

SUSPICIOUS ACTIVITY DETECTION

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Abstract - With the increasing in the number of anti-social activates that have been taking place ,security has been given utmost importance lately. Many Organizations have installed CCTVs for constant Monitoring of people and their interactions. For a developed Country with a population of 64 million, every person is captured by a camera 30 times a day. A lot of video data generated and stored for a certain time duration. A 704x576 resolution image recorded at 25fps will generate roughly 20GB per day. Constant Monitoring of data by humans to judge if the events are abnormal is near impossible task as requires a workforce and their constant attention. This creates a need to automate the same. Also , there is need to show in which frame and which part of it contain the unusual activity which aid the faster judgment of the unusual activity being abnormal. This is done by converting video into frames and analyzing the persons and their activates from the processed frame .Machine learning and Deep Learning Algorithms and techniques support us in a wide accept to make Possible.

1.INTRODUCTION

Human behaviour and the human face are key factors in identifying a person. A crucial source for these identifications is visual data. Surveillance footage offers this kind of visual data that may be watched in real time or recorded for later use. Even the field of video analytics is being impacted by the current "automation" movement. Applications for video analytics include motion detection, human activity prediction, person identification, anomalous activity recognition, vehicle counting, crowd counting, and many more. The two elements that are employed in this field to identify people are, respectively, facial recognition and gait

recognition. Face recognition is more adaptable than both of these methods for automated person identification through surveillance footage. The orientation of a person's head can be predicted using face recognition, and this will help anticipate that person's behaviour. Motion recognition combined with face recognition has various uses, including confirming a person's identity, identifying a person, and determining a person's presence or absence at a particular location and time. A system that can identify and recognise suspicious behaviour is also developed using human interactions such subtle eye contact between two people, head motion detection, hand gesture recognition, and estimating. This project offers a face recognition technology for detecting questionable human behaviour. Security and research are two major fields that use video processing. This technique makes use of clever algorithms to watch real-time video. A real-time system's design must take into account a number of important elements, including time and computational complexity. For time-critical applications like bank robbery detection, patient monitoring systems, spotting and reporting suspicious activities at railway stations, etc., the system that uses an algorithm with a relatively lower time complexity, using less hardware resources, and producing good results will be more beneficial. When used as a "automated suspicious activity detection system," such a system will not only assist in identifying suspicious activity but also in reducing it. Also, there will be considerably less chance of error. For educational facilities, this technology will act as a beneficial surveillance system.

2. IMPLEMENTATION

2.1 Algorithms

2.1.1 Convolution Neural Network

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning method that can take in an input image, give various elements and objects in the image importance (learnable weights and biases), and be able to distinguish between them. Comparatively speaking, a ConvNet requires substantially less preparation than other classification techniques. ConvNets have the capacity to learn these filters and properties, whereas in primitive techniques filters are hand-engineered. A ConvNet's architecture was influenced by how the Visual Cortex is organised and is similar to the connectivity network of neurons in the human brain. Only in this constrained area of the visual field, known as the Receptive Field, do individual neurons react to stimuli. Some of these fields intersect to completely enclose the visual field.

Convolution neural networks: How do they operate? Convolutional neural networks outperform other neural networks when given inputs such as images, voice, or audio, for example. There are three basic categories of layers in them:

- Convolutional layer
- Pooling layer
- Fully-connected (FC) layer

2.2 Modules

2.2.1 Tkinter, a GUI for Python Python provides a variety of choices for GUI development (Graphical User Interface). Tkinter is the approach used the most frequently among all GUI approaches. It is a typical Python interface for the Python-supplied Tk GUI toolkit. The quickest and easiest approach to **construct the GUI**

is with Python and tkinter. applications. Tkinter makes building a GUI a simple process. making a tkinter application

1. Importing the module – tkinter
2. Create the main window (container)
3. Add any number of widgets to the main window
4. Apply the event Trigger on the widgets

2.2.2 Matplotlib - A Python 2D plotting toolkit called Matplotlib creates publication-quality graphics in a range of physical formats and in cross-platform interactive settings. Four graphical user interface toolkits, the Python and IPython shells, the Jupyter notebook, web application servers, and Python scripts can all make use of Matplotlib. Matplotlib aims to make difficult things feasible and simple things easy. With just a few lines of code, you can create plots, histograms, power spectra, bar charts, error charts, scatterplots, and more. See the sample plots and thumbnail galleries for examples. Particularly when used in conjunction with IPython, the `py plot` module offers a MATLAB-like interface for basic graphing. An object-oriented interface or other method gives power users complete control over line styles, font settings, axis properties, etc. either either a user-friendly collection of MATLAB functions or an object-oriented interface.

2.2.3 Python module – date time Date and time are not separate data types in Python, but they can be used together by importing the `datetime` package. There is no requirement to install the Python Datetime Module outside because it is already included in Python. Classes for working with date and time are provided by the Python Datetime module. Many capabilities to deal with dates, times, and time intervals are provided by these classes. Python treats date and datetime as objects, so any manipulations you make to them are actually

manipulations of objects. not a timestamp or a string. • Datetime: This term refers to a combination of the terms date and time as well as the terms year, month, day, hour, minute, second, microsecond, and tzinfo.

2.2.4 CV2- For computer vision applications like video analysis, CCTV footage analysis, and picture analysis, Opencv is a highly helpful open source library. More than 2,500 efficient algorithms make up OpenCV, which is written in C++. We can utilise this library to begin concentrating on real-world issues while developing computer vision applications that we don't want to design from scratch. Today, many businesses, including Google, Amazon, Microsoft, and Toyota, use this library. There are numerous researchers and developers. It is simple to install on any OS, including Windows, Ubuntu, and Macintosh.

