IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Issue 5, May 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 5, May 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1105217 |

Anomaly Detection Network for Video Surveillance Using CNN

Pradip Ugale[1], Ganesh Pund[2], Abhishek Dahale[3]

UG Student, Dept. of I.T.PREC, SPPU University, Maharashtra India[1,2]

Assistant Professor, Dept. of I.T. PREC, SPPU University, Maharashtra India[3]

ABSTRACT: Video analytics is the method of processing a video, gathering data and analysing the data for getting domain specific information. In the current trend, besides analysing any video for information retrieval, analysing live surveillance videos for detecting activities that take place in its coverage area has become more important. Such systems will be implemented real time. Automated face recognition from surveillance videos becomes easier while using a training model such as Artificial Neural Network. Hand detection is assisted by skin colour estimation. This research work aims to detect suspicious activities such as object exchange, entry of a new person, peeping into other's answer sheet and person exchange from the video captured by a surveillance camera during examinations. Nowadays, people pay more attention to fairness of examination, so it is meaningful to detect abnormal behaviour to ensure the order of examination. Most current methods propose models for particular cheating behaviour. In thissystem, we extract the optical flow of videodata and propose a 3D convolution neural networks model to deal with the problem. This requires the process of face recognition, hand recognition and detecting the contact between the face and hands of the same person and that among different persons. Automation of 'suspicious activity detection' will help decrease error rate due to manual monitoring.

KEYWORDS:convolution networks; optical flow; abnormal behaviour; examination surveillance video.

I. INTRODUCTION

Human face and human behavioural pattern play an important role in person identification. Visual information is a key source for such identifications. Surveillance videos provide such visual information which can be viewed as live videos, or it can be played back for future references. The recent trend of 'automation' has its impact even in the field of video analytics.

Video analytics can be used for a wide variety of applications like motion detection, human activity prediction, person identification, abnormal activity recognition, vehicle counting, people counting at crowded places, etc. In this domain, the two factors which are used for person identification are technically termed as face recognition and gait recognition respectively. Among these two techniques, face recognition is more versatile for automated person identification through surveillance videos. Face recognition can be used to predict the orientation of a person's head, which in turn will help to predict a person's behaviour. Motion recognition with face recognition is very useful in many applications such as verification of a person, identification of a person and detecting presence or absence of a person at a specific place and time.

In addition, human interactions such as subtle contact among two individuals, head motion detection, hand gesture recognition and estimation are used to devise a system that can identify and recognize suspicious behaviour among pupil in an examination hall successfully. This paper provides a methodology for suspicious human activity detection through face recognition. Video processing is used in two main domains such as security and research. Such a technology uses intelligent algorithms to monitor live videos. Computational complexities and time complexities are some of the key factors while designing a real-time system. The system which uses an algorithm with a relatively lower time complexity, using less hardware resources and which produces good results will be more useful for time-critical applications like bank robbery detection, patient monitoring system, detecting and reporting suspicious activities at the railway station, exam holes etc.

II. METHODOLOGY

In this section, we define the abnormal behaviour, introduce the proposed CNN model in detail, and describe the algorithm of detecting the abnormal behaviour in examination surveillance video. The abnormal behaviour can be identified as irregular behaviour from normal one. During examination, we pay more attention to the abnormal

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 5, May 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1105217 |

behaviours which mainly include leaning, reaching out hand, turning around, entering and leaving the classroom halfway. If there exist frequent abnormal behaviours in a period, it is very likely that some problems appear in the examination. For example, if students can't hear English listening clearly due to equipment problem, they would lean and turn around to confirm the problem. Meanwhile, the electronic monitor would detect the abnormal behaviours and notify the supervisor to deal with the problem in time. So it is essential and significant to detect abnormal behaviour in examination surveillance video.

surveillance video. Table I shows the architecture of our 3D CNN model. The model has 2 convolution layers, 2 pooling layers, 2 fully-connected layers and 1 SoftMax layer. The number of filters for 2 convolution layers are 64 and 128. Two fully connected layers each have 256 and 128 outputs. The kernel size of the first convolution layer is 7×7×7 which represents that height, width and temporal depth of the feature map are 7. The kernel size of the second convolution layer is 7×7×3 which represents that height and width of the feature map are still 7 but temporal depth is 3. All convolution kernels have 1 stride. All pooling layers are max pooling with kernel size 2×2×2 and have 2 strides. At last, the soft max layer has 2 outputs, which means the proposed 3D CNN is a binary classification model. We train the model from scratch using mini-batches of 10 clips, with initial learning rate of 0.0005.

