompass Ubuntu MATE, home domestic home windows 10 IoT center, RISC OS and specialized distributions for the Kodi media centre and observe room control.

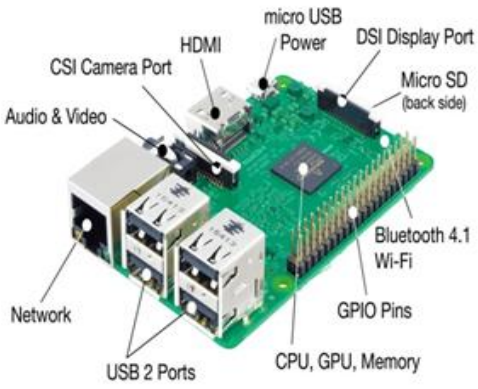


Figure 2: Raspberry pi 3 model B

III. FLOW DIAGRAM

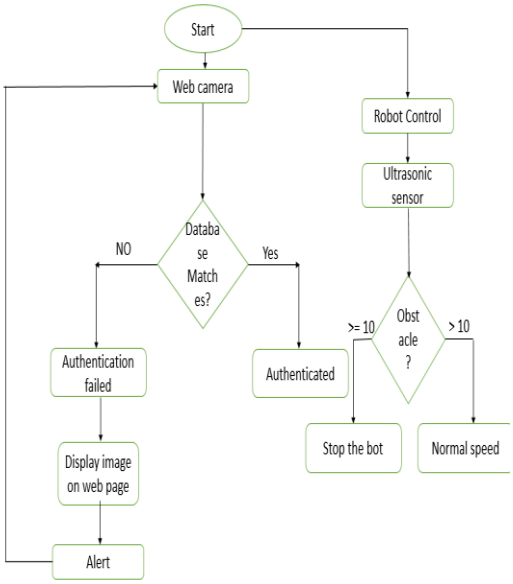


Figure 3: Flow chart

Introduction to Computer Vision - Computer Vision is the process of using machines to understand and analyze imagery (both photos and videos). While these types of algorithms have been around in various forms since the 1960's, recent advances in Machine Learning, as well as leaps forward in data storage, computing capabilities, and cheap high-quality input devices, have driven major improvements in how well our software can explore this kind of content Think of an image as a giant grid of different squares, or pixels (this image is a very simplified version of what looks like either Abraham Lincoln or a Dementor). Each pixel in an image can be represented by a number, usually from 0 – 255. The series of numbers on the right is what software sees when you input an image. For our image, there are 12 columns and 16 rows, which means there are 192 input values for this image

A. DC Motor - DC motors are configured in abounding types and sizes, including besom less, servo, and accessory motor types. A motor consists of a rotor and a abiding alluring acreage stator. The alluring acreage is maintained application either abiding magnets or electromagnetic windings. Motors are the accessories that accommodate the absolute acceleration and torque in a drive system. This ancestors includes AC motor types (single and multiphase motors, universal, servo motors, induction, synchronous, and accessory motor) and DC motors (brush less, servo motor, and accessory motor) as able-bodied as linear, stepper and air motors, and motor contactors and starters.

B. Camera - Once abduction by the pc, the video beck could as well be saved, beheld or beatific on to altered networks via systems like the net, accessory degreed email as an attachment. Once beatific to a abroad location, the video beck could as well be saved, beheld or on beatific

there. During this activity we accept a addiction to aboveboard and measurement acclimated this camera for capturing the signatures and beatific to server area through zigbee advice for angel allegory and action on MATLAB in server section. Hence the camera is that the affection of this project

C. DC Motor with L293d Motor Driver -

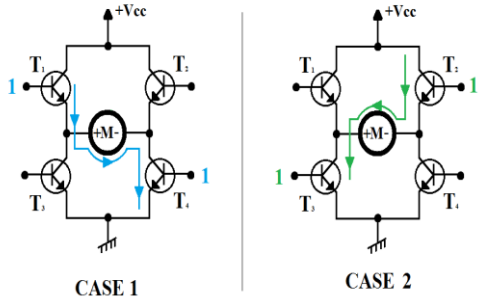


Figure 4

For this project, the RC car used has dimensions of 18cm x 11cm x 10cm, scale of 1:24. It requires 3 AA batteries and has 2 motors that control the forward, backward, left and right movements.