5.2.5 Python module Python's OS module offers tools for communicating with the operating system. OS is included in the basic utility modules for Python. A portable method of exploiting operating system-specific functionality is offered by this module. There are numerous functions to deal with the file system in the `*os*` and `*os.path*` modules.

2.2.6 Python module Shutil The Python Shutil module offers a wide range of high-level actions on files and file collections. It falls under one of Python's common utility modules. The copying and deleting of files and directories is assisted by this module. To copy the content of a source file to a destination file or directory in Python, use the `shutil.copy()` method. The permission **such as** the creation and modification **times** mode of the file is also kept, but other file metadata, **are not**. The destination might be a file or a directory, but the source must represent a file. The file will be transferred into the destination using the base filename if the destination is a directory. in the source. The destination also needs to be writable. If the destination is

a file and it is already present, the source file will be overwritten; otherwise, a new file will be created.

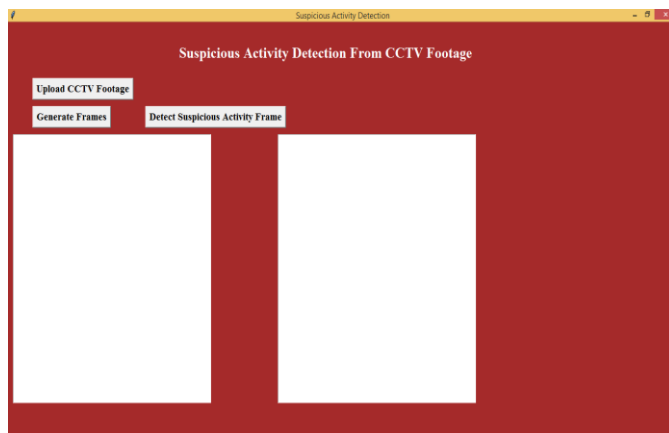


Fig: Interface layout

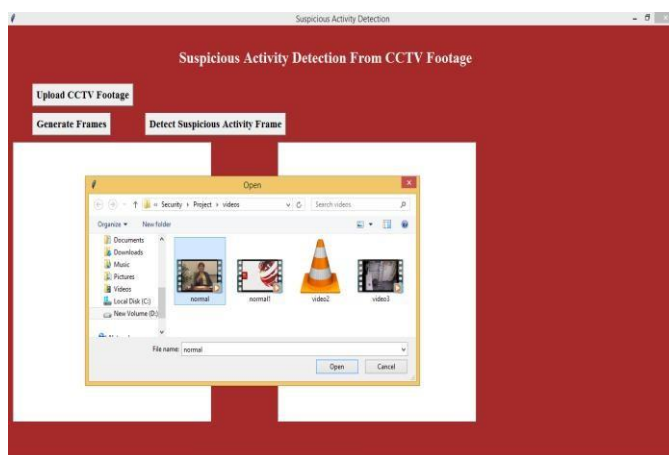


Fig:2 Uploading an Image

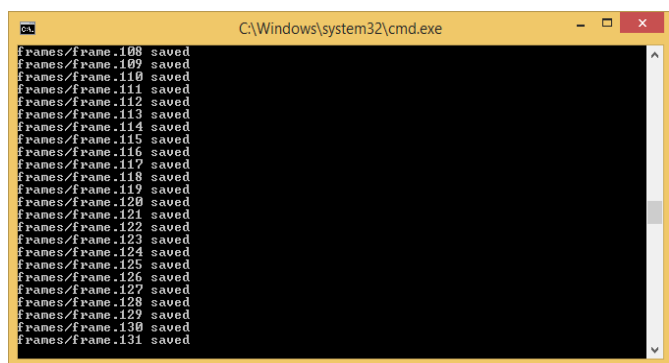


Fig: 3 Frame Generation

3. CONCLUSIONS

According to present circumstances designing an automatic approach for detecting suspicious activity from video data for video surveillance systems is an important requirement. Unfortunately most existing approaches are hugely depending on human observers and there is no unified framework to meet this requirement. Here we proposed a self trainable, human activity and behavior detectable Intelligent Suspicious Activity Detection Framework (ISADF) for video surveillance systems. This framework contained video and extraction unit will extract the video data images as frameset and sends to video data processing unit for suspicious activity detection. CNN algorithm will compare the current activity against past experience to know whether activity is common, uncommon or unknown activity. Experiments show that ISADF is able to process and identify the suspicious activities from video data.

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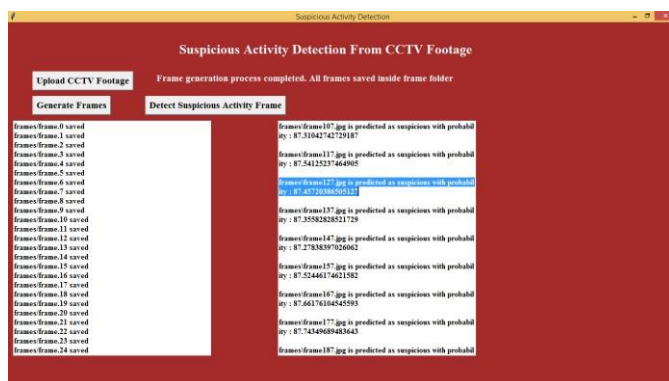


Fig :4 Detected Suspicious Frames



Fig 5: Suspicious Frame