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Unusual Crowd Activity Detection Using Open CV and Motion Influence Map

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Abstract: ***Suspicious behavior is dangerous in public areas that may cause heavy causalities. There are various systems developed on the basis of video frame acquisition where motion or pedestrian detection occur but those systems are not intelligent enough to identify the unusual activities even at real time. It is required to recognized scamper situation at real time from video surveillance for quick and immediate management before any casualties. Proposed system focuses on recognizing suspicious activities and target to achieve a technique which is able to detect suspicious activity automatically using computer vision. Here system uses OpenCV library for classifying different kind of actions at real time.***
Keywords: Unusual Activity Detection, Action Recognition, Motion Influence Map, OpenCV, Crowd based activity detection.

I. INTRODUCTION

Visual/Optical surveillance is highly identified research which has greater area applications in human activity monitoring, public safety in spaces like banks, shopping sectors, private areas etc, automated identification of events of interest, motion based recognition, human counting, reality, autonomous robot navigation and other areas. The rapid advances in availability of good quality and non-expensive video recording devices, super computers and increased demand for analysis of such footages has made great interest and need of video surveillance in every sector. However, the detection of objects in motion and tracking them from the videos is very important as well as critical. Whereas, differentiation of objects from there background is also a very difficult yet important task.

That's why it is very important to understand the contents of the video and the background of objects. Object from other background objects become a vital problem. Hence it becomes the foremost criteria to understand the video and its constituents with depicted scenarios.

The predictable intention in unpredicted activity detection process is usage of a standard human behavior approach. In the beginning, the process is designed during the process with respect to standard some activity dataset. Then, in verification, actual information and facts are compared to the pattern. Eventually, a decision whether the activity is expected or not is decided determined. The prerequisite of defined normal human activity approach makes it difficult for unusual activity detection in real scenario security systems.

II. LITERATURE SURVEY

Soumalya Sen, Moloy Dhar and Susrut Banerjee, “Implementation of Human Action Recognition using Image Parsing Techniques”, 2018 Emerging Trends in Electronic Devices and Computational Techniques (EDCT), IEEE.

Zakia Hammal1, Wen-Sheng Chu1, Jeffrey F. Cohn1,2, Carrie Heike3, and Matthew L. Speltz4, “Automatic Action Unit Detection in Infants Using Convolutional Neural Network”, 2017 Seventh International Conference on Affective Computing and Intelligent Interaction (ACII), IEEE

He Xu1,2, Chengcheng Yuan1, Peng Li1,2, Yizhuo Wang3, “Design and Implementation of Action Recognition System Based on RFID Sensor”, 2017 13th International Conference on Natural Computation, Fuzzy Systems and Knowledge Discovery (ICNC-FSKD 2017), IEEE.

Jiahao Li†, Hejun Wu∗ and Xinrui Zhou‡, “PeMapNet: Action Recognition from Depth Videos Using Pyramid Energy Maps on Neural Networks”, 2017 International Conference on Tools with Artificial Intelligence, IEEE.

Nour El Din Elmadany, Yifeng He and Ling Guan, “Information Fusion for Human Action Recognition via Biset/Multiset Globality Locality Preserving Canonical Correlation Analysis”, IEEE TRANSACTIONS ON IMAGE PROCESSING, 2018.

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III. PROPOSED SYSTEM

Proposed work is able to recognize human activity in crowd and analyze whether the action is usual or unusual. System purely debates with crowd based activities that ensure situations. System uses OpenCV library along with python IDE that deals with best precision. System proposes motion influence map that comprises for correct recognition rate. The proposed framework is centered on the acknowledgment of suspicious movement and is planned for finding a technique that can identify suspicious action naturally by utilizing PC vision strategies. Proposed system classifies the differences among the frames using motion influence map that represents the frequent changes in the frames in a short interval of time. Recognizing unusual activity from crowd is difficult task especially for sensor networks; computer vision is an effective approach that can acquire real time human activities and later analyzes for uncommon frames.

