IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 5, May 2023

DOI: 10.17148/IARJSET.2023.10565

Unusual Crowd Activity Detection Using OpenCV and Motion Influence

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Abstract: Suspicious behaviour in open areas is sensitive and prone to serious consequences. There are many systems built based on video frame acquisition that monitors motion or identifies pedestrian but those systems are not smart enough to find out the unusual activities even in a real-life scenario. It is necessary to identify fugitive scenarios in real-time from video surveillance for rapid and immediate control before any casualties. To create a technology that can automatically identify suspicious behaviour using computer vision, the system focuses on distinguishing suspicious scenarios and pinpointing the precise target of the activity. The system utilizes the Open CV library for distinguishing and categorizing several kinds of tasks or actions in real-life scenario. Automated event identification, movement-based recognition, person count tracking, autonomous robot navigation, and a variety of other disciplines are some of the other topics covered. Separating objects from their background, on the other hand, is a challenging process.A difficulty arises when an object appears from the background as a result understanding the footage and its elements with portrayed scenarios becomes the most essential requirement. The utilization of a typical human behavior approach is the predictable goal in the unpredicted activity detection phase.

I. INTRODUCTION

General Introduction With the expansion in crime and abnormal human activity that has been occurring, security has been given the most extreme significance recently. Numerous associations have introduced CCTVs for the consistent checking of individuals and their collaborations. A large portion of the memory spaces of the business is involved in big data. The execution of CCTV cameras in all areas because of security purposes and utilization of CCTV cameras is basic however, it devours more memory spaces to store information. Security is utilized for robbery recognizable proof, viciousness recognition, unapproved people entering, criminal behaviour in a locale. Thus, for all unusual movement's security assumes a significant job, so security must be actualized in the area of more privacy. Abnormal Human Activity Detection System is a model for unusual human activity identification in a crowded scene. The development heading of a walker inside a group can be affected by different factors, for example, impediment along the way, close by walkers, and moving trucks. This communication interaction, which we call the "motion influence". In particular, rather than distinguishing or dividing people, we integrate a productive strategy, called a motion influence map, for characterizing to human movement. The key element of the proposed motion influence map is that it viably mirrors the movement qualities of the motion speed, motion heading, and size of the articles or subjects and their interaction inside a frame. Utilizing the proposed motion influence map, we further built up a general system in which we can distinguish both global and local uncommon exercises. Anomaly recognition and limitation can be separated into two sub-issues: how to portray crowd practices, and how to quantify the "anomaly score" of particular conduct. For the main issue, we propose to show movement designs in crowd through the utilization of a mixture of dynamic textures (MDT), which is a bound together portrayal catching both the appearance and dynamics of visual cycles. In the subsequent part, rather than legitimately demonstrating the atypical conduct itself, the routineness is first learned, and afterward the "anomaly score" of perception is processed by estimating the distinction from the regularity model. In particular, two segments are proposed to mirror the regularity in alternate points.

II. REVIEW OF OTHER METHODS

Literature Survey is most important step in the software development process. Before developing the tool, it is necessary to determine the time factor, economy and company strength. Once these things are satisfied, the next step is to determine which operating system and language can be used in developing the tool.

A. Motion Influence Map for Unusual Human Activity Detection and Localization in Crowded Scenes

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Dong-Gyu Lee, Heung-Il Suk, Sung-Kee Park, and Seong-Whan Lee
There has been significant interest in a smart surveillance system that can automatically detect unusual or abnormal activities. Over the last decades, many researchers in computer vision and pattern recognition have devoted their efforts toward human action and human interaction recognition in video Sequences. Recently, abnormal or unusual activity detection in crowded scenes has gained more interest from researchers. Unlike human action or interaction recognition, conventional methods are not applicable to the detection and/or tracking of human subjects in a crowded scene owing to the presence of occlusions, small objects sizes, and other factors. For unusual activity detection in a crowdedscene, texture information such as a spatio-temporal gradient , mixture of dynamic textures , and spatio-temporal frequency , has been considered an efficient means of detection. In the meantime, other groups have used optical flows that directly characterize motion features in a sequence.

