



## Webcam Surveillance and Plotting using OpenCV and Bokeh

<sup>1</sup>Prabhav Jain, <sup>2</sup>Yashraj Singh Solanki, <sup>3</sup>Pragya Mahalkari, <sup>4</sup>Pawan Makhija, <sup>5</sup>Sanjay Singh Bisht

<sup>1,2,3,4,5</sup>Acropolis Institute of Technology & Research, Indore

### ABSTRACT—

For the Current Situation, now a Day Video Surveillance is an Important Security Mechanism for many Applications either it is for personal use or Commercial use. Using the Surveillance System we can establish security without physical need. In this paper we have done comprehensive Study on Motion Detection in Video with Surveillance System.

**Keywords—** Video Tracking, OpenCV, Motion Detection, Bokeh Plotting.

### I. Introduction

The topic of the project is “Motion Detection Application Using Web Camera”. From the topic, everyone may know that the target of the project is using “web camera” to achieve the target of the “motion detection”. In the application, there are many web camera attached to the computer. These web cams are used as an eye to find motion. Whenever a movement occurs in front of the web cam that frame is stored in specific location. The project also focuses on reducing the storage capacity needed for these types of applications.

Webcam Surveillance and Plotting using OpenCV and Bokeh uses advanced motion detection algorithms. It allows detecting the movement of any objects or people in the camera field of view. With this feature, you can monitor or record all activity in automatic mode. If motion detected, the application plots graph according to the time stamps.

### II. Literature Review

S.No.	Existing system/website/software	Features	Disadvantages
1.	<a href="https://www.geeksforgeeks.org/webcam-motion-detector-python/">https://www.geeksforgeeks.org/webcam-motion-detector-python/</a>	Different frames available for motion detection.	Lacks feature of Graph Plotting.
2.	<a href="https://www.researchgate.net/publication/242733396_Implementation_of_a_Motion_Detection_System">https://www.researchgate.net/publication/242733396_Implementation_of_a_Motion_Detection_System</a>	Accurate.	User cannot access CSV file.
3.	<a href="https://nevonprojects.com/camera-motion-sensing-project/">https://nevonprojects.com/camera-motion-sensing-project/</a>	Background Noise Detection.	Only Color Frame available.

### III. Methodology

- A. We have used quantitative methods to gather data and analyze our system. In these methods we have performed different test cases on our system.

These includes cases like when:

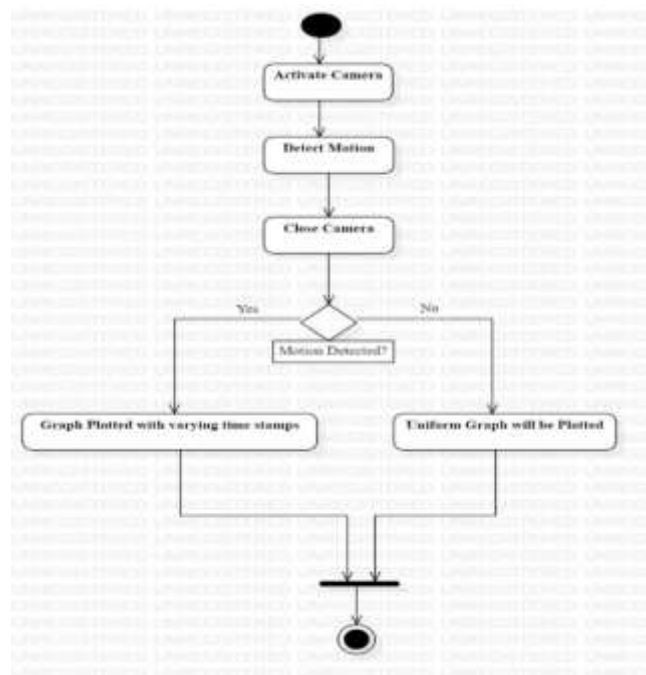
- (a) When there is no activity in front of the webcam.
- (b) When a movement occurs in front of the webcam.

We have used 4 different frames for detecting motion,

The frames are:

1. Gray Frame : In Gray frame the image is a bit blur and in grayscale we did so because, In gray pictures there is only one intensity value whereas in RGB(Red, Green and Blue) image there are three intensity values. So it would be easy to calculate the intensity difference in grayscale.
2. Delta Frame : Delta frame shows the difference of intensities of first frame to the current frame.
3. Threshold Frame : If the intensity difference for a particular pixel is more than a certain value then that pixel will be white and if the difference is less than that value, pixel will be black.
4. Color Frame : In this frame, you can see the color images in color frame along with green contour around the moving objects.

#### B. System Model:



## IV. Materials

As for the materials, we have mainly used python libraries like OpenCV and Bokeh.

OpenCV: OpenCV is the huge open-source library for the computer vision, machine learning, and image processing and now it plays a major role in real-time operation which is very important in today's systems. By using it, one can process images and videos to identify objects, faces, or even handwriting of a human.

