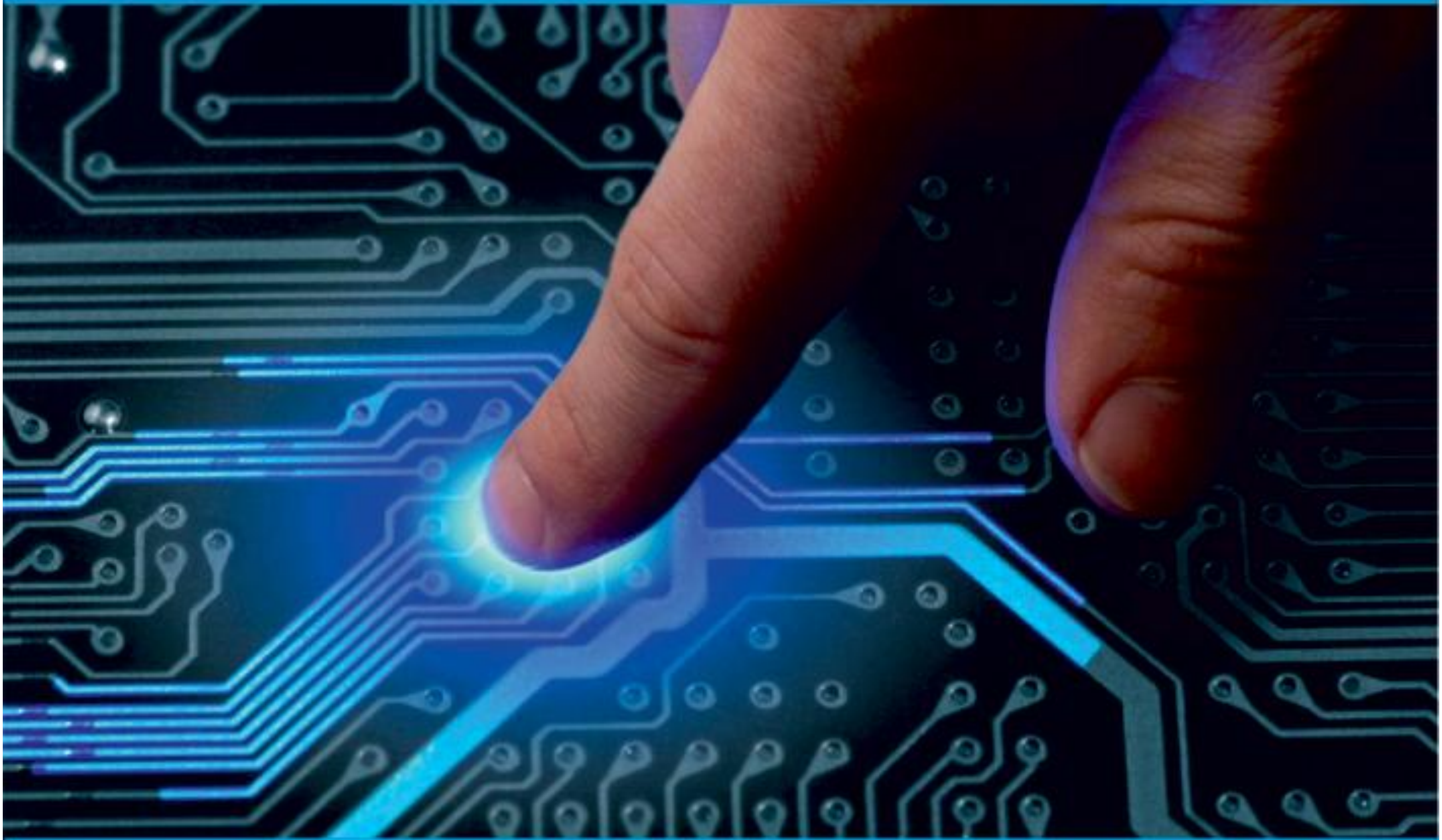
IJIRCCE

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



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

## IN COMPUTER & COMMUNICATION ENGINEERING

**Volume 8, Issue 8, August 2020**

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

**Impact Factor: 7.488**

# Intelligent Video Surveillance System Based on Machine Learning

**Nikita Sandeep Mahajan[1], Renu Lalchand Sharma[2], Pratiksha Pradip Gargate[3], Vanita Babanne[4]**

UG Students, Department of Computer Science. RMDSSOE Pune, Maharashtra, India[1,2,3]

