



# OPEN ACCESS INTERNATIONAL JOURNAL OF SCIENCE & ENGINEERING

## A SURVEY ON INTELLIGENT SURVEILLANCE VIDEO ANALYTICS SYSTEM USING VIDEO PROCESSING AND MACHINE LEARNING

Priya P. Morey<sup>1</sup>, Prof. Dr. S. M. Deshmukh<sup>2</sup>, Prof. Dr. N. N. Khalsa<sup>3</sup>

Student M.E.(Digital Electronics), Department of Electronics Engg., Prof. Ram Meghe Inst. of Technology & Reaserch, Badnera, India<sup>1</sup>

Professor and Head, Department of Electronics Engg., Prof. Ram Meghe Inst. of Technology & Reaserch, Badnera, India<sup>2</sup>

Associate Professor, Department of Electronics Engg., Prof. Ram Meghe Inst. of Technology & Reaserch, Badnera, India<sup>3</sup>  
priyasinghbagade@gmail.com<sup>1</sup>

**Abstract:** Surveillance video system framework assumes a huge part in the security frameworks of current urban communities since it can suspicious objects and abnormal behavior early instead of the late location by people. Though, because of the development in surveillance, a gigantic measure of information is produced which makes the analytics, storage and retrieval of the information perplexing. Each private or public region today is liked to be under surveillance to guarantee significant degrees of safety. Subsequently the surveillance occurs nonstop, information accumulated thus is immense and requires a great deal of manual work to go during each time of the recorded recordings that is the reason manual perception by security faculty for extended periods isn't plausible no proficient. There is a requirement for a smart and intelligent framework which can conquer this trouble via computerizing this interaction. It should alarm the security staff when doubtful items in the edge are recognized. It ought to likewise restrain fake alerts. If this is accomplished, crafted by surveillance will be upgraded and the existence of safety recruits can be utilized else-where more workforce is required. In this project, we deliver a exhaustive study of the present work in research of surveillance system. The most of the model reviewed are based on the principle of video processing and machine learning which helps to identify anomalous and normal behavioral classes among surveillance video. **Keywords:** Video Processing, Machine Learning, Surveillance System, intelligent video surveillance

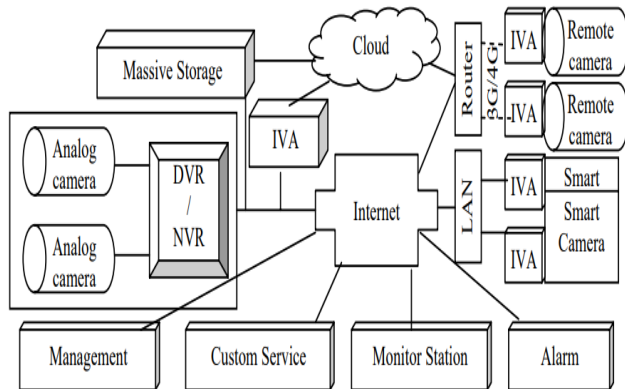
### I INTRODUCTION

Video surveillance frameworks have full-fledged in modification in the course of recent many years, getting pervasive in both exclusive settings (shopping centers, arena) and public spaces (transportation center points, city roads). Live recorded and observing video aid to prevent offence, address violations, and give proof to indictment. While so many CCTV recording techniques (servers, cameras, display walls and network infrastructure) has developed, survey of video stays an intensely manual assignment [1] [5]. It is unthinkable for a predetermined number of administrators to persistently screen all telecast over several camera, convoluted further by realized human-factors issues of visual over-burden, carefulness, change visual impairment, and job interference. In numerous security situations, for example, activity focuses of basic framework (air terminals, rail frameworks), video is utilized from a responsive perspective. An administrator is

prompted somehow or another, regularly through report of a doubtful individual or thing, a concealed wire caution, or automatic alarm from the video framework itself. The administrator then wants to discover pertinent cameras, areas, and time ranges to explore the occasion [8].

