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SUSPICIOUS ACTIVITY DETECTION NETWORK FOR VIDEO SURVEILLANCE USING MACHINE LEARNING.

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Abstract: - Anomaly Activity is predicting the body part or joint locations of a person from an image or a video. This project will entail detecting suspicious human Activity from real-time CCTV footage using neural networks. Human Anomaly Activity is one of the key problems in computer vision that has been studied for more than 15 years. It is important because of the sheer number of applications which can benefit from Activity detection. For example, human pose estimation is used in applications including video surveillance, animal tracking and behavior understanding, sign language detection, advanced human-computer interaction, and marker less motion capturing. Low cost depth sensors have limitations like limited to indoor use, and their low resolution and noisy depth information make it difficult to estimate human poses from depth images. Hence, we plan to use neural networks to overcome these problems. Suspicious human activity recognition from surveillance video is an active research area of image processing and computer vision. Through the visual surveillance, human activities can be monitored in sensitive and public areas such as bus stations, railway stations, airports, banks, shopping malls, school and colleges, parking lots, roads, etc. to prevent terrorism, theft, accidents and illegal parking, vandalism, fighting, chain snatching, crime and other suspicious activities. . It is very difficult to watch public places continuously, therefore an intelligent video surveillance is required that can monitor the human activities in real-time and categorize them as usual and unusual activities; and can generate an alert.

I INTRODUCTION

We plan to build an application for detection of anomaly activity of people in public places in real time. Our application can be used in surveillance at places like malls, airports, railway stations, etc. where there is a risk of robbery or a shooting attack. We will be using deep learning and neural networks to train our system. 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 on the administrator's device if some suspicious pose is found. Human anomaly activity is related to identifying human body parts and possibly tracking their movements. Real life applications of it vary from gaming to AR/VR, to healthcare and gesture recognition. Compared to image data domain, there is relatively little work on applying CNNs to video classification. This is because, a video is more complex than images since it has another dimension - temporal. Unsupervised learning exploits temporal dependencies between frames and has proven successful for video analysis. Some anomaly activity approaches use CPU instead of GPU so that anomaly activity can run on low cost hardware like embedded systems and mobile phones. Low cost depth sensors are another new technology in computer vision. They are present in gaming consoles like the Kinect for Xbox 360. They are motion sensors which allow the user to interact with the console without a game controller, through just hand gestures. These are RGB-D sensors that obtain depth information by structured light technology. The structured light sensors infer the depth values by projecting an infrared light pattern onto a scene and analyzing the distortion of the projected light pattern. However, these sensors are limited to indoor use, and their low resolution and noisy depth information make it difficult to estimate human poses from depth images.

II LITERATURE SURVEY:

1)Paper Name :Real-Time Anomaly Detection and Localization in Crowded Scenes

Author: Mohammad Sabokrou , Mahmood Fathy

Description : In this paper, we propose a method for real-time anomaly detection and localization in crowded scenes. Each video is defined as a set of non-overlapping cubic patches, and is described using two local and global descriptors. These descriptors capture the video properties from different aspects. By incorporating simple and cost-effective Gaussian classifiers, we can distinguish normal activities and anomalies in videos. The local and global features are based on structure similarity between adjacent patches and the features learned in an unsupervised way, using a sparse autoencoder. Experimental results show that our algorithm is comparable to a state-of-the-art procedure on UCSD ped2 and UMN benchmarks, but even more time-efficient. The experiments confirm that our system can reliably detect and localize anomalies as soon as they happen in a video

2) Paper Name : Anomaly Detection in Video Using Predictive Convolutional Long Short-Term Memory Networks

Author: Jefferson Ryan Medel

Description : Automating the detection of anomalous events within long video sequences is challenging due to the ambiguity of how such events are defined. We approach the problem by learning generative models that can identify anomalies in videos using limited supervision. We propose end-to-end trainable composite Convolutional Long Short-Term Memory (Conv-LSTM) networks that are able to predict the evolution of a video sequence from a small number of input frames. Regularity scores are derived from the reconstruction errors of a set of predictions with abnormal video sequences yielding lower regularity scores as they diverge further from the actual sequence over time. The models utilize a composite structure and examine the effects of 'conditioning' in learning more meaningful representations. The best model is chosen based on the reconstruction and prediction accuracies. The Conv-LSTM models are evaluated both qualitatively and quantitatively, demonstrating competitive results on anomaly detection datasets. Conv-LSTM units are shown to be an effective tool for modelling and predicting video sequences.