Assistant Professor, Department of Computer Science. RMDSSOE Pune, Maharashtra, India[4]

**ABSTRACT:** Now a day's million monitoring cameras have been equipped for surveillance systems in all over world. So we have implemented video surveillance by giving video contents containing early fire events detection, abnormal activities and smart parking system and crowd estimation. We have overcome existing drawbacks of post investigation techniques of video surveillance systems by providing pre alert generation system. Our work is based on machine learning techniques for video analysis with better performance and event detection with advantages of alert generation. Video surveillance system has become a important part in the security and protection of modem cities. Since Video surveillance system has become a critical part in the security and protection of modem cities, since smart monitoring cameras equipped with intelligent video analytics techniques can monitor and pre-alert system by capturing abnormal activity and events. Recent years, more and more video surveillance devices are deployed as the increasing demands on public security and smart city.

**KEYWORDS** Intelligent Video Surveillance, Fire Detection, Deep neural network.

## I.INTRODUCTION

To intensive task of monitoring surveillance regions as well as explore richly valuable information from the big surveillance data, researchers seek the advanced computer vision algorithms to develop intelligent video surveillance (IVS). Motive behind proposed work is to parsed meaningful structured information from the raw non-structured video. The Video Surveillance and Monitoring has become the richest source of security and investigation. In which motion detection, object recognition, tracking, and some are higher level analysis modules for specific applications, e.g., people counting, activity recognition etc. The current world is completely under CCTV or video surveillance systems. The video recorded is used to find out robbery investigation, crime investigation and abnormal activity detection. After event happened these video sequences is used to catch criminals. But problem is that after event happened we are unable to save loss done by that event or accidents. So there is need of such systems which is able to early event detection and pre alert generationsystems.

## II.RELATEDWORK

In existing on machine learning and surveillance techniques we come on conclusion that there is not any promising solution for pre- event identification and alert generation. All alert systems are based on sensors and hardware devices which is very expensive. Existing work on video surveillance is used recorded video sequences for crime investigation which is post investigation process. In which chances of overcome risk and loss is very less. So there is need of pre-event identification systems in video surveillance and monitoring with the addition of alert generation for better accident prevention techniques. So we are working on smart surveillance system for giving most promising solution over existing post prevention methods.

## III.PROPOSED ALGORITHM

*A. Design Considerations:*

- CNN takes in processed images as input. Extracts different features about the images regardless of their position using a series of mathematical operations to identify the pattern. Every layer in CNN has API which transforms input to output with differentiablefunctions.
- Steps InCNN:-
- ConvolutionalLayer

- Pooling
- Flattening
- FullyConnection

*B. Description of the ProposedAlgorithm:*

Aim of the proposed algorithm is to maximize the network life by minimizing the total transmission energy using energy efficient routes to transmit the packet. The proposed algorithm is consists of three main steps.

Step 1: Convolutional Layer

We are going to extract different features of frames like pixel weight matrix calculations by using feature kernels. Perform mathematical convolutions on frames, where every function uses a unique filter. This outcome will be in different feature maps. At the end, we will collects all of these feature maps and draft them as the destination output matrix of the convolution layer.