B. Unusual Activity Detection in Crowd using Deep Learning.
Marvin Dabhi, Mukti Shah, Prutha Bharti, Priyanka Puvar, Bhagirath Prajapati
Modern technology is making people's life easier, but the safety of life is also most important thing. Crowded places like public events, stadiums, festival grounds, rally affects not only the comfort level of humans, but it also increases the risk of safety of pedestrians and other civilians. Heavy crowds may lead to major accidents, crowd-crush and causing an overall control loss. To reduce the risk of civilians in heavy crowds, we have worked with technology to manage the crowd. The applications of crowd management are manifold, ranging from crowd counting to human computer interaction. Research articulated here is focused on how to detect any unusual event in crowds at the early stage using modern technology like Deep learning so that it be handled and managed timely and causes least harm to civilians. The concept of Convolutional Neural Network is utilized for processing of images and videos.

The aim of this work is to suggest three inspections like tracking the human detecting the direction of the motion and analysing the action. It has become easy to capture and monitor human actions by CCTV cameras around the globe. While video footage capture devices in today's world are more reliable and common, it requires constant human resource intervention to track and evaluate the footage that is not viable. At times situations like this, intelligent systems with appropriate detection techniques come in handy and proven to be more efficient. Heavy crowds may lead to major accidents, crowd-crush and causing an overall control loss. To reduce the risk of civilians in heavy crowds, we have worked with technology to manage the crowd. The applications of crowd management are manifold, ranging from crowd counting to human computer interaction. Research articulated here is focused on how to detect any unusual event in crowds at the early stage using modern technology like Deep learning.

C. Unusual Human Activity Detection using Open CV Python with Machine Learning
Abhishek Mohite, Darshan Sangale, Prathamesh Oza, Tushar Parekar, Prof. Manisha Navale
In this project, we propose a novel method for unusual human activity detection in crowded scenes. Specifically, rather than detecting or segmenting humans. The key feature of the proposed motion influence map is that it effectively the movement speed, movement direction, and size of the objects their interactions within a frame sequence. Using the proposed motion influence map, we further developed a general frame which we can detect both global and local unusual activities. Furthermore, thanks to the power 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.

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 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. 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. 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.

D. Detection of Unusual Activities in Crowd
Payal P. Likhar, P.P.Gundewar
Diagnosing an aberrant event now a day is very necessary. Extraction of unusual event manually is a challenging chore especially in a large number people gathered in a disorganized way. Various detectors has been introduce but failed detect abnormal is proposed in this paper to detect the abnormal events. As a result this detector distinguishes abnormal

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events from the normal once. In this paper, a various techniques are used. Super Vector Machine (SVM) for classification, wavelet transform for feature extraction.

Video surveillances are use in a lot of places because of security purpose. Abnormal event detection processes used in this project was to sensitive to any small movement that it was giving false alarm most of the time hence the proper solution was required to eliminate this problem. Several conditions were introduced in the implementation like wavelet transform for feature extraction, SVM classifier is used to classify the events. The HAAR detection technique is introduced to provide number of moving humans. Some challenges occur during abnormality detection in crowded scenes are rapid movement of object across frames. Sometimes the illumination is not same across the frame another challenge could be that when we Tracking complex future. Now we understand that there is need to address these challenges and therefore their is a need for robust and efficient algorithm for detecting abnormal activities.

III. METHODOLOGY

Software called Anaconda was used to create our project. A desktop GUI called Anaconda Navigator is included with Anaconda Individual Edition. Without utilising command-line commands, it makes it simple to run apps and manage packages and environments. With over 25 million users globally, Anaconda Individual Edition is the most widely used Python distribution platform. We can rely on our ongoing dedication to assisting the Anaconda open-source ecosystem, which serves as the preferred computing environment for Python data science. You can start using thousands of free Conda, R, Python, and other open-source packages by running the conda-install command. Individual Edition is an open source, adaptive system that offers the tools to cross-platformly create, distribute, install, update, and manage software. Conda makes managing various data environments simple.