IV. METHODOLOGY

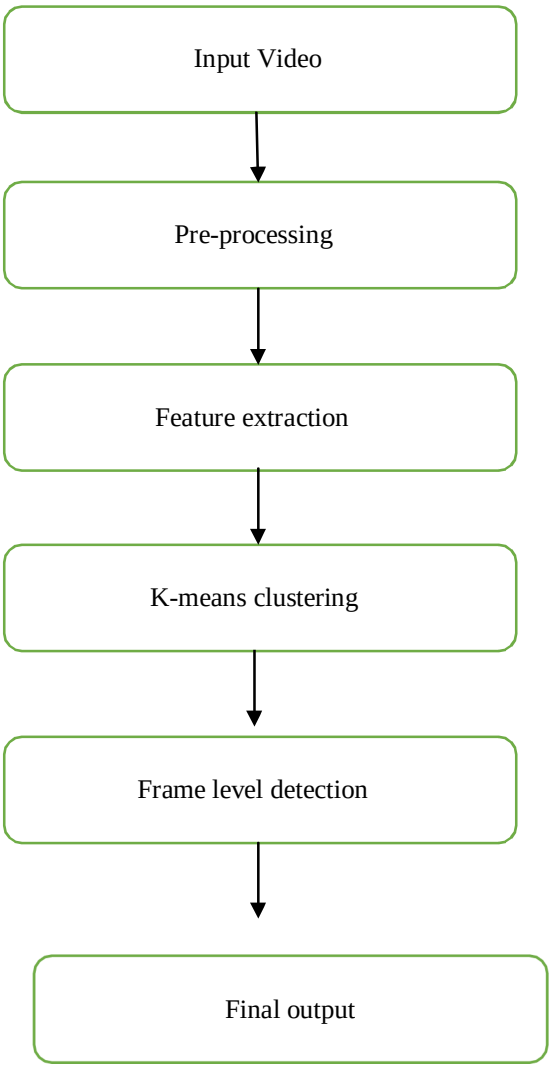

Fig: Flow chart

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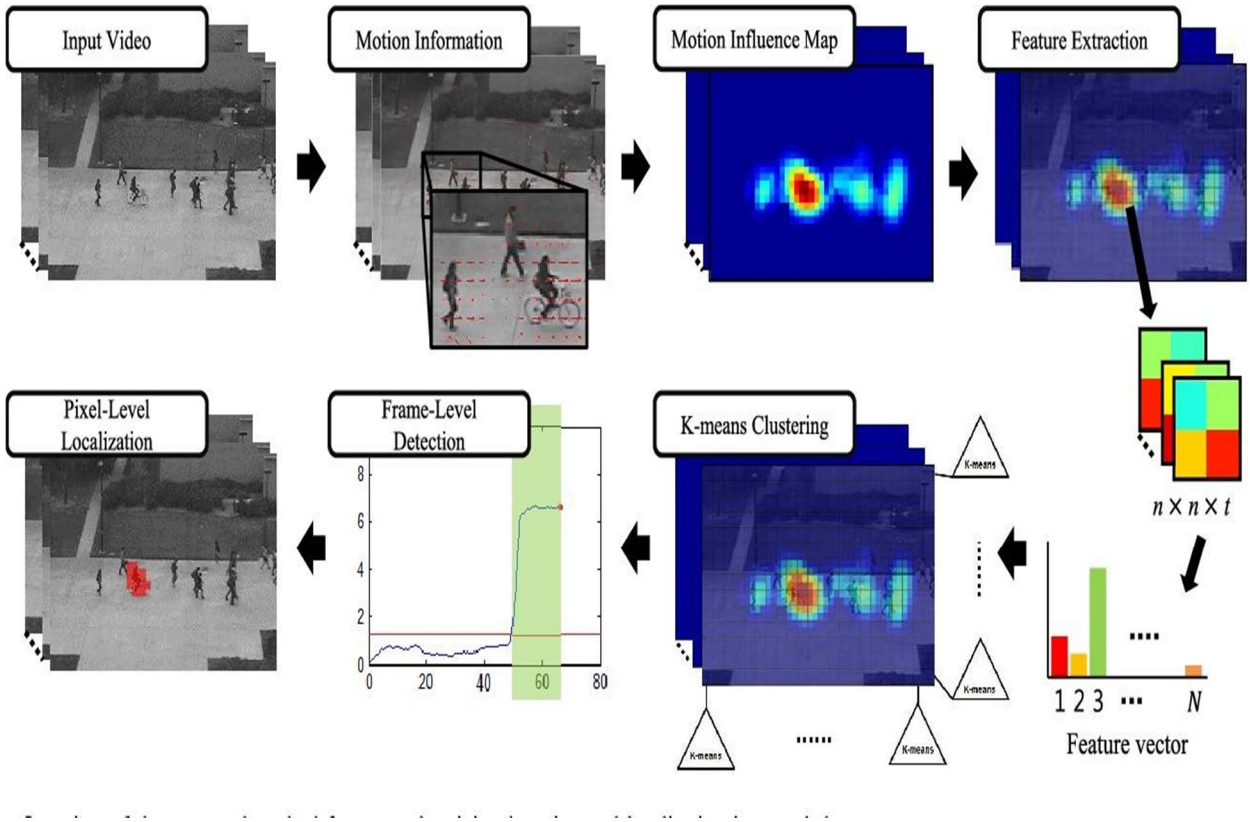
V. PROCESS FLOW