Bokeh: Bokeh is a Python library for creating interactive visualizations for modern web browsers. It helps you build beautiful graphics, ranging from simple plots to complex dashboards with streaming datasets.

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## V. Results

After following the methodologies, the system was created with the integration of Bokeh Plotting. The system formed is reliable and can help in detection of motion. Also with the addition of Bokeh Plotting, the system formed provides better visualization of results.

#### A. The Modules created were:

##### 1) User:

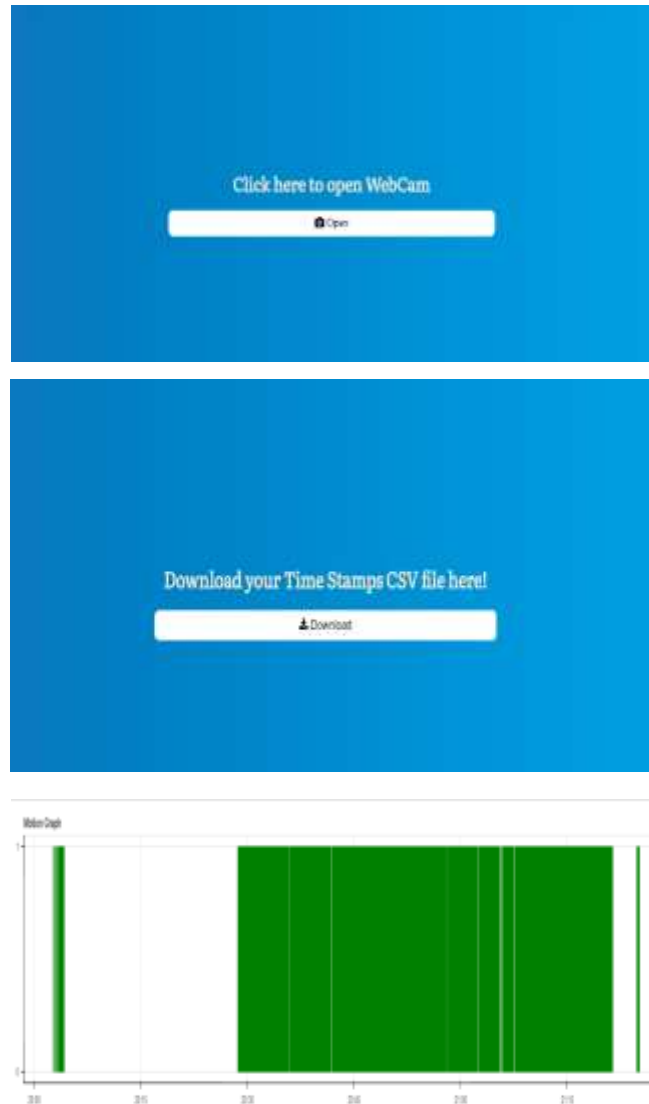
- **Open Camera:** Firstly the user will open the camera using the 'Open Webcam' button and record video.

- **Close Camera:** To stop the camera the user have to press 'Q'.
- **View Graph:** The HTML which contains the Graph will automatically get opened once the user will press 'Q' to stop the camera. The Graph contains the plotted view of time stamps of all the movements.
- **Download CSV:** User can also download the CSV file containing all the time stamps using the download button provided there.

2) System:

- As the user provides the recorded video, the system will generate CSV file and Graph.

B. Screenshots



## VI. Conclusion

The proposed approach is able to reduce the storage size by storing only the time intervals having motion instead of the whole video and plot the recorded values on a graph. A video monitoring & detection system was thus developed successfully in this paper. This system mainly provides an efficient method for surveillance purposes and is aimed to be highly beneficial for any person or organization. Thus, a motion detection system for videos was completed and successfully implemented.

## VII. Acknowledgment

We thank the almighty Lord for giving me the strength and courage to sail out through the tough and reach on shore safely.

There are number of people without whom this projects work would not have been feasible. Their high academic standards and personal integrity provided me with continuous guidance and support.

We owe a debt of sincere gratitude, deep sense of reverence and respect to our guide and mentor **Mr. Mayank Bhatt**, Professor, AITR, Indore for his motivation, sagacious guidance, constant encouragement, vigilant supervision and valuable critical appreciation throughout this project work, which helped us to successfully complete the project on time.

We express profound gratitude and heartfelt thanks to **Mr. Prashant Lakkadwala**, HOD IT, and AITR Indore for his support, suggestion and inspiration for carrying out this project. I am very much thankful to other faculty and staff members of IT Dept., AITR Indore for providing me all support, help and advice during the project. We would be failing in our duty if do not acknowledge the support and guidance received from **Dr S C Sharma**, Director, AITR, Indore whenever needed. We take opportunity to convey my regards to the management of Acropolis Institute, Indore for extending academic and administrative support and providing me all necessary facilities for project to achieve our objectives.

We are grateful to *our parents* and *family members* who have always loved and supported us unconditionally. To all of them, we want to say “Thank you”, for being the best family that one could ever have and without whom none of this would have been possible.

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