

# Unusual Human Activity Detection using Open CV Python with Machine Learning

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**Abstract:** In this project, we propose a novel method for unusual human activity detection in crowded scenes. Specifically, rather than detecting or segmenting humans, we devised an efficient method, called a motion influence map, for representing human activities. The key feature of the proposed motion influence map is that it effectively reflects the motion characteristics of the movement speed, movement direction, and size of the objects or subjects and their interactions within a frame sequence. Using the proposed motion influence map, we further developed a general framework in which we can detect both global and local unusual activities. Furthermore, thanks to the representational power of the proposed motion influence map, we can localize unusual activities in a simple manner. In our experiments on three public datasets, we compared the performances of the proposed method with that of other state-of-the-art methods, and showed that the proposed method outperforms these competing methods. Over a last decade it has been seen the rapid growth and an extraordinary improvement in real-time video analysis. Video surveillance is a prominent area of research which includes recognition of human activities and categorisation of them into usual (normal), unusual (abnormal) or suspicious activities. Due to exponential increase in crime rate, surveillance systems are being put up in malls, stations, schools, airports etc. The face recognition using deep learning and image processing is used to detect the criminal in particular area such as bank, atm, public places etc.

**Keywords:** Unusual human activity, Detection, Face recognition, CNN, Deep Learning, Image processing

## I. INTRODUCTION

Now a day's human behaviour and activity pattern researches are more important in surveillance. Detection and tracking the object of behaviour is important factor in video surveillance system. If any problem is happening in crowded area based on behaviors of persons then it depends on two types spatial and temporal. Over a last decade it has been seen the rapid growth and an extraordinary improvement in real-time video analysis. Main goal of video analytics is to identify the potential threaten events with less or no human intervention. Video surveillance is a prominent area of research which includes recognition of human activities and categorization of them into usual (normal), unusual (abnormal) or suspicious activities. Main task is to locating unusual events in videos by using some surveillance system which can be manual, semi-automatic or fully automatic. Manual surveillance system is fully dependent on human. It required manual labour to analyze behaviour or to make difference between abnormal and normal behaviour. Semi-automatic system required less human intervention while fully automatic are intelligent and smart video surveillance system which doesn't required human intervention to make decision. The other method of intrusion detection is face recognition. The dataset of criminals is created and stored in system, When criminal face is recognized by camera it will create alert message to system and notify about it. Face recognition is done by opencv library in python. Internally image processing and deep learning is done in this process of recognition. Because of such advance technique system become more accurate.

## II. LITERATURE SURVEY

Numerous attempts have been made in this field to automatize video surveillance but each and every approaches has its own pros and cons.

On the basis of prior knowledge and human involvement in the learning process, the research in human activity recognition can be categorized as supervised, unsupervised and semi supervised.

A. Supervised Learning: In this type of learning, a number of models of normal or abnormal behavior are built based on the labeled training samples [5]. A video sample which does not fit any model are classified as abnormal. But this approach is limited to only events that are well defined and would require sufficient training data. However, real world video samples would mostly contain events that are not well defined and such events are rare and hence sufficient training samples are not available.

B. Unsupervised Learning: In these type of learning, a number of models of normal or abnormal behavior are built based on the labeled training samples [5]. Video samples which does not fit any model are classified as abnormal. But this approach is limited to only events that are well defined and would require sufficient training data. However, real world video samples would mostly contain events that are not well defined and such events are rare and hence sufficient training samples are not available.

C. Semi-supervised Learning: In these type of learning, a number of models of normal or abnormal behavior are built based on the labeled training samples [5]. Video samples which does not fit any model are classified as abnormal. But this approach is limited to only events that are well defined and would require sufficient training data. However, real world video samples would mostly contain events that are not well defined and such events are rare and hence sufficient training samples are not available. Human group behavior detection has attracted increasing research interests. From the security perception, the automatic detection of group activities is very important. Some of the issues for group event detection as mentioned in [4] are as follows: 1. Group Event Detection with a Varying Number of Group Members. 2. Group Event Detection with a Hierarchical Activity Structure. 3. Clustering with an Asymmetric Distance Metric.