Surveillance is an interaction of inspecting a territory, to monitor any exercises. Each private or public region is ideally held under inspection to improve safety efforts. Nonetheless, Closed Circuit Television (CCTV) cameras produce a gigantic measure of video information. Efficient surveillance uncover strange occasions in these recordings. Recognizing misconduct events, blasts, mishaps, and so on are a portion of the basic undertakings in video observation. It is trying to physically discover glitches from the gigantic measure of information accessible for observation purposes. The event of abnormal occasions that are of interest for checking reason could be low contrasted with typical occasions. Subsequently, physically examining this

information to discover peculiar occasions is a drawn-out task and can be work costly [12-15]. Peculiarity recognition in observation is a cycle of checking a region to recognize any examples of conduct which show a deviation from the examples of ordinary conduct. Fig. 1 shows the outline of present video frameworks.



**Figure 1: Generalized architecture of Intelligent Video Surveillance System**

Existing strategies which utilize manual insight by security workforce 24x7 is certainly not a productive or attainable route for observation. Assume if any individual conveys a blade or a weapon in a jam-packed spot, it can go undetected due to the powerlessness of the security workforce to see such items in the group through the unaided eye. Hence there was a need of a framework which would in the end beat this issue, a framework which would have the option to include the quantity of individuals in the casing and recognize protected and uncertain items. This would bring down the weight on the security staff and make the cycle of surveillance more careful and proficient [16-18]. Such frameworks can be utilized in historical centers, air terminals, signals and banks. Abnormality location in recordings requires the utilization of computer vision and machine learning. The subsequent framework with machine learning and video preparing won't just assistance in computerizing the observation cycle yet will likewise serve to productively limit human blunders and carelessness in security angles.

**II RELATED WORK**

Work presented by various authors is portrayed as an action to determine, identify and scrutinize all publications or researches explores or distributions in a particular territory to introduce the response to each examination question is done and given beneath.

Anala M.R. et.al. [1] designed a framework which recognize abnormal practices and alert the client on the kind of odd conduct. Since there are a heap of abnormalities, the characterization of irregularities must be limited. There are sure irregularities which are by and large seen and gigantically

affect public security, like blasts, street mishaps, attack, shooting, and so forth To limit the varieties, this framework can distinguish blast, street mishaps, shooting, and battling and surprisingly yield the edge of their event. The model has been prepared with recordings having a place with these classes. The dataset utilized is UCF Crime dataset. Taking in designs from recordings requires the learning of both spatial and worldly highlights. Convolutional Neural Networks (CNN) separate spatial highlights and Long Short-Term Memory (LSTM) networks become familiar with the groupings. The characterization, utilizing a CNN-LSTM model accomplishes an exactness of 85%.

Sirurang Phatchuay et.al. [2] presented calculations for reconnaissance checking understudy conduct in the research center and distinguished understudy conduct. With exercises while learning issues. The camera used to concentrate attention on the scholars with computer vision for detection of face. To screen conduct with multiple or different video camcorders (MVC), the outcome is facial acknowledgment. Furthermore, the framework will make the Lecture aware of perceive unusual conduct of understudies. Assents and to discover how the understudies are keen on finding out more, 20% of the test when school hours at whatever point viable.

Kang Hao Cheong et.al. [3] introduced a minimal expense and proficient methodology that coordinates the utilization of computational item recognition to accomplish complete automation, counting, and tracking of human traffic on camera video transfers. Two programming executions are investigated and the presentation of these plans is looked at. Approval against controlled and non-controlled true conditions is likewise illustrated. The execution gives automatic video investigation to monitor mock people and its tracking, taking out worker task generally requiring human activity, with results demonstrating better performance in real time situations.

Marianne DeAngelus et.al. [4] discussed FOVEA, an extra set-up of scientific devices for the criminological audit of video in enormous scope surveillance frameworks. While huge speculation has been made toward improving camera inclusion and quality, the weight on video administrators for assessing and separating helpful data from the video has just expanded. Every day examination assignments (like looking through video, exploring deserted items, or sorting out data from different cameras) actually require a lot of manual inspection by video administrators. As opposed to different devices which require sending out video information or in any case curating the video assortment before investigation, FOVEA is intended to coordinate with existing reconnaissance frameworks. Apparatuses can be applied to any video transfer in an on-request style without extra equipment. This paper subtleties the specialized methodology, fundamental

calculations, and consequences for video administrator execution.

Gargi Desai et.al. [5] implemented framework apprehends video transfer, registers the info and the framework alarms are produced progressively, which implies no extra sensors would be required. Utilizing camera itself, the arrangement is to distinguish mishaps progressively and furthermore send alarms to ambulances or clinical benefits; so that fitting assets required for saving lives are accessible on schedule. Different targets are: to recognize vehicles what defy as far as possible guidelines and transfer this data to a concerned position; to screen limited streets zones and traffic light infringement, and plan to identify number plates of the violators and discover them. Alongside this the proposed framework will likewise order the kind of vehicles that sudden spike in demand for street, so further development of streets can be customized according to the normal vehicles for smoother traffic stream. In this investigation we will be taking assistance of calculations, for example, Background Subtraction, Morphological changes and numerous other fundamental ideas to play out the undertakings referenced previously. By utilizing innovation at its best, the point is to incorporate different variables into one shrewd framework. The undertaking will profit to lessen cost of street observation framework and complete automation of street surveillance framework.

Mandar S Munagekar et.al. [6] addressed the distinguishing a crime occurring in an encased climate and catch the burglary in an effective way. This paper utilizes Canny edge detection calculation to forestall robbery. As this method gives absolute security by identifying and getting of surprising movement occurring. Besides, proposed framework doesn't discarded its memory by recording the movement superfluously. Subsequently saves wastage of memory of hard disk.

Virender Singh et.al. [7] has primary objective is to consequently distinguish indications of hostility and brutality progressively, which channels out anomalies from typical examples. We plan to use diverse Deep Learning models (CNN and RNN) to recognize and arrange levels of high development in the casing. From that point, we can raise an identification alert for the circumstance of a danger, demonstrating the dubious exercises at a case of time.

Ashish Singh Patel et.al. [8] introduced a system to utilize the observation in videos to remove helpful data like location of trucks, their enlistment number/proprietorship distinguishing proof, tally of approaching and active trucks, and check of stacked or void trucks. We tried the work introduced in this paper at the paddy stockpiling focuses in Chhattisgarh, India, and the outcomes were extremely reassuring.

Tasriva Sikandar et.al. [9] presented survey which encapsulates the data dependent on anomaly identification, highlights, framework structure and strategy, picture procurement, test determination, execution investigation and venture financing. Besides, the review assesses the examinations according to the perspective of their pertinence, reasonableness, and utilization in unique climate like ATM. Survey all in all, regardless of having tremendous potential, an undeniable video observation framework coordinated with picture preparing techniques has not been found in the current writing for ATM. The discoveries of this audit may assist the future scientists with creating dynamic and multipurpose calculations for observation framework that can identify and forestall ATM misconduct.

Zhenfeng Shao et.al. [10] introduced a new intellectual processing and use answer for huge observation video information dependent on the occasion recognition and disturbing messages from front-end keen cameras. The strategy incorporates three sections: the intelligence pre-disturbing for strange occasions, smart capacity for reconnaissance video and quick recovery for proof recordings, which completely investigates the transient fleeting spatial affiliation examination regarding the unusual occasions in various observing destinations. Proposed results uncover that proposed approach can dependably pre-alert security hazard occasions, considerably diminish extra room of recorded video and fundamentally accelerate the proof video recovery related with explicit suspects.

### III CONCLUSION

The modern strategy that is broadly applied in each critical thinking visual oversight is concentrated around three principle task, for example tracking, identification, and acknowledgment of movements or getting behaviours. Many machine learning techniques have been suggested and appealed as answers for visual observation. Notwithstanding visual observation that applies image or video processing techniques, there are various examinations that emphasis on refining and incorporating network foundation plans to satisfy the need for interactive media information produced by surveillance gadgets. In this paper, general outline of insightful observation frameworks has been introduced. Such novel or intelligent frameworks are promising to be executed in different conditions and applications. Though a few promising outcomes have been acquired, further investigations are required for genuine execution with more intricate settings.

### REFERENCES

[1]M.R., M. Makker and A. Ashok, "Anomaly Detection in Surveillance Videos," 2019 26<sup>th</sup> International Conference on High Performance Computing, Data and Analytics Workshop (HiPCW), Hyderabad, India, 2019, pp. 93-98, doi: 10.1109/HiPCW.2019.00031.