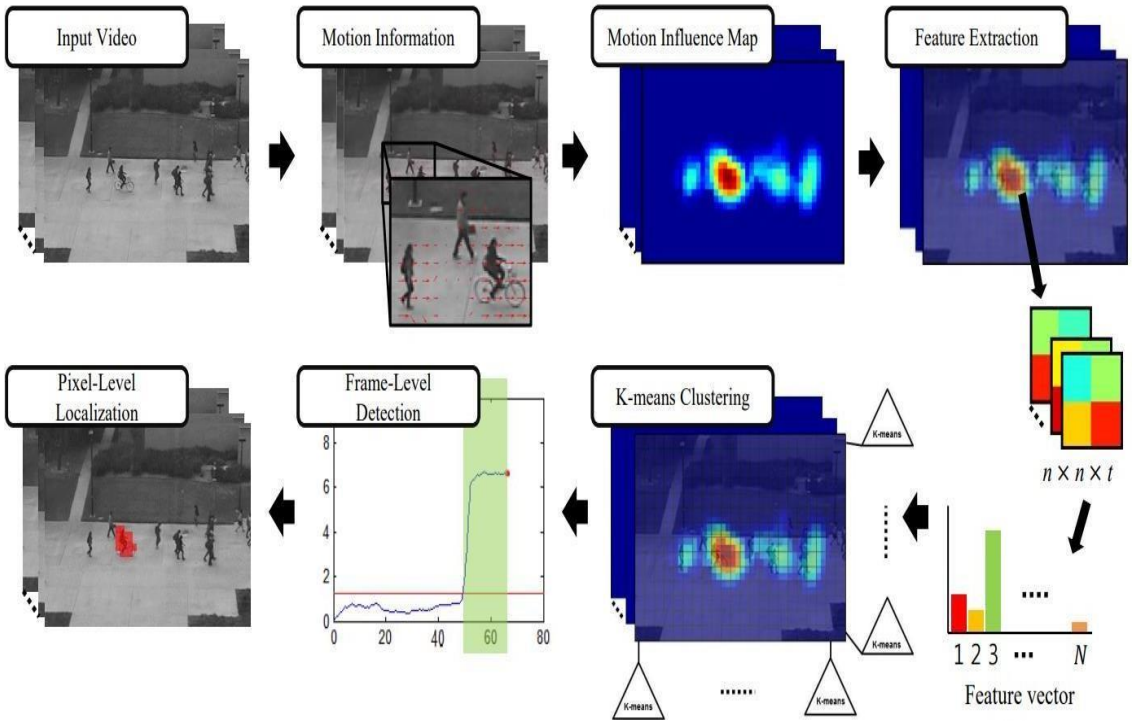

Figure 1: Overview for unusual activity detection and localization in crowded scenes.

Proposed System

We propose to show movement designs in crowd through the utilization of a mixture of dynamic textures (MDT), which is a bound conduct itself, the routineness is first learned, and afterward the "anomaly score" of perception is processed by estimating the distinction from the regularity model. In particular, two segments are proposed to mirror the regularity in alternate points of view.What makes Abnormal Human Activity Detection System model different is that Existing methodologies center particularly around motion information, overlooking anomaly information because of varieties of item appearance. This makes them impenetrable to irregularities that don't include 9 motion anomalies. Besides, descriptors, for example, optical flow, pixel change histograms, or other conventional foundation deduction activities, are hard for swarmed scenes, where the foundation is by definition dynamic, of inescapable mess, and confounded impediments.