A. Motion Influence MAP

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.

B. Feature Extraction

Feature extraction is a process of dimensionality reduction by which an initial set of raw data is reduced to more manageable groups for processing. A characteristic of these large data sets is a large number of variables that require a lot of computing resources to process. Feature extraction is the name for methods that select and /or combine variables into features, effectively reducing the amount of data that must be processed.

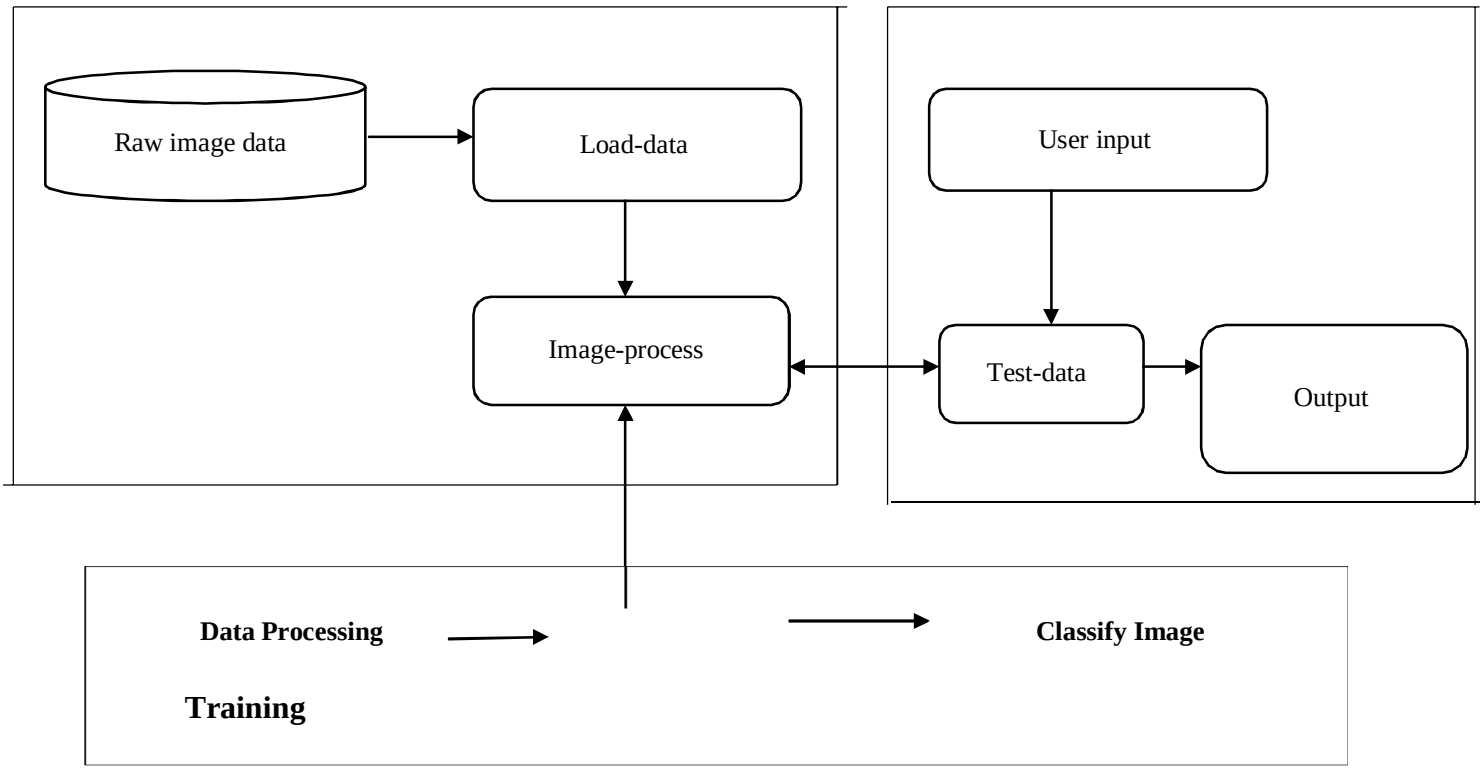
C. K-MEANS Clustering

It is a method of vector quantization, originally from signal processing, that aims to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean (cluster centers or cluster centroid), serving as a prototype of the cluster. This results in a partitioning of the data space into Voronoi cells. *k*-means clustering minimizes within-cluster variances (squared Euclidean distances), but not regular Euclidean distances, which would be the more difficult Weber problem: the mean optimizes squared errors, whereas only the geometric median minimizes Euclidean distances. For instance, better Euclidean solutions can be found using k-medians and k-medoids.

D. Frame Level Detection

We propose a novel framework for abnormal event detection in video that is based on deep features extracted with pre-trained convolutional neural networks (CNN). The CNN features are fed into a one-class Support Vector Machines (SVM) classifier in order to learn a model of normality from training data.

Design Architecture



VI. TEST CASES