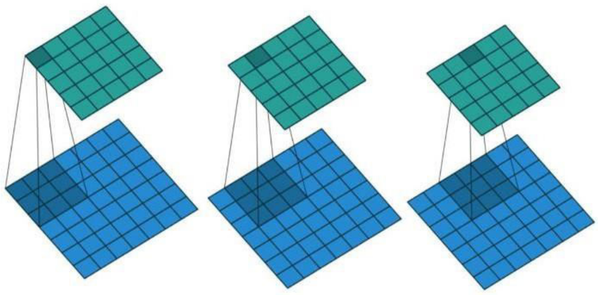


Fig- 1 Convolutional layer

Step 2: Pooling

The expression of pooling is to constantly decrease the dimensionality to limits the number of factors and calculation in the network. This limits the time of training and maintains over fitting problem. The max Pooling extracts out the largest pixel value out of a feature. While pooling average is calculated for the average pixel value that has to be evaluated.

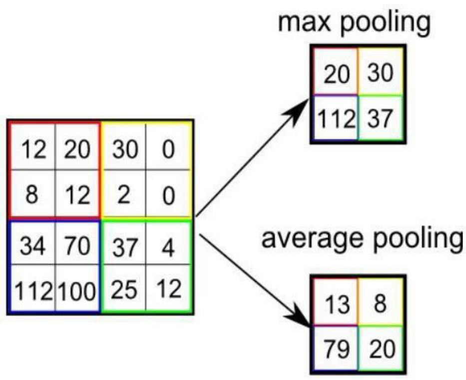



Fig-2 Pooling Layer

Step 3: Flattening

Generally here we put the pooled feature into a single column as a sample input for further layer (transform the 3D matrix data to 1D matrix data)

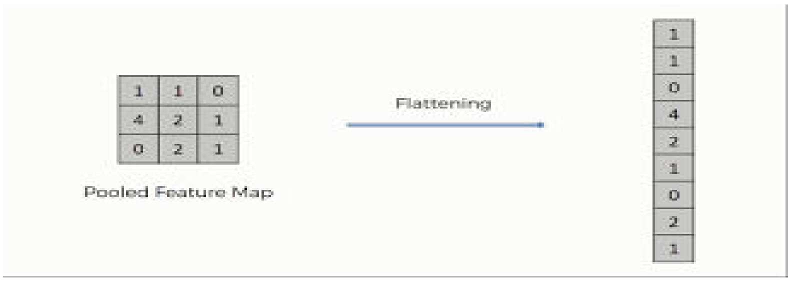



Fig-3 Flattening Matrix

Step 4: Fully Connection

A fully connected layer has fullconnections of neurons to all the nodes in the previous layer. The fusion of more neurons to evaluates accurately.

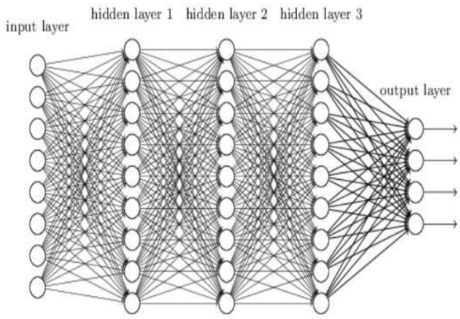



Fig-4 Fully Connected Layer

## V.PSEUDO CODE

**a] Testing Model1:**
**Sign System:**
Mathematical Model: Let us consider S as a system for Smart video surveillance system.
**S={s, H, I, O, V,e}**

**INPUT:**

1. S=start ofprogram

H= {h1,h2,h3……, hn} where H is the set of video frames/images of testingdataset.

2. I= i1, i2, i3 testing image submitted by the User, i.e. fire sequence , parking vehiclesequences
3. O= o1, o2, o3 Set of voice outputs from the function sets, Output of desired event detection, i.e. firedetection
4. V=alert voice as aoutput
5. e = End of theprogram.