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The dataset we have produced contains thousands of photos, each of which has a resolution of 256x384 pixels. It basically involves uploading an image using a browser, and the deep features, which are done in pure Python, will return images of a similar type. Similar images will be fetched after the photographs are uploaded for the similarity search in the web interface. The availability of numerous open-source libraries makes it simple to design and deploy an image processing system.

IV. EXPERIMENTAL RESULTS

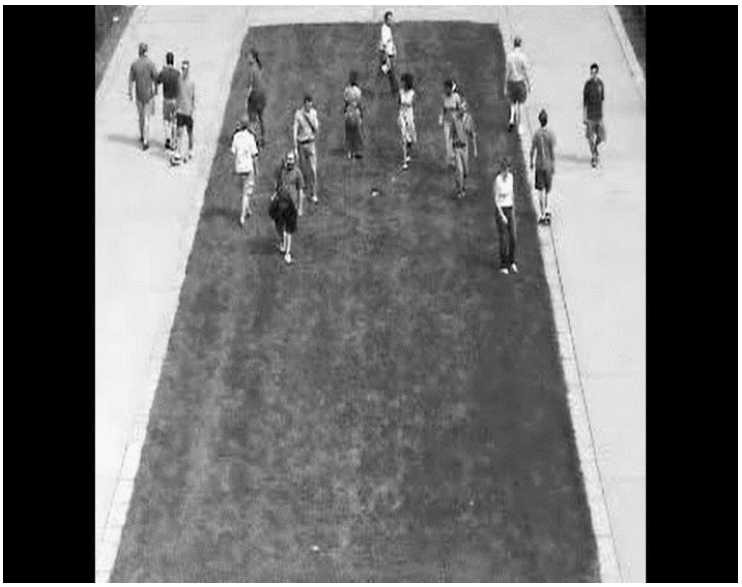

Figure 2 : Normal Activity

Figure 3 : Abnormal activity being detected

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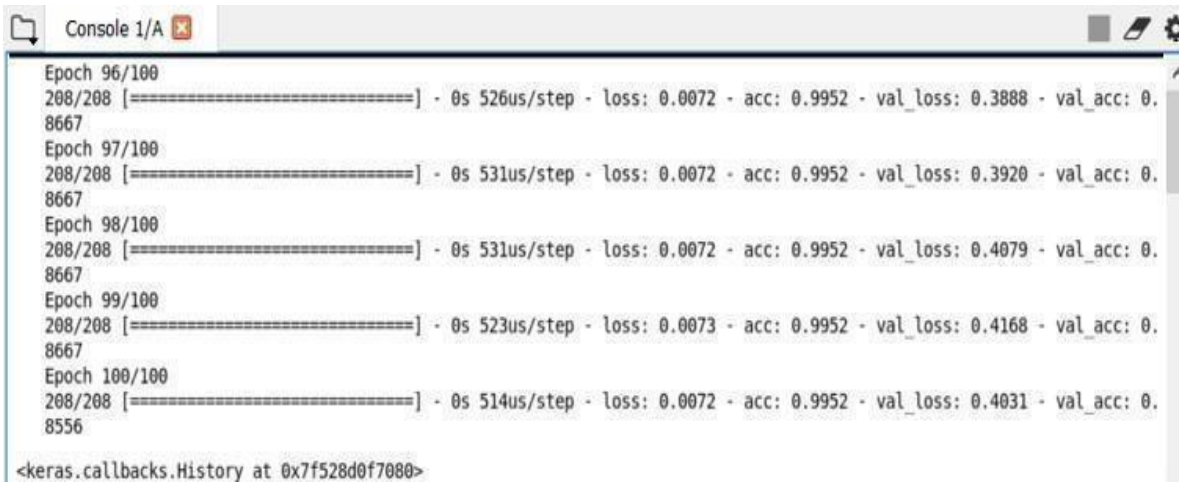