A. GUI Layout Testcase

Test Case	1
Name of Test	GUI layout
Input	Resolution(width, height)
Expected output	Display window specified by user resolution
Actual output	User specified window is displayed
Result	Successful

B. Input Button's Testcase

Test Case	1
Name of Test	Input button
Input	Number of buttons and there position in the window(column, row)
Expected output	Display button's in specified column, row
Actual output	Buttons are displayed in the specified position
Result	Successful

C. Video frame GUI Testcase

Test Case	1
Name of Test	**Video frame GUI**
Input	User clicked button
Expected output	Display video frame in GUI
Actual output	Display video frame in GUI
Result	Successful

D. Quit button Testcase

Test Case	1
Name of Test	**Quit button**
Input	User input / click
Expected output	To kill or destroy GUI window
Actual output	Window was killed when user click's exit button
Result	Successful

VII. CONCLUSION

The structures which have been suggested till now are intended to understand basic human behavior such as walking, running and many more but not appropriate for crowded environment. The proposed device is capable of detecting irregular human behavior from the crowd and behavior using deep learning model. The accuracy rating is marginally higher than that of others and less testing has been conducted on this theory. The proposed framework is capable of dealing with Previous Crime Appraisal. By using OpenCV and deep learning, the proposed device is capable of accurately detecting the irregular human behavior of the crowd, which improves the device 's accuracy and expertise to a great degree.