### III. PROPOSE SYSTEM

Unusual activity recognition systems are developed to make surveillance system more smart and intelligent. Main aim is to detect suspicious or abnormal activities in videos to avoid future happening or to give alert whenever any type of mis happening occur. These anomalous activity recognition system classify normal and abnormal activities of objects. Most of previous research in anomalous or suspicious activity recognition has focused on behavior understanding by training the system manually. Some of work shows unsupervised learning methodologies for activity detection. The main aim of this proposed work is to design a framework that can detect unusual activity in surveillance real-time videos. Our proposed work is capable of recognition multiple activities in single video and also perform behaviour understanding. If any anomalous activity occurs it give alert to the system which signifies the presence of such activity by labeling it. OpenCV is used for object detection and some problem domain rules are used distinguish different types of behaviour. We considered running, walking and crawling as main activities of our approach. In which behaviour pattern and direction of object help to identify anomalous event.

1. Determining object direction –whether all objects are moving, running or crawling in same direction or not.
2. Analysing motion pattern- whether all objects are performing same activity or some are doing same activity and other are doing other activity.

### IV. SYSTEM ARCHITECTURE

Following diagram is our system’s architecture diagram:

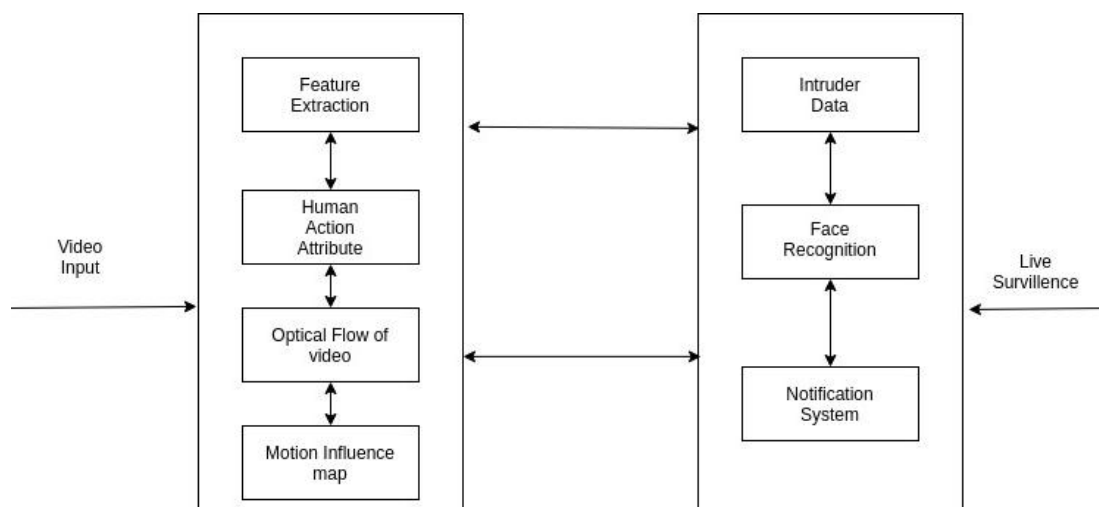


Figure 1: system architecture

The implementation phase involves the actual materialization of the ideas that are expressed in the analysis document and that are developed in the design phase. Implementation should be a perfect mapping of the design document in a suitable programming language in order to achieve the necessary final product. This section discusses about the

important decisions regarding selection of the platform, the language used, etc. These decisions are often influenced by several factors such as the real environment in which the system works, speed that is required, the security concerns, other implementation-specific requirements etc. And also we have brief discussion on the important modules and methods that are present in the project. The code is divided into 5 modules, opt flow of blocks, motion influence generator, create mega blocks, training and testing. In this section, a method for representing motion characteristics is described for the detection and localization of unusual activities within a crowded scene. The training and testing dataset is created for face recognition. First the user data is trained and then using cnn algorithm data is processed. The criminal face data is detected by classifier in system. The alert message or notification is generated to system.

## V. CONCLUSION

This paper enlightens all the issue, challenges and issue faced by Human behaviors. There are complex and have much variety in an unconstrained environment. In this paper we did the analysis of detection techniques such as abnormal human behavior, motion detection, and face recognition. It detects the human body in CCTV Video camera. Result shows that the user is abnormal or not. We achieve real-time video processing of the actual application requirements; therefore it can be used in practical applications, especially the process of social public security. We also use the face recognition for the detection of theft.

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