Figure 4 : Training Losses

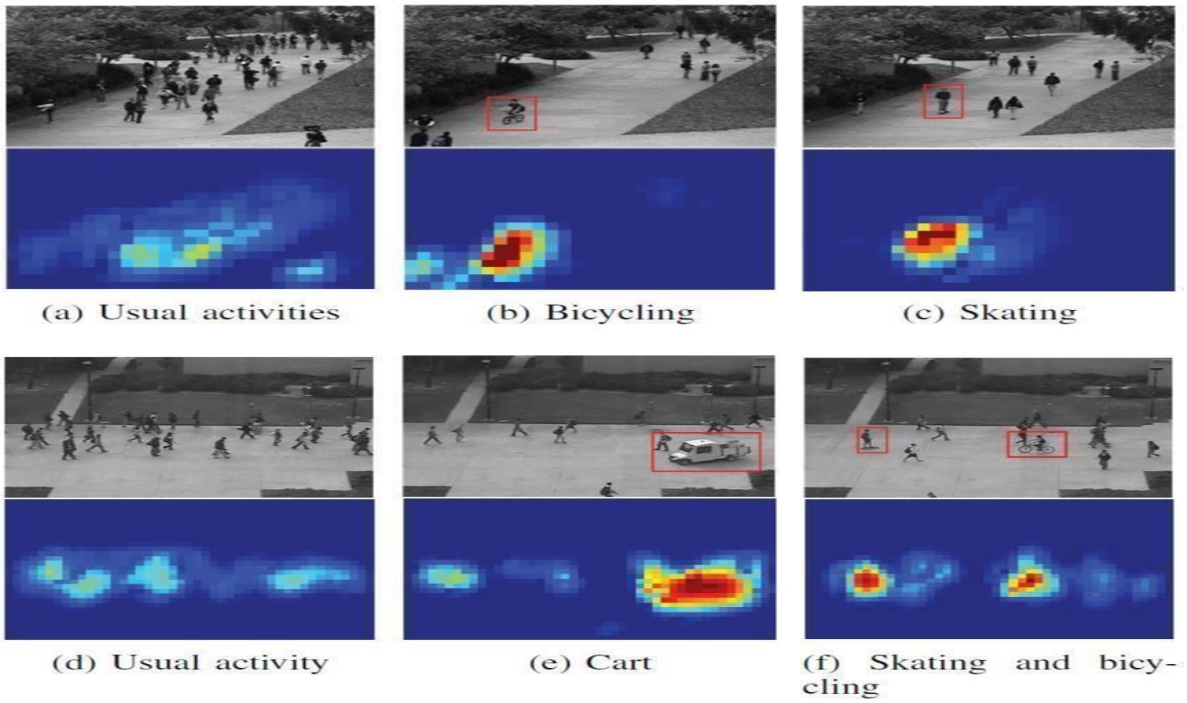

Figure 5 : Sample frames of various unusual activities

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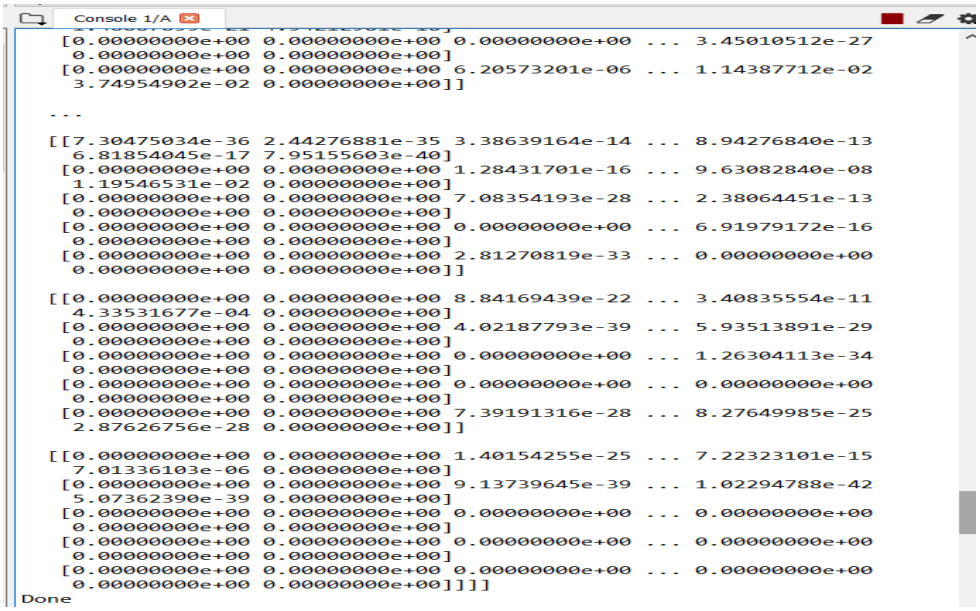