**b] Training Model2:**
Set Theory
**T={s, e, D, M}**

Where,
s = Start of the program. T=Train set
D=video Dataset contains {L1,L2,L3,….Ln} where L is label sets of total dataset images =set of label one fire dataL2= set of label two vehicle parking L3=set of label three robbery video's
M=Trained model

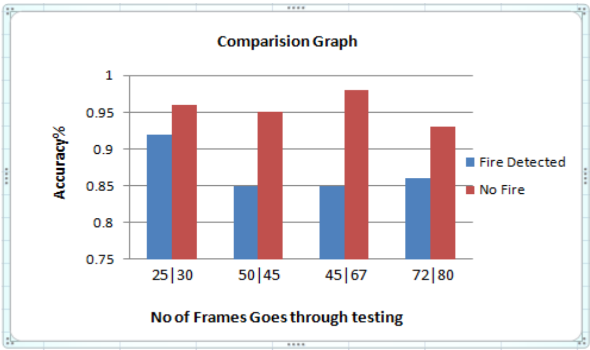
## VI. SIMULATION RESULTS

In our experimental setup, as shown in table , the total numbers of fire and no fire video frames were tested. These frames go through event detection framework by following feature extraction using our image processing module. Then our trained model of fire detection get classifies the video into fire and no fire categories. Same procedure followed by robbery detection which classifies the video into robbery and no robbery categories. Smart parking video sequence get classified into car, bike and other vehicle categories. The common action will take on event detection by us after getting appropriate voicealert.

| Sr. No | Category | Number of Frames |
|---|---|---|
| 1 | Positive Frames | 750 |
| 2 | Negative Frames | 250 |

Table-1 : Classification of frames

From above data, as shown in graph, the numbers of frames goes through test module some of found fire detected, some of found nofire.




Graph : Classification of fire videos

In our experimental setup, as shown in graph , the total numbers of frames were 414. These frames were then divided into Two subcategories; among which 25,50,45,72 found Fire detected and 30,45,67,80 found No Fire respectively We classified video data into fire and no fire categories based on accuracy factor which is our mainmotive

## VII. CONCLUSION AND FUTUREWORK

We have proposed smart surveillance systems based on video surveillance and monitoring techniques by saving cost of hardware. And give best result over post-event recognition by our pre-event recognition and alert generation work.
Future work will be based on real time CCTV based video surveillance systems mounted on real time areas.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | Impact Factor: 7.488 |

|| Volume 8, Issue 8, August 2020 ||

## REFERENCES

[1] Patel Parin, Gayatri Pandi " **Traffic Monitoring using Video Stream with Machine Learning: Based on Big Data Process with Cloud".** International Journal of Innovations & Advancement in Computer Science2017

[2] Shaoqing Ren,Kaiming He Ross Girshick Jian Sun, "**Faster R-CNN: Towards Real-Time Object Detection with Region Proposal Networks.**" International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 4 Issue 3, March2015

[3] Jeany Son,Mooyeol Baek,Minsu Cho,Bohyung Han "**Multi-Object Tracking with Quadruplet Convolutional Neural Networks**" Dept. of Computer Science and Engineering, POSTECH, Korea2017

[4] Ying-li Tian, Lisa Brown, Arun Hampapur, Max Lu, Andrew Senior, and Chiao-fe Shu "**IBM Smart Surveillance System (S3): Event Based Video Surveillance System with an Open and Extensible Framework**" Machine Vision and Applications Journal2017

[5] Tong Xiao, Shuang Li ,Bochao Wang, Liang Lin,Xiaogang Wang "**Joint Detection and Identification Feature Learning for Person Search**" The Chinese University of Hong Kong2017

[6] Weihua Xu, Md Azher Uddin ID , Batjargal Dolgorsuren, Mostafijur Rahman Akhond, Kifayat Ullah Khan, Md Ibrahim Hossain and Young-Koo Lee "**Similarity Estimation for Large-Scale Human Action Video Data on Spark**" Data and Knowledge Engineering Lab2018

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor:
7.488

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर
NISCAIR

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING