Detection of Humans in Surveillance Area (DHSA)

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Abstract—**In modern society, theft has become an increasing problem to the public. Deploying human detection systems could relieve this problem, especially to prevent theft of valuables form prohibited areas. There may be some prohibited areas which are kept under surveillance to prevent any human from entering inside. The system was so designed to detect the presence of humans in surveillance [1] or any restricted area and giving an alert if a human gets detected [2]. Research was done to check if the following designed system is already in existence or if there is any modification needed. The objective of previously designed systems is securing a home environment using a Raspberry Pi and various sensors and camera modules. Images of authorized personnel are stored in the AWS cloud, and the moment someone rings the doorbell, the camera will capture the image, send it to AWS service [3]. The key conclusions are the system detects the humans in surveillance and generates an alert without requiring any external Iot device. Also, it provides an immediate alert with sound to get attention at same moment.**

Keywords—detection systems, surveillance, AWS cloud

I. INTRODUCTION

The system expressed in this article, here in this case consists of a webcam [4] that takes photos of the outer area of the house at fixed time intervals and stores those photos on a cloud storage and to detect labels to check whether a human ispresent.[5]Ifhumanisdetectedanalertgetsactivated.The system works on real time captured images, hence insufficient illumination and background changes may drastically affect the performance of the system. Various systemdetailshavebeendescribedinthisresearchpaper.

The Technological system is straightforward, precise, and justifiable. Amazon Rekognition [6] is an API offered by Amazon Web Services (Aws) that provides built-in and modifiable computer vision libraries to bring out useful business insights from the images and videos. Flask is a python framework used to develop web applications. It uses WSGI as an interface between web server and web application. Html pages are used to provide the operating interface. Appropriately an alert is generated using python module pyttsx3.

Theobjectivesofthisresearcharetomodifytheprevious detection systems and using them in surveillance and restricted area detection with a modification ofproviding
alert.[7] Deploying human detection systems could relieve this problem, especially to prevent theft of valuables form prohibited areas. There may be some prohibited areas which are kept under surveillance to prevent any human from entering inside. Also, this system can be used by house owners to prevent any human from entering his houseduring nighttimewhengenerallyallmembersareinsidethehouse.

II. BACKGROUND /LITERATUREREVIEW

Previous systems have been designed for detection of humans in surveillance, but they lack in providing timely alert and without any external hardware device. Previous research uses complex algorithms and data structures. The paper been referred is Home Security System using IOT and AWS Cloud Services

"The studies have demonstrated that such a task (manually detecting events in surveillance video), even when assigned to a person who is dedicated and well-intentional, does-not support an effective security system. After only 20 minutes of watching and evaluating monitor screens, the attention of most individuals has degenerated to well below acceptable levels. Monitoring video screens is both boring and mesmerizing as There are no intellectually engaging stimuli, such as when watching a television program. "Thus, the concept of providing alert in form of speech has been devised." [8]
"The scenes obtained from a surveillance video are usually with low resolution.[9] Most of the scenes captured by a static camera are with minimal change of background.
Objects in the outdoor surveillance are often detected in far field." Thus, amazon rekognition provides a way to accurately provide labels as soon as a human is detected. It provides for highly efficient label providing service.[10]
In 2020,"An Effective Trespasser Detection System using Video Surveillance Data," similar system has been made in which, "The Intelligent Video Surveillance System is mainly composed of with Artificial Intelligent (AI) based vision algorithms such as face detection and recognition, trespasser detection and etc. These algorithms are installed on cameras or computing server." [11]

In previous works, "The input videos are taken from existing and created datasets. As part of preprocessing, frames are extracted from the captured videos". In current system, real time video is recorded, and frames are extracted and stored on cloud. These stored images can be used for futures references.[12]

This paper presents an approach to tracking human motion in a sequence of monocular images. The process consists of detecting motion, segmenting moving subjects by recovering the background and, finally, tracking the subject of interest.[13]

This paper is a Utilization of face identification and following in recordings and cameras utilizing Open CV. [14]

The moving human is separated out of the scene (We are taking hypothetical situation where a human walk into the scene) and we get a binary image capturing motion in the scene.[15]

