Anomaly Detection from Video Streams Using Deep Learning Techniques

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Introduction

- Cameras have been installed frequently in public places e.g Banks, streets, shopping malls etc.
- One critical task in video surveillance is detecting anomalous events such as traffic accidents, crimes or illegal activities.
- We propose an anomaly detection system that will be efficient enough to detect and classify unusual activities.
- To formulate a supervised learning approach, we resort to 3D Convolutional Neural Networks.

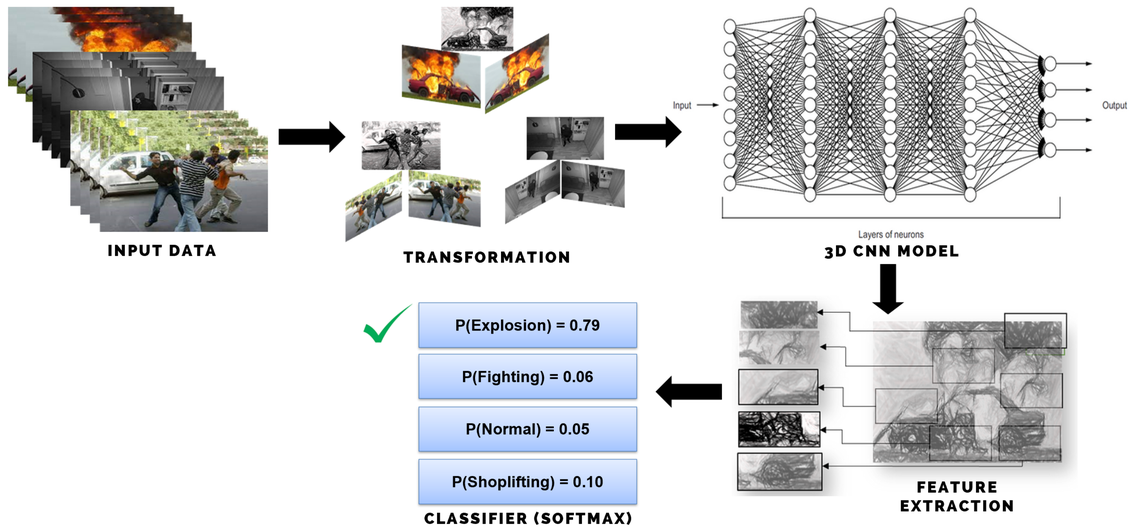
Motivation

The boundary between normal and anomalous behaviors is often ambiguous which is why it is very difficult to define a normal event that takes all possible normal patterns/behaviors into account. But there is a need for an intelligent system that makes them differ from one another.

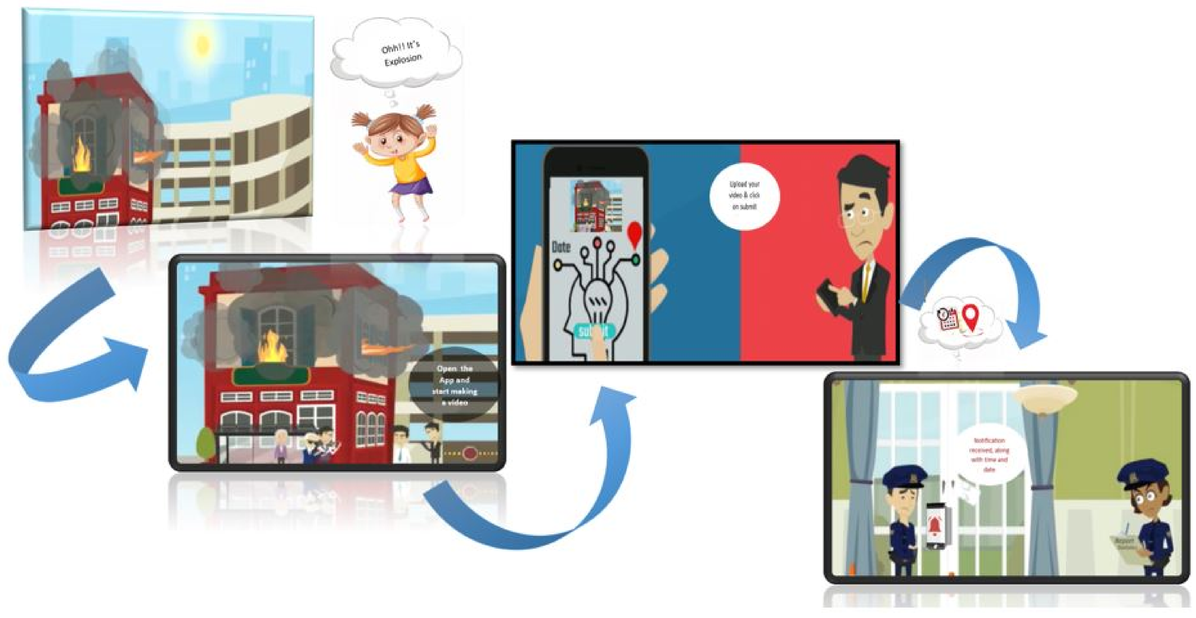
We developed an intelligent automated anomaly detection system:

- To ensure public safety in the cities
- To timely signal an activity that deviates normal patterns
- To alleviate the waste of labor, time, money and resources
- To increase the monitoring capacity of the law enforcement agencies
- To prevent security breaches and threads
- Faster results, preventing significant damage beforehand (by the time they are found)

Flow Diagram



Operating Procedure



Dataset

The training dataset contains 600 videos, 300 minutes long and around 700MB of size categorized into 4 classes from UCF-Crime. We randomly split the dataset into two sets: 80% for training, 20% for testing. One category represents the normal activities and other 3 categories represent 3 different anomalous activities we consider here.

Results

The results are calculated based on testing data which gives an accuracy of 82%.