Image Distortion in Restricted Places Using Matlab and Arduino

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Abstract: - **Digital cameras, Smart phones, Tablets, Laptops, etc. are commonly used all around the universe. These gadgets use charge coupled device (CCD) sensor which is called as the heart of a camera. It is responsible for converting the light falling on it into equivalent electric charge and then process it into an electronic signal for capturing image. Places such as banks, courts, theatres, museums, military forces, etc where people are prohibited to capture the images of the sites which are illegal (i. e) interfering with the privacy or security of the proprietor. Our paper aims at a solution for the above which will detect these cameras at that time of capturing images. After detection of the camera, a strong light source (i. e) LASER will be focused onto that particular camera's lens, so that the high lightened image will be distorted due to over exposure of given LASER light. Experiment show that our proposed approach can achieve the state of distorting the image captured in prohibited places where the uniqueness of the pro rietor is taken away by unauthorized person.**

KEYWORDS- **LASER, CCDSensors, CCTV Camera, Distortion, Neutralize**

I. INTRODUCTION

It is Supreme Court justices themselves who have been the most vocal opponents of allowing cameras into courtroom. The no-photography policy is not limited just to India. But it is a worldwide phenomenon. Photography is banned at places such as museums, court rooms, shopping malls, industries, defence areas, jewellery stores etc. Eliminating use of cameras in such places improves visitor experience. Preventing photography ensures the gift shop maintains a monopoly on selling images. Banning photography is believes to boost security by preventing thieves or terrorists from visually capturing and pinpointing weakness in alarm systems and surveillance. Also, taking photographs after violates copyright protection. Film industry also suffers 1/3 loss due to movie piracy. Hence, there arises a need to prevent this undesired photography, to avoid this heavy loss. This paper presents solution for this undesired photography to prevent security and privacy of the site. Our solution is based on detecting the camera's that are capturing pictures of the site. After detection of camera's a strong light is focused onto detected camera, which degrades the quality of the captured image, thus rendering the captured photograph useless We like to propose our system mainly based on the prohibition of capturing unauthorized images. CCTV cameras are almost widely used in many areas like schools, colleges, hospitals, banks etc., for propose of security. But various places like museums, temples, army, navy and air-force. The main role of CCTV is to prohibit people from taking images of unique identities of their own concern.

Apart from various restrictions, some people tend to take unauthorized photos without the knowledge of higher authorities which is considered as an offence. So, in this paper, we would like to propose solution for the above case: All CCTV have IR transmitter module which surrounds a lens of a camera will continuously transmits the IR rays in the field of view. When these IR rays strike on any other camera lens, a white circular speckle is seen in the image seen by our CCTV camera. This white circular speckle can be seen due to the retro reflection [1] this author proposed an idea for the detection of the object & color using image processing algorithms.and Using theory of image acquisition the object is detected. our paper further calculate the axis position of the detected image.[2] this paper explains about image denoishing which helps in removing noise in the captured image. For this purpose our system involves two sections

• **Camera lens detection section :**
In this section a camera of resolution 1080*720 pixels and IR transmitter module with 36 IR LEDS (850nm) is considered which is at a view range of 90 degree. This camera is interfaced with a laptop or computer using image acquisition tool box called matrices laboratory (MAT LAB).
First to check the proper function a video feed is taken from the CCTV. This video will be converted in to a no of frame using imaqhwinfo command [1] of MATLAB which will further undergo image processing. Now the CCTV camera which is surrounded by a IR transmitter module will emit IR rays in all direction, when these rays
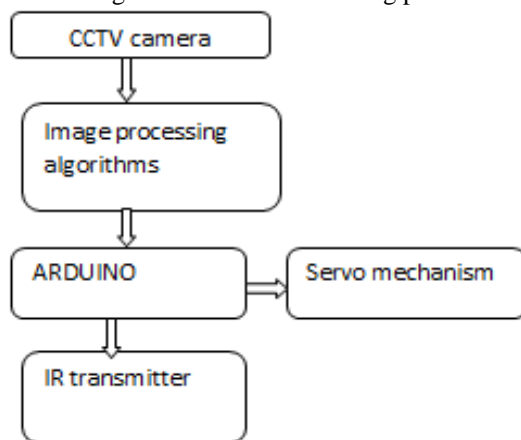
strike on any other camera lens a white speckle, will be formed in

. This web camera will be interfaced with computer via image acquisition toolbox in MATLAB. The obtained data will be in the image capture by the CCTV. This white color speckle is seen due to retro reflections. It is nothing but returning light with minimum scattering which will be detected by thresholding. The luminance thresholding is also done by MATLAB. Thus after locating the white speckle the centroid and the axis position of the camera lens calculated.

•Neutralising unit:

The next step of the process is neutralizing. The neutralizing unit which consists of strong light source e.g LASER with the controller (arduino) . The serial communication receives axis position through arduino. Arduino will give this control signal to servomechanism. Now, strong light source will mount on servomechanism. When this camera lens is detected by camera detection section, the control signal will be sent to the arduino and servomechanism will rotate in that direction and focus a strong light onto the camera's lens.

Block diagram consists of following parts:

A. CCTV CAMERA

The first stage of any vision system is an image acquisition device. CCTV camera will be used as an image acquisition device for capturing images in photography prohibited areas the form of video. The video will be divided into frames for further processing.