III. PROPOSED ALGORITHM

Algorithm 1 Negation phrases identification

Input: Tagged Sentences, Negative Prefixes

Output: NOA Phrases, NOV Phrases

```
for every Tagged Sentences do
    for i/i + 1 as every word/tag pair do
        if i + 1 is a Negative Prefix then
            if there is an adjective tag or a verb tag in next pair then
                NOA Phrases ← (i, i + 2)
                NOV Phrases ← (i, i + 2)
            else
                if there is an adjective tag or a verb tag in the pair after next then
                    NOA Phrases ← (i, i + 2, i + 4)
                    NOV Phrases ← (i, i + 2, i + 4)
                end if
            end if
        end if
    end for
end for
return NOA Phrases, NOV Phrases
```

:

Occurrence not worth NOA
not go wrong NOA
not bad NOA
not be happier NOA
not good NOA
didn't work NOV
don't recommend NOV

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 5, May 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1105217 |

IV. SIMULATION RESULTS

we propose a unified deep learningbased framework for abnormal event detection from exam hall. The proposed Anomaly Net consists of three blocks which are designed to achieve three keys of anomaly detection in neural networks. In short, the motion fusion block is designed to keep the temporal and spatial connection between the motion and appearance cues.

A. Reach out hand *B. Turn around* *C. Leave* *D. Lean*

V. CONCLUSION AND FUTURE WORK

In this project, we can detect and recognize faces of the criminals in a video stream obtained from a camera in real time. We have used Haar feature-based cascade classifiers in Open CVapproach for face detection. It is a machine learning based approach where a cascade function is trained from a lot of positive and negative images.It is then used to detect objects inother images. Also, we have used Convolutional Neural Network (CNN) for face recognition.Several advantages of this algorithm are: Efficient selection of features, Scale and location in-variant detector, instead of scaling the image itself, we scale the features. CNN recognizer can recognize faces in different lighting conditions with high accuracy. Also, CNN can recognize efficiently even if single training image is used for each person.The real-time automated

this proposed system, we've got investigated the functionality for CNN to analysecapabilities from video frames. We recommend a unified deep reading primarily based definitelyframework for abnormal event detection and criminal identification in public.The proposedsystem includes 3 blocks that are designed to advantage 3 keys of extraordinary detection

REFERENCES

1. Y. Cong, J. Yuan and J. Liu, "Sparse reconstruction cost for abnormal event detection," IEEE Conference on ComputerVision and Pattern Recognition, pp. 3449-3456, 2019.
2. L. Kratz and K. Nishino, "Anomaly detection in extremely crowded scenes using spatio-temporal motion pattern models," IEEE Conference on Computer Vision and Pattern Recognition, pp. 1446-1453, 20019.
3. R. Mehran, A. Oyama and M. Shah, "Abnormal crowd behavior detection using social force model," IEEE Conferenceon Computer Vision and Pattern Recognition, pp. 935-942, 2020.
4. Y. B. Wang, "An intelligent algorithm for detecting cheating behavior at the exam site," Chang Sha: National Universityof Defense Technology, 2019.
5. J. Li, "Detection and analysis of abnormal behavior in electronic invigilating," Tai Yuan: Taiyuan University of Technology, 2022.
6. D. Gowsikhaa, Manjunath and S. Abirami, "Suspicious human activity detection from surveillance videos," InternationalJournal on Internet and Distributed Computing Systems, vol. 2, no. 2, 2022.
7. S. Xiong, "Research of SVM-based abnormal behavior detection in electronic invigilated examination room," Journalof Hubei University of Education, vol. 30, no. 8, pp. 42-46, 2020.
8. S. W. Ji, W. Xu, M. Yang and K. Yu, "3D convolutional neural networks for human action recognition," IEEE Transactionson Pattern Analysis and Machine Intelligence, vol. 35, no. 1, pp. 221-231, 2019.
9. W. Z. Nie, W. Li, A. A. Liu, T. Hao and Y. T. Su, "3D convolutional networks-based mitotic event detection in timelapse phase contrast microscopy image sequences of stem cell populations," IEEE Conference on Computer Vision andPattern Recognition Workshops, pp. 55-62, 2021

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 5, May 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1105217 |

10. T. Du, L. Bourdev, R. Fergus, L.Torresani and M. Paluri,"Learning spatiotemporal features with 3D convolutional networks," IEEE International Conference on Computer Visionand Pattern Recognition, 2015.
11. Mr. Rajesh H. Davda1, Mr. Noor Mohammed, " Text Detection, Removal and Region Filling Using Image Inpainting", International Journal of Futuristic Science Engineering and Technology, vol. 1 Issue 2, ISSN 2320 – 4486, 2022.

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 8.379

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details