III. PROPOSEDMETHODOLOGY

The user will use the buttons provided on the HTML interface that represents the home page. When the system is turned on by the user, it starts capturing images using the webcam of the system. The images are stored using the Amazon s3 storage service in the s3 bucket. Amazon Rekognition service has been used to detect the presence of humans in the surroundings. Amazon rekognition retrieves images that are stored in the s3 bucket. If any person comes in front of the webcam, Amazon rekognition detects and predicts an appropriate label which in turn gives an alert to the user and displays an alert page. The alert is provided usingpythontexttospeechconversionlibrarypyttsx3.Itcan be used as a human detection device using one's system without requiring any external IoT devices, thus reducing hardware setupcosts.
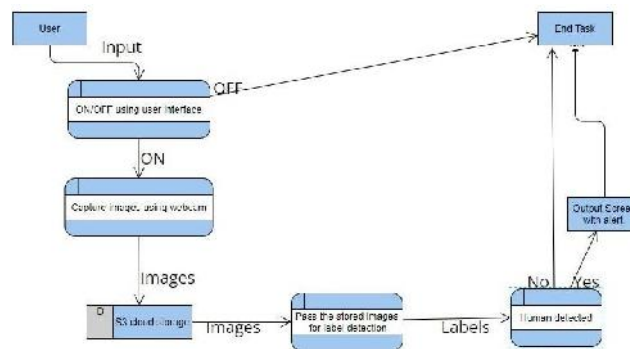

Figure 1

IV. SOFTWARE DESIGN

The flowchart shown in "Fig. 1" explains the working of the system. The flask application is executed on a local server using the app.run() method. This launches a very simple built-in server and renders the home page.

The user interface (home page) has been made using HTML and CSS that provides a button to start the system.

def index (): return render template('index.html').

To access amazon services, Boto3(AWS SDK for Python) has been used. It can be used to create, configure, and manage AWS services. It creates a session that allows creating service clients and resources.

A client has been created to access storage service s3. To capture images from the webcam, OpenCV has been used. OpenCV is a real-time computer vision library. Open CV is supported by multiple platforms including Windows, Linux, and macOS. It is availableforuseinmultiplelanguagesaswell(C,C++,Java, Python, etc). It obtains the real-time video feed and captures imagesafterfixedintervalsoftime.Theimagesareuploaded to the Amazon s3 bucket via theinternet.

The name of an Amazon S3 bucket must be globally unique. The bucket can be located in a specific region to minimize latency. The video capture object is released after the images are stored. cv2.imwrite("NewPicture1.jpg", frame) s3.upload_file("store.jpg","bucket_name","image.jpg") Create a client for amazon rekogntion service. Call detects labels method of rekognition service. Inputeach image and check for labels that match with the person or head.

boto3.client("rekognition") s3=boto3.client("s3")

response   =   rekognition.detect_labels(Image={ "S3Object":

{ "Bucket": bucket, "Name": key, } }, MaxLabels=3, MinConfidence=90,)

If the label is matched display the alert page and play an audio with an appropriate message.

if((i['Name']=="Person"   or   i['Name']=="Head")   and i['Confidence']>90):

engine = pyttsx3.init() engine.say("Alert! Human detected") engine.runAndWait()

return render_template('alert.html')

V. CONCLUSION

Human detection has become an increasing need of the hour.Inrecenttimes,thefthasbeenthebiggestchallenge in everyday life. To combat theft, we need to devise a mechanism for timely detection and prevention of humans performing illegal actions. The system discussed in this research paper is Human detection in surveillance system. This system uses amazon services for the detection. No IOT devices have been used in this paper. Therefore, this system is cost effective. This system offers faster detection as compared to older versions and costeffectivenessprovestobeanasset.Thissystemdoes not use computer's memory whilst uses amazon storage serviceS3buckets.Thesebucketsstoresvarietyandhuge amount of data. This proves this system is memory efficient also. This system can be used by anyone to prevent theft in thearea.

Result Discussion

		Outcome
1.	If the human is present in real life.	Alert is triggered
2.	If the human is not there.	No alert
3.	If some snapshot of human is fed.	Alert is triggered
4.	If the area is not well illuminated and human is there in real life.	No alert

Clear distinction between old method and new method

		Old Method	Proposed Method
1.	Detection of humans in surveillance Area	No alert was there	Adaption of alert is there
2.	External hardware or usage of IOT devices	It was there so cost was high.	Optimized and cost effective

VI. RESULT DISCUSSION

Figure 2.

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