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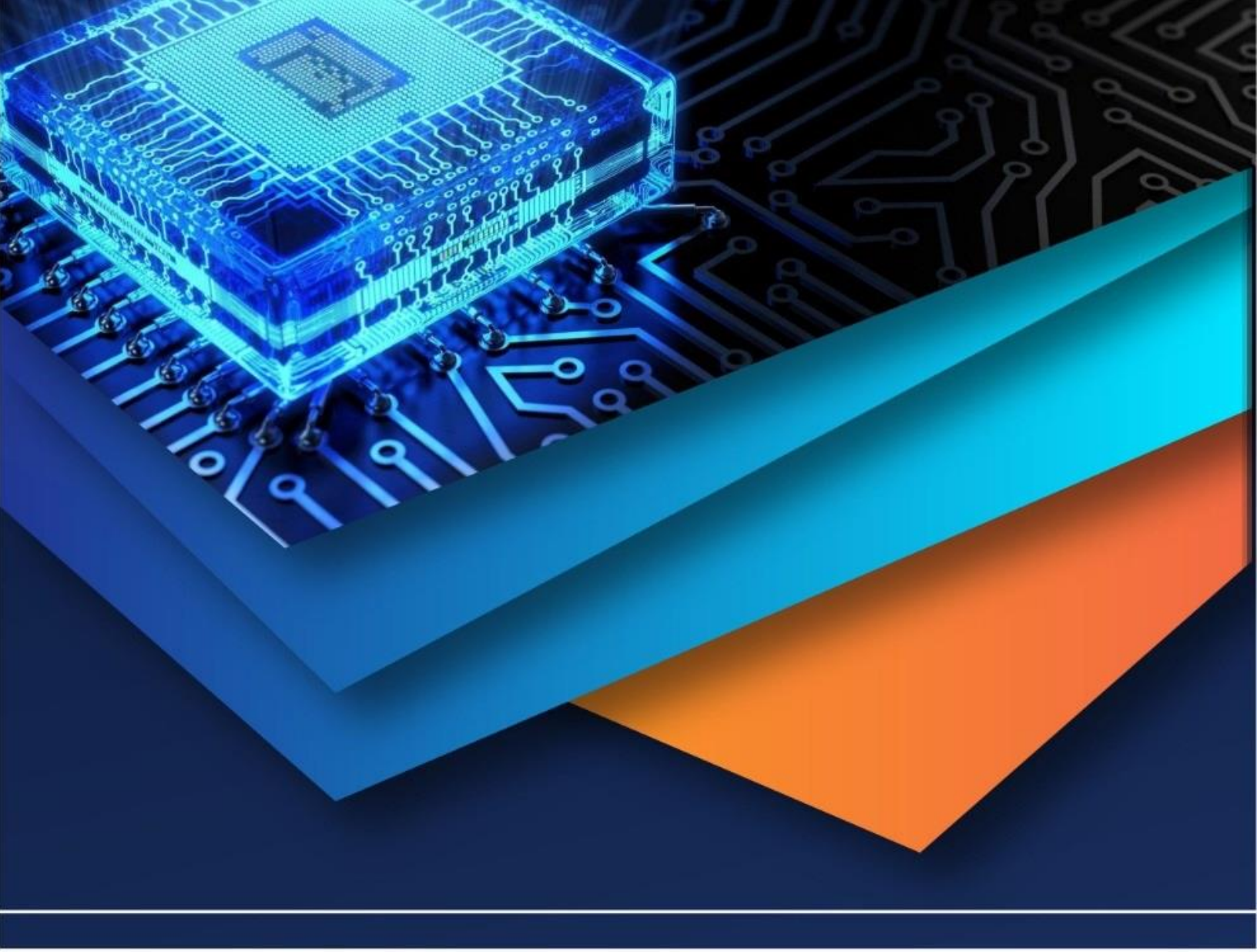

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