Figure 6 : Codewords formed after training

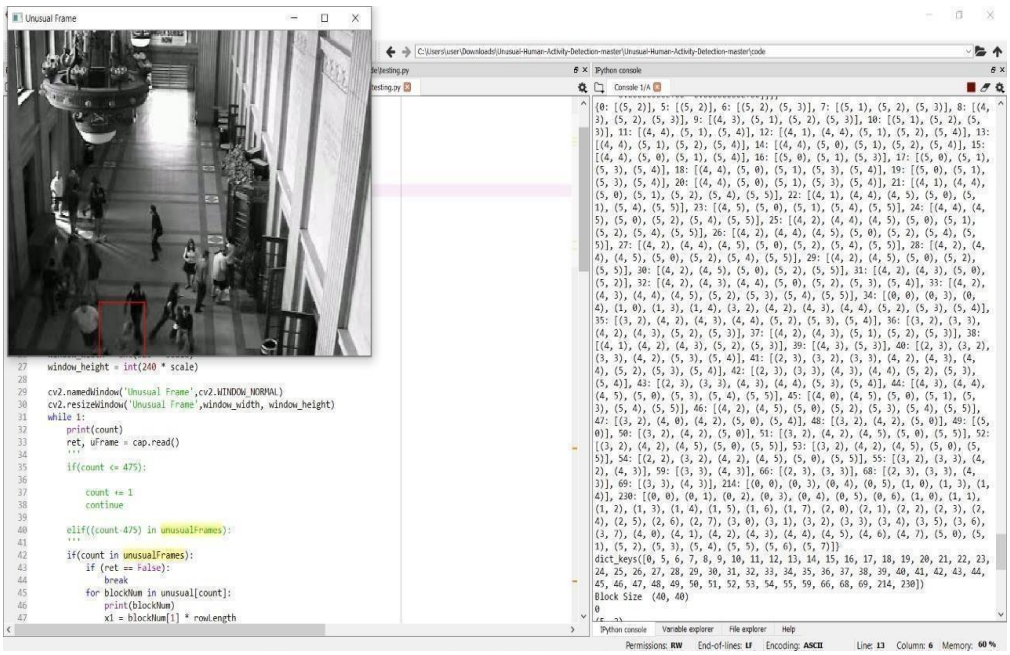

Figure 7 : Display of result

V. CONCLUSION

We have presented an abnormal event detection method via motion influence map. This approach directly learns motion influence characteristics, which increase the testing speed hundreds of times without compromising effectiveness. Our method achieves state-of-the-art results in several datasets. It is related to but differ largely from traditional subspace clustering.

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In a time where surveillance cameras are being used everywhere, effectively checking it for any abnormal event would be a bottleneck. Thus, a fast and intelligent method to check theses surveillance cameras is atmost required. It would help in cutting down a lot of work to be done by people struggling to monitor it and would help it taking faster actions during those situations by integrating these with alarms and other important actions like informing the police or calling an ambulance.

Since it achieves a frame rate of 100fpm, frames can be analysed at a decent rate and thus can be used in surveillance cameras to detect abnormalities automatically. Based on the signal of this system, alarms and other actions can be controlled. 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.

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