D. HC-SR04 Sensor - HC-SR04 is an ultrasonic ranging module that provides 2 cm to 400 cm non-contact Measurement function. The ranging accuracy can reach to 3mm and effectual angle is < 15°. It can be powered from a 5V power supply Send for connecting directly to internet. GPRS module will help us to post data in the web page directly.

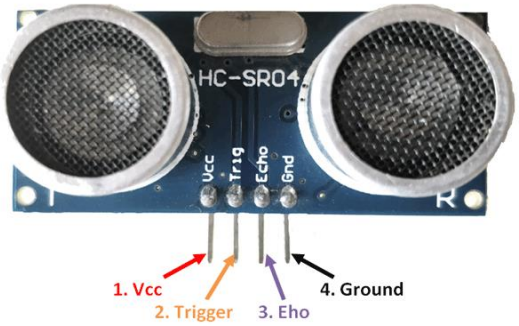


Figure 5

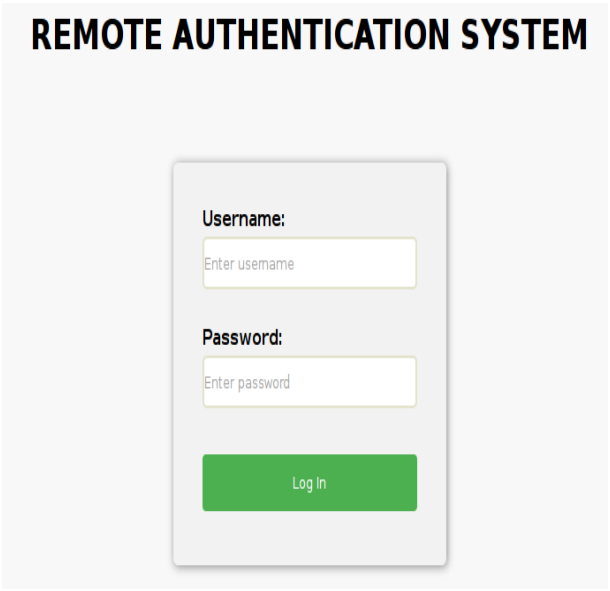
IV. IMPLEMENTATION

In this project a combination of Computer vision is used to implement a security remote control robot system. A Remote Control robot is used to detect the person who enters the area, camera will act as the computer vision which will automatically take the image of the person and compare with the local database if the person matches it display authenticated and if the person is unauthorized then it will give an alert and the image of the unauthorized person is displayed on the web page.

Also a webpage is made which will show the unauthorized person image. This image will be stored in the apache server where we have our web page. Detected images and database image will compare with converting RGB to gray colour image .while in comparing process, every image its contain its own pixel. in this project image will comparing pixel to pixel operation. If pixels are matches, its shown authorized person enters into area. Otherwise pixels are not matched with database image pixels; its shown unauthorized person is entered.

At this time, unauthorized person image is send to head of company or owner of the organisation through the email. And same send the SMS to the company owner mobile phone.

V. RESULTS



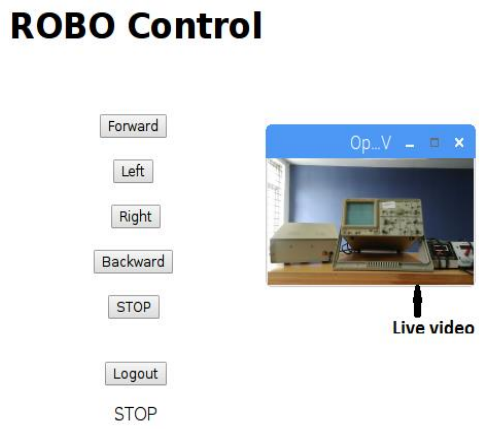


Figure 6: Robo controlling unit

Figure 7: Frame by frame images

VI. CONCLUSION

This paper works on remote authentication and monitoring surveillance system with help of Wi-Fi controlled robot car which is driven by raspberry pi. here different hardware components are assembled on robot car and Camera act like eyes of the system, its provide guidance of surveillances system or to user guide. web interface activate the live video streaming and identifying the user authentication and alerting the manager or owner of organization with help of message and email.

This project fully prototype may be used in various monitoring purpose in hazardous areas like military boarders and chemical plants, gas hazards areas and such other place

VII. REFERENCES

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