

Deep Anomaly Detection Network System through Video Surveillance

Prof. Pratima Kadam

Assistant Professor, Department of Computer Engineering,
Bharati Vidyapeeth's College of Engineering Lavale, Pune

Abstract

Abnormal activity is predicting the abnormal event from an image or a video. This paper will entail detecting suspicious abnormal human activity from real-time CCTV footage using convolutional neural network. Abnormal activity is one of the key problems in computer vision. It is important to large number of abnormal activities to detect from this system. This system strives for the detection of real world anomalies such as crime and terrorisms in videos surveillance too difficult task. For example, abnormal human activity is used in video surveillance, location tracking and understanding behavior, moments of human.

Keywords: Normal and Abnormal Activity, Machine learning, CNN (Convolutional Neural Network).

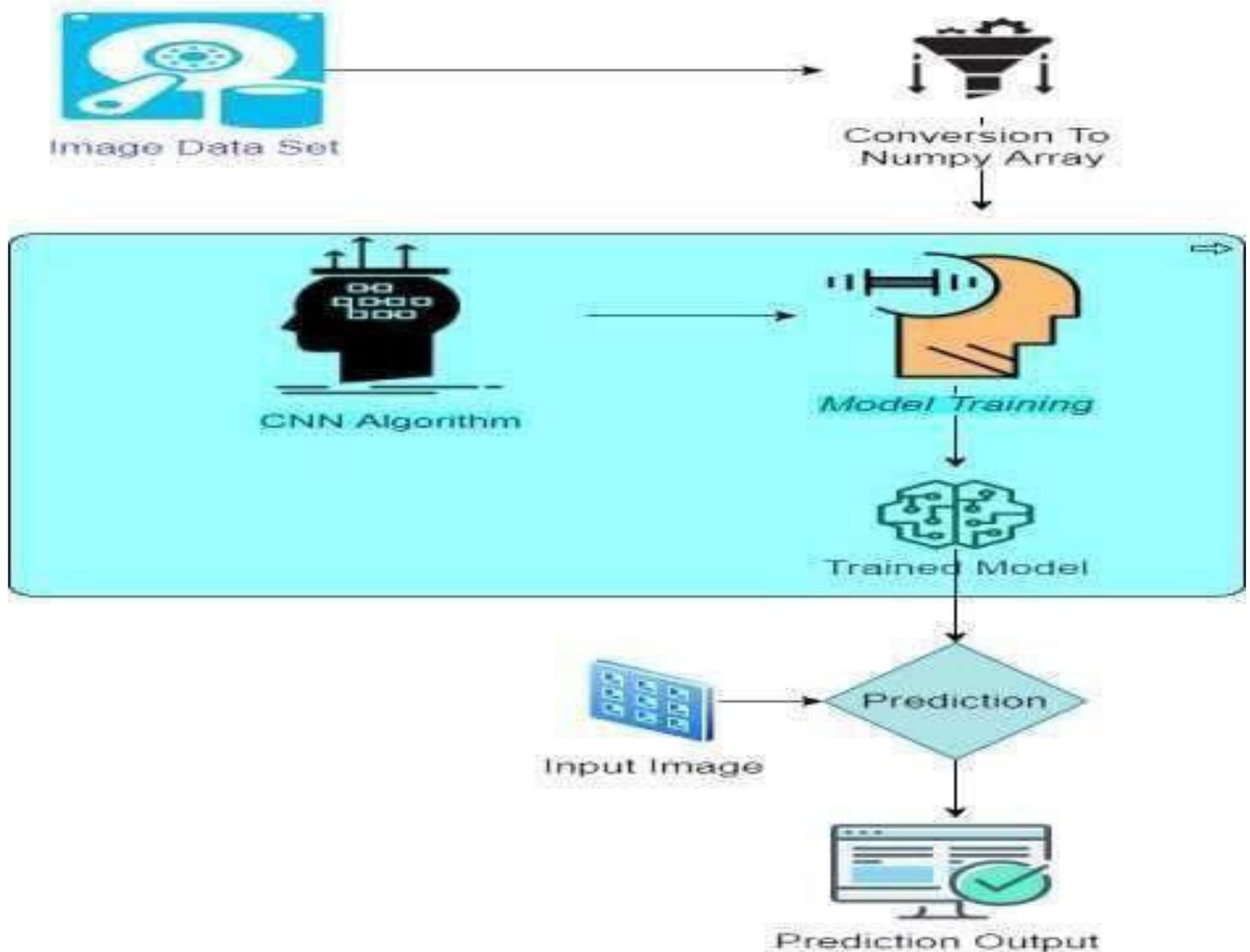
1 Introduction

We are planning to build an application for detection of abnormal human activity in public places in real time. Our application can be used in surveillance at public places like hospitals, malls, roads, railway stations and airports, etc. Where there is a risk of crimes and terrorism. Real life devices gesture recognition, to Healthcare and Augmented Reality/Virtual Reality. There is little work on applying CNNs to video classification by comparing to image data domain. It has another dimension temporal because video is more complex as compared to image. Embedded system and mobile phone like hardware uses CPU instead of GPU so that anomaly activity can run on such lowcost hardware. Low-cost depth sensor is present in gaming consoles like Kinect V2. They are motion sensor which allow the user to interact with console through just hand gestures. Structure light technology those are RGB-D sensor that obtain depth information. The structure light sensors infer the depth values of the projecting an infrared light pattern on to a sense and analyzing the distortion. It difficult to estimate human poses from depth images however, sensor limited to indoor uses, low resolution and noisy depth information. We will be using convolution neural networks to train our system. If some suspicious activity found this model will then be deployed as a mobile and desktop app which will take real time CCTV footage as input and send an alert to administrator's device. The result is that there is a glaring deficiency in the utilization of surveillance video. Critical task in video surveillance is detecting anomalous events such as traffic accidents, crimes or illegal activities. Due to its high dimensionality, noise, and a huge verity of events and interaction video data is challenging to represent and model. Running in a restaurant would be anomaly but running at a park would be normal. The definition of anomaly can be more than one meaning/refer to more than one subject it may difficult knowing exactly what it is you are describing.

This paper represent video data by a set of general features through a deep learning approach which are inferred automatically from a long video footage. Specifically, a convolutional neural network composed of a stack of convolutional autoencoders was used to process video in an unsupervised manner that capture urban structure in the data which group together

2 Methods

The method described here is based on the principle that when an abnormal human activity occurs, the most recent frames of video will be significantly different than the older frames. We train an end-to-end model that consists of a reflective, transmissivity and a temporal encoder-decoder which together learns the temporal patterns of the input volume of frames. The model is trained with video volumes consists of only normal scenes, with the objective to minimize the reconstruction error between the input video volume and the output video volume reconstructed by the learned model. After the model is properly trained, normal video volume is expected to have low reconstruction error, whereas video volume consisting of abnormal scenes is expected to have high reconstruction error. By thresholding on the error produced by each testing input volumes, our system will be able to detect when an abnormal event occurs. Inspired by [2],



3 Conclusion

The anomaly detection in video surveillance involves breaking down the whole process into three layers, which are CNNs, image processing, and abnormal activity detection. Hence, anomaly detection in videos for video surveillance application gives assured results in regards to real-time scenarios.

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