MOVING OBJECT CAPTURING & TRACKING

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Abstract

This system is used to monitor security at sensitive areas such as banks, highways, crowded public places, borders, forest and traffic monitoring areas. The system we develop aims at detecting and tracking a moving object. The making of these system "smart" requires fast, reliable and robust algorithms for moving object detection and tracking.

The algorithm includes background subtraction in the image sequences thus detecting the moving objects in the foreground. The task of object detection in video first is the background subtraction and after the moving object is detected to track it.

1. Introduction

Today with the increasing advancement in technology, a growing concern for safety and security is arising everywhere. To address this concern, the numbers of surveillance cameras have increased in the recent past.

Data collected is nevertheless difficult to store and monitor manually on a continual basis. There are several approaches to do this job without human intervention. The underlying principle of all these methods is detection and tracking objects in the live video and also giving a buzzer when it detects a moving object.

The steps involved are

- Object Detection
- Object Tracking
- Sending alert message

2. Figures

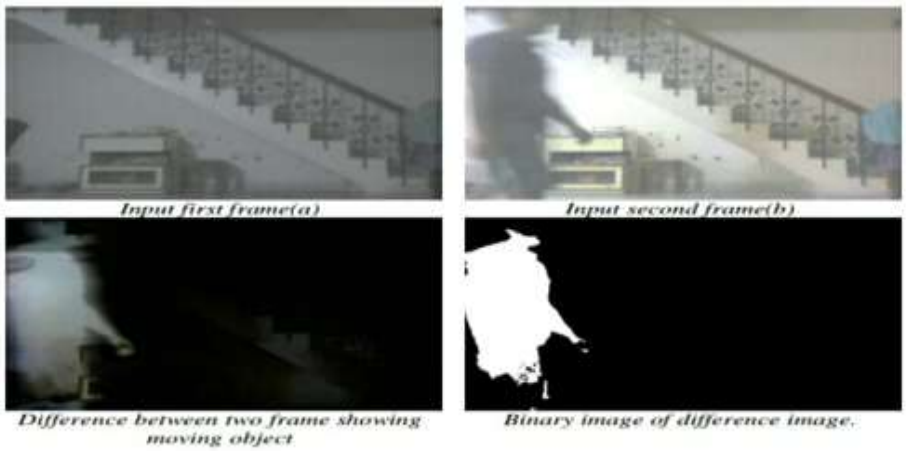


Figure 1. When a person tries to enter in front of camera, it will detect the motion and captures the picture and message is sent.

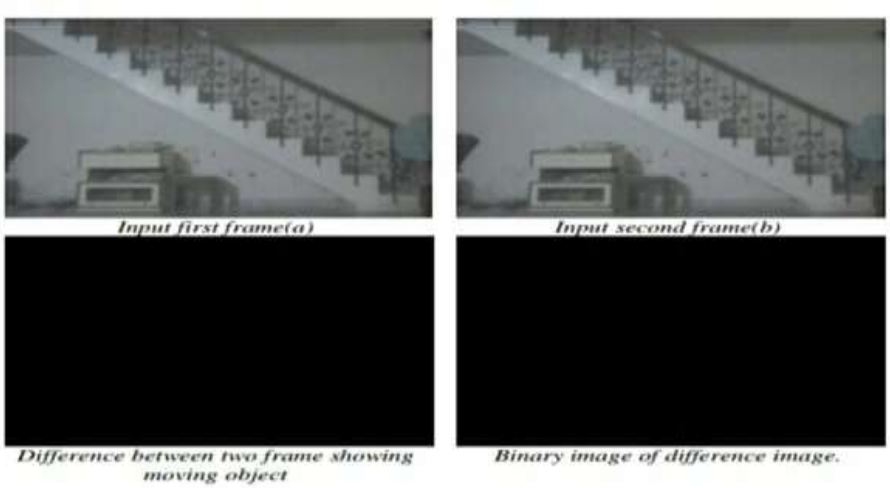
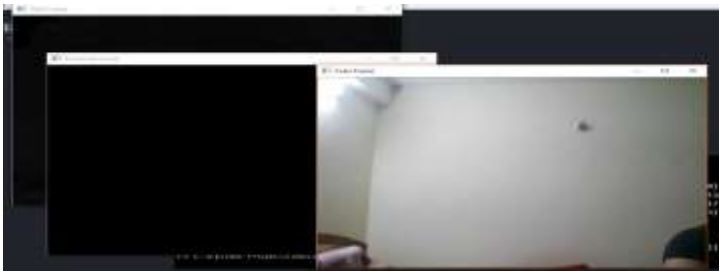
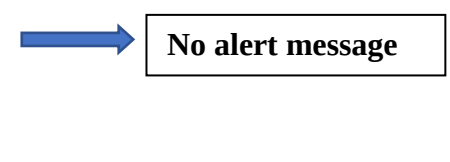
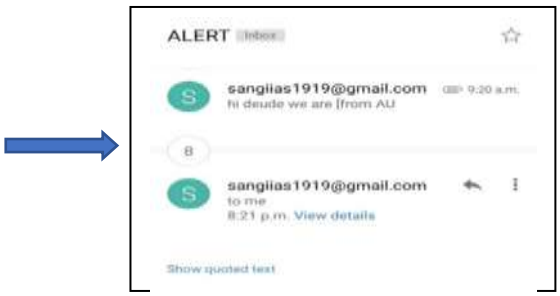


Figure 2. When no object is infront of the camera then their will be no moment and no message is sent.

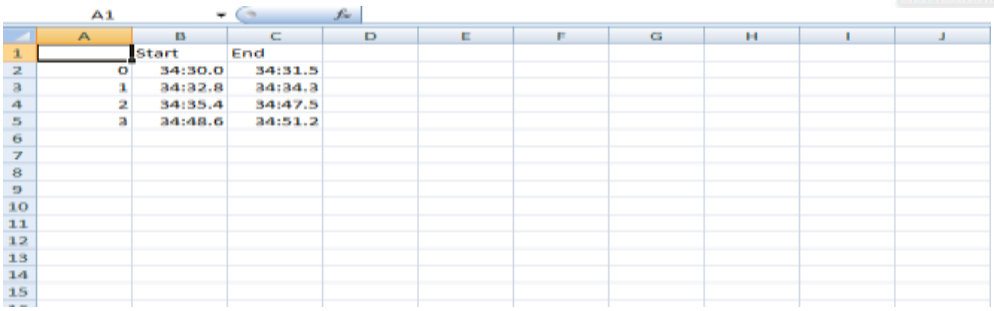
3. Test cases







4. Screenshots



	A	B	C
1		Start	End
2	0	34:30.0	34:31.5
3	1	34:32.8	34:34.3
4	2	34:35.4	34:47.5
5	3	34:48.6	34:51.2

5. Program code

```
import cv2, time, pandas
from datetime import datetime
import smtplib
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
from email.mime.base import MIMEBase
from email import encoders
email_user='sangiias1919@gmail.com'
email_send='sangisaikumar1919@gmail.com'
subject='ALERT'
msg=MIMEMultipart()
msg['From'] = email_user
msg['To'] = email_send
msg['Subject'] = subject
body = ‘Alert someone entered'
msg.attach(MIMEText(body,'plain'))
i=0
mine=0
first_frame=None
status_list=[None,None]
times=[]
df=pandas.DataFrame(columns=["Start","End"])
video=cv2.VideoCapture(0)
while True:
    check, frame = video.read()
    status=0
```

```
    gray=cv2.cvtColor(frame,cv2.COLOR_BGR2GRAY)
    gray=cv2.GaussianBlur(gray,(21,21),0)
    if first_frame is None:
        first_frame=gray
        continue
    delta_frame=cv2.absdiff(first_frame,gray)
    thresh_frame=cv2.threshold(delta_frame, 30, 255, cv2.THRESH_BINARY)[1]
    thresh_frame=cv2.dilate(thresh_frame, None, iterations=2)
(cnts,_)=cv2.findContours(thresh_frame.copy(),cv2.RETR_EXTERNAL,
cv2.CHAIN_APPROX_SIMPLE)
    for contour in cnts:
        if cv2.contourArea(contour) < 14000:
            continue
        status=1
        cv2.imwrite('kang'+str(i)+'.jpg',frame)
        i+=1
        mine=1

        (x, y, w, h)=cv2.boundingRect(contour)
        cv2.rectangle(frame, (x, y), (x+w, y+h), (0,255,0), 3)
    status_list.append(status)
    status_list=status_list[-2:]
    if status_list[-1]==1 and status_list[-2]==0:
        times.append(datetime.now())
    if status_list[-1]==0 and status_list[-2]==1:
        times.append(datetime.now())
cv2.imshow("Gray Frame",gray)
    cv2.imshow("Delta Frame",delta_frame)
    cv2.imshow("Threshold Frame",thresh_frame)
    cv2.imshow("Color Frame",frame)
    key=cv2.waitKey(1)
    if key==ord('q'):
        if status==1:
            times.append(datetime.now())
        break
if mine==1:
    filename='kang1.jpg'
    attachment = open(filename,'rb')
    part = MIMEBase('application','octet-stream')
    part.set_payload((attachment).read())
    encoders.encode_base64(part)
    part.add_header('Content-Disposition',"attachment ; filename = "+filename)
    msg.attach(part)
    text = msg.as_string()
    server = smtplib.SMTP('smtp.gmail.com',587)
    server.starttls()
    server.login(email_user,'********')
    server.sendmail(email_user,email_send,text)
server.quit()
print(status_list)
print(times)
for i in range(0,len(times),2):
    df=df.append({"Start":times[i],"End":times[i+1]},ignore_index=True)
df.to_csv("Times.csv")
video.release()
cv2.destroyAllWindows
```