3)Paper Name : Abnormal Event Detection in Videos using Spatiotemporal Autoencoder Author: Yong Shean Chong

Description : We present an efficient method for detecting anomalies in videos. Recent applications of convolutional neural networks have shown promises of convolutional layers for object detection and recognition, especially in images. However, convolutional neural networks are supervised and require labels as learning signals. We propose a spatiotemporal architecture for anomaly detection in videos including crowded scenes. Our architecture includes two main components, one for spatial feature representation, and one for learning the temporal evolution of the spatial features. Experimental results on Avenue, Subway and UCSD benchmarks confirm that the detection accuracy of our method is comparable to state-of-the-art methods at a considerable speed of up to 140 fps.

4)Paper Name : A Review of Human Anomaly activity from Single Image

Authors : Naimat Ullah Khan, Wanggen Wan

Description : This review is focused on the most significant contributions in Human Pose Estimation methods from a single two-dimensional image. They start their study with the traditional pictorial structure, go through a discussion of the use of Deep Neural Networks that improved the human pose estimation significantly and then the most recent, more famous approach namely Stacked Hourglass. Starting from the first practical models for estimating human pose, they provide a comprehensive study of some of the most famous deep learning methods in order to provide a concise analytical review of these most influential methods.

Existing System:

It is very difficult to watch public places continuously, therefore an intelligent video surveillance is required that can monitor the human activities in real-time and categorize them as usual and unusual activities; and can generate an alert. Mostly, of the research being carried out is on images and not videos. Also, none of the papers published tries to use CNNs to detect suspicious activities.

Proposed System:

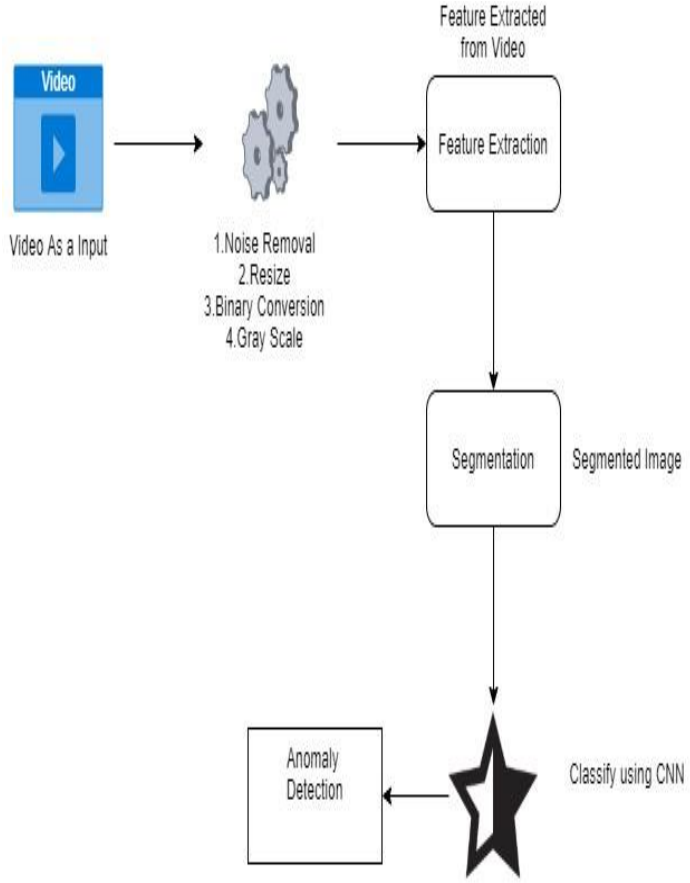
The proposed system uses deep learning techniques to classify the images of a video.The image processing model is very important to extract the required features.

In this work, two conversion such as Original to Gray are done and, Gray and HSI color model are used as an input images for feature extraction module. Feature Extraction is the most important step in the analysis of images.

It is a process of gathering distinguishable information from the image itself from an object or group of objects.

The system is divided into three modules Base Input, Pre-processing, feature extraction ,Classification.

III SYSTEM ARCHITECTURE DIAGRAM:



IV CONCLUSION:

A system to process real-time CCTV footage to detect any Anomaly activity will help to create better security and less human intervention.Great strides have been made in the field of human anomaly Activity, which enables us to better serve the

myriad applications that are possible with it. Moreover, research in related fields such as Activity Tracking can greatly enhance its productive utilization in several fields.

REFFERENCES

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