B.IMAGE PROCESSING ALGORITHMS

After acquisition of images from the CCTV cam, position of lens can be detected by identifying the distinct features of the camera lens. This can be done by using different image processing algorithms

C. ARDUINO

Image processing algorithms identifies the camera lens and generates control signal. The control signal will be sent to the Arduino to control the servomechanism movement. The mode of communication between the MATLAB and Arduino will be serial communication [1] via COM Port.

D. SERVOMECHANISM

Servomechanism will operate as per the control signal received by the Arduino board. Servomechanism controls the direction of IR transmitter. It includes the servomotors interfaced with the Arduino board so that IR transmitter can point in each and every direction.

E. IR- TRANSMITTER OR STRONG LIGHT SOURCE

R transmitter or IR LED plays an important role in the camera disabling part. With the control of servomechanism IR transmitter point to the direction of camera and it will reduce the quality of captured image.

The entire algorithm for object detection based on image processing .The first step involved is the

III. METHODOLOGY

The process of detecting the presence of camera [1], where used as an acquisition device .The MATLAB command' imaqhwinfo' can be used to get the detail of hardware interface. Thus the whole procedure can be divided into several parts:

A.IMAGE ACQUISITION TOOL

The first task is to get the video feed from the CCTV camera present in that location. The video which is captured by CCTV camera will have continuous resolution of 720*1280 pixels. Now this video will be converted into a number of frames. For that 'getsnapshot' command [1] is used. This converted' n' number of frames will further undergo image processing algorithm. if there is some noise in image From the frames a particular sequence is taken and it is considered for the processing. For consideration if the third frame is chosen, it sequence is taken for processing.

B.DETECTION OF CAMERA

Here the detection of circular shape objects is required for analysis. This circular object detection method is used for the detection of camera lens which is circular in shape. The image processing software such as MATLAB can be used for camera lens detection. Apart from detection of the circularly shaped camera lens the algorithm defines the position of the detected lens.

C. LOCATING CAMERA

When the camera lens is detected from the environment the exact position of lens will be calculated. For locating the centroid of the detected camera lens we have to calculate the value of X-Y axis. According to this value the control signal is given to aurdino for operating servomechanism.

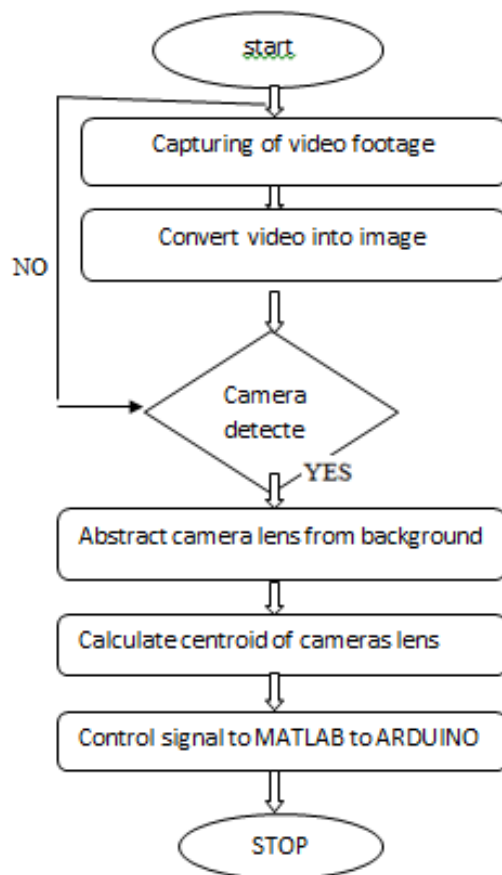In this section[1] of algorithm, the video converted into image further which is divided into sections.

D .DETERMINING THE AXIS OF THE IMAGE

Using its parameter such as length and width. These parameters can be determined using size command in MATLAB .

E . NEUTRALIZING CAMERA

Servomechanism is important role in neutralizing the detected camera. The first step is to interface the servomechanism with arduino board. In servomechanism a strong point laser is mounted to operate as per the control signal send from the arduino. The laser light have alternative components such as IR transmitters or any other strong light sources. With the help of over exposure property of light, the laser will destroy the quality of image or fine details of image.the requirement of strong laser of any other strong light source is that the intensity of strong light source must be greater than the background light.

IV. CONCLUSION

The main objective of our paper, is to detect and disable the use of cameras in photography prohibited area using certain algorithm and servo mechanism. The image processing technique will locate the position of various number of cameras in prohibited areas. The axis value of the camera received by the controller. After this, the control signal received from the controller rotates. Now strong light source laser will be focused on the centroid of the camera. So the person gets a distorted image. This is essential in places such as theatre as a reason for prevention piracy. Other than this it includes many applications such as maintaining security at various defence areas, courts, industries, museum, historical and religious monuments, research and development sector etc

V. FUTURE WORK

Aim of this work is to prevent unauthorized capture images and videos in restricted areas. The demerit of this paper is that is cannot distinguish between unauthorized and authorized camera. Hence for the work shall involve to capture images from authorized camera. One solution is it can be achieved by attaching a glyph sticker to authorized cameras. The glyph sticker can be placed at some points of focus just near the lens of the authorized camera For this purpose, first the pattern of the register glyph sticker must be reconigised already using a suitable image processing algorithm.

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