6. Appendix

The importance and popularity of motion analysis has led to several previous surveys: Wang and Zhao[1] proposed a motion detection by using background subtraction technique. In this video sequence is composed of a series of video images which contains the features of geometry information of the target, extract relevant information to analyze the motion of targets then get detection results. The compression ratio was greatly improved. Rakibe and Patil[2] presented motion detection by developing a new algorithm based upon the background subtraction algorithm. In this firstly reliable background model based upon statistical is used. After that subtraction between the current image and background image is done based upon threshold. And then detection of moving object is done. After that, morphological filtering is initiated to remove the noise and solve the background interruption difficulty. Kavitha and Tejaswini[3] presented motion detection by overcoming the disadvantages of background subtraction algorithm. In this robust an efficiently computed background subtraction algorithm has been used, which is able to cope with the problem of local illumination changes such as shadows and highlights as well as Motion Detection Based on Frame Difference Method 1561 global illumination changes. Shafie et al. [4] presented motion detection using optical flow method. Optical flow can arise from the relative motion of objects and the viewer so it can give important information about the spatial arrangement of the objects viewed and the rate of change of this arrangement. Discontinuities in the optical flow can help in segmenting images in to regions that correspond to different objects. Shuigen et al. [5]developed motion detection by using a method based on temporal difference and optical flow field. It is good at adapting to the dynamic environment. Firstly, an absolute differential image is calculated from two consecutive gray images. The absolute differential image is filtered by low pass filter and translated into binary image. Secondly optical flow field is calculated from image sequences by Hron's algorithm. Thirdly, moving object area is found out by indexed edge and optical flow field.. Devi et al.[6] presented motion detection using background frame matching. This method is very efficient method of comparing image pixel values in subsequent still frames captured after every two seconds from the camera. Two frames are required to detect movement. First frame is called reference frame and the second frame, which is called the input frame contains the moving object. The two frames are compared and the differences in pixel values are determined. Lu et al. [7] presented motion detection by proposing a real time detection algorithm. In this the algorithm integrates the temporal differencing method, optical flow method and double background filtering (DBF) method and morphological processing methods to achieve better performance.

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References

Wei Zeng, Wen Gao and Debin Zhao, "Automatic Object Extraction in MPEG Video", Transaction on Signals and Image processing.

D. Gutchess, M. Trajkovie, E. Cohen-Solal, D. Lyons, and A. K. Jain, "A background model initialization algorithm for video surveillance".

https://www.ijert.org/background-subtraction-algorithm.

Journal Article

[1] Mugila J., Muthulakshmi.M, Santhiya K, Prof.Dhivya. P [International Journal of Innovative Research in Science Engineering and Technology (IJIRTSE) ISSN: 2395-5619, Volume – 2, Issue – 7. July 2016] - "Smart helmet system using alcohol detection for vehicle protection"

[2] Nimmy James, Aparna C, Tenna P John, International Journal of Research in Computer and Communication Technology, Vol 3, Issue 1, January- 2014 – "Alcohol Detection System"

Conclusion

The application provides efficient "Object movement Detection". For this to happen the algorithm involved includes background subtraction of the video and foreground detection of objects. The system finds its applications where real time surveillance is required such as bank ,traffic monitoring , forest etc.

This project proposes the sampling by calculating the intersection of a number of background-subtracted frames which are sampled over a period of time. The paper aims at tracking an object motion**.**