- [2]Siruruang Phatchuay, and Mahasak Ketcham, "The Surveillance System for Lab Security based on Image Processing", Int'l Conference on Advanced Computational Technologies & Creative Media (ICACTION'2014) Aug. 14-15, 2014 Pattaya (Thailand), <http://dx.doi.org/10.15242/IIIE.E0814542>
- [3]K. H. Cheong et al., "Practical Automated Video Analytics for Crowd Monitoring and Counting," in IEEE Access, vol. 7, pp. 183252-183261, 2019, doi: 10.1109/ACCESS.2019.2958255.
- [4]M. DeAngelus, R. Duarte, Z. Elko and J. Thornton, "On-demand Forensic Video Analytics for Large-Scale Surveillance Systems," 2019 IEEE International Symposium on Technologies for Homeland Security (HST), Woburn, MA, USA, 2019, pp. 1-7, doi: 10.1109/HST47167.2019.9033004.
- [5]G. Desai, V. Ambre, S. Jakharia and S. Sherkhane, "Smart Road Surveillance Using Image Processing," 2018 International Conference on Smart City and Emerging Technology (ICSCET), Mumbai, 2018, pp. 1-5, doi: 10.1109/ICSCET.2018.8537279.
- [6]Mandar Shriram Munagekar, "Smart Surveillance system for theft detection using image processing", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056, Volume: 05 Issue: 08 | Aug 2018
- [7]Virender Singh, Swati Singh, Pooja Gupta, Real-Time Anomaly Recognition Through CCTV Using Neural Networks, Procedia Computer Science, Volume 173, 2020, Pages 254-263, ISSN 1877-0509, <https://doi.org/10.1016/j.procs.2020.06.030>.
- [8]A. S. Patel, O. P. Vyas and M. Ojha, "Vehicle Tracking and Monitoring in Surveillance Video," 2019 IEEE Conference on Information and Communication Technology, Allahabad, India, 2019, pp. 1-6, doi: 10.1109/CICT48419.2019.9066256.
- [9]Sikandar, Tasriva & Ghazali, Kamarul & Rabbi, Mohammad. (2018). ATM crime detection using image processing integrated video surveillance: a systematic review. Multimedia Systems. 2018. 10.1007/s00530-018-0599-4.
- [10]Shao, Zhenfeng et al. "Smart Monitoring Cameras Driven Intelligent Processing to Big Surveillance Video Data." IEEE Transactions on Big Data 4 (2018): 105-116.
- [11]V. C. M. Vishnu, M. Rajalakshmi, and R. Nedunchezian, "Intelligent traffic video surveillance and accident detection system with dynamic traffic signal control," Cluster Comput., vol. 21, no. 1, pp. 135–147, 2018.
- [12]C. Ma, D. Liu, X. Peng, L. Li, and F. Wu, "Traffic surveillance video coding with libraries of vehicles and background," J. Vis. Commun. Image Represent., vol. 60, pp. 426–440, Apr. 2019.
- [13]D. Karthikeswaran, N. Sengottaiyan, and S. Anbukaruppusamy, "Video surveillance system against anti-terrorism by using adaptive linear activity classification (ALAC) technique," J. Med. Syst., vol. 43, no. 8, p. 256, 2019
- [14]V. Tsakanikas and T. Dagiuklas, "Video surveillance systems-current status and future trends," Comput. Elect. Eng., vol. 70, pp. 736–753, Aug. 2018.
- [15]D. Frejlichowski, K. Gościewska, P. Forczmański, and R. Hofman, "Application of foreground object patterns analysis for event detection in an innovative video surveillance system," Pattern Anal. Appl., vol. 18, no. 3, pp. 473–484, 2015.
- [16]B. Cui, J. Cui, and D. Yong, "Intelligent security video surveillance system based on deviance technology," Journal of Mechanical Strength, vol. 42, no. 1, pp. 1–12, 2016.
- [17]V. Khatri, "Intelligent video surveillance using soft biometrics," Xitsonga Lila You Shavian/System Engineering Theory and Practice, vol. 35, no. 5, pp. 12-13, 2015.
- [18]N. Babaguchi, A. Cavallaro, R. Chellappa, F. Dufaux, and L. Wang, "Special issue on intelligent video surveillance for public security and personal privacy," IEEE Transactions on Information Forensics & Security, vol. 16, no. 1, pp. 8–15, 2017.