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Using Sift Algorithm Identifying An Abandoned Object By Moving Camera

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ABSTRACT

Detection of suspicious items is one of the most important applications in Visual Surveillance. To find out those suspicious items the static objects were detected in a scene using a moving camera which detects a slight color variation, light variation and climatic changes but failed to detect the particular abandoned object. To deal with this detection problem we propose a system, which can detect only those suspicious object by using "SIFT ALGORITHM" which remove alarms in flat areas.

Keyword: Abandoned object detection, geometric and photometric alignment, video matching.

1. INTRODUCTION

To deal with this detection problem, we propose a simple but effective framework based upon matching a reference and a target video sequences. The reference video is taken by a moving camera when there is no suspicious object in the scene, and the target video is taken by a second camera following a similar trajectory, and observing the same scene where suspicious objects may have been abandoned in the mean time. The objective is to find these suspicious objects. We will fulfil it by Matching and comparing the target and reference sequences. To make things efficient, GPS is initially utilized to roughly align the two sequences by finding the corresponding intersequence frame pairs. The symbols R and T are used throughout this paper to denote the GPS-aligned reference and target video respectively. Based upon the GPS alignment, the following four ideas are proposed to achieve our objective. 1) an intersequence geometric alignment based upon homographies to find all possible suspicious areas, 2) an intrasequence alignment (between consecutive frames of R) to remove false alarms on high objects, 3) a local appearance comparison between two aligned intrasequence frames to remove false alarms in flat areas (more precisely, in the dominant plane of the scene) , and 4) a temporal filtering step using homography alignment to confirm the existence of suspicious objects.

2. RELATED WORK

Almost all current methods for static suspicious object detection are aimed at finding abandoned objects using a static camera in a public place, e.g., commercial center, metro station or airport hall. Spengler and Shield propose a tracking/surveillance system to automatically detect abandoned objects and draw the operator's attention to such events [1]. It consists of two major parts: A Bayesian multi person tracker that explains as much of the scene as possible, and a blob-based object detection system that identifies abandoned objects using the unexplained image parts. If a potentially abandoned object is detected, the operator is notified, and the system provides the operator the appropriate key frames for interpreting the incident. Porikli *et al.* propose to use two foreground and two background models [2] for abandoned object detection. The abandoned objects are correlated within multiple camera views using location information, and a time-weighted voting scheme between the camera views is used to issue the final alarms and eliminate the effects of view dependencies. Smith *et al.* propose to use a two-tiered approach [3].

3. METHODS

To detect non flat static objects in a scene using a moving camera . Since these objects may have arbitrary shape , color or texture , state-of-the-art category-specific object detection technology , which usually learns one or more specific classifiers based upon a large set of similar training images. We propose a simple but effective framework based upon matching a reference and a target video sequence. The reference video is taken by a moving camera when there is no suspicious object in the scene, and the target video is taken by a second camera following a similar trajectory, and observing the same scene where suspicious objects may have been abandoned in the mean time. The objective is to find these suspicious objects. We will fulfil it by matching and comparing the target and reference sequences.

4. MODULE DESCRIPTION

4. INTERSEQUENCE GEOMETRIC ALIGNMENT MRANSAC-BASED HOMOGRAPHY ESTIMATION

Apply SIFT algorithm to get a set of SIFT feature descriptors for reference R and target T. Find the putative matches between these SIFIT features of R and T and find the optimal H inter using MRANSAC. Find the best as H temp as H inter. The second image of bottom row, the optimal inliers obtained by MRANSAC. By visually comparing the two images in the last column, MRANSAC gives better alignment than RANSAC. Based upon H inter , the reference frame is warped into to fit the target frame .We get the NCC image between and . We binaries the NCC image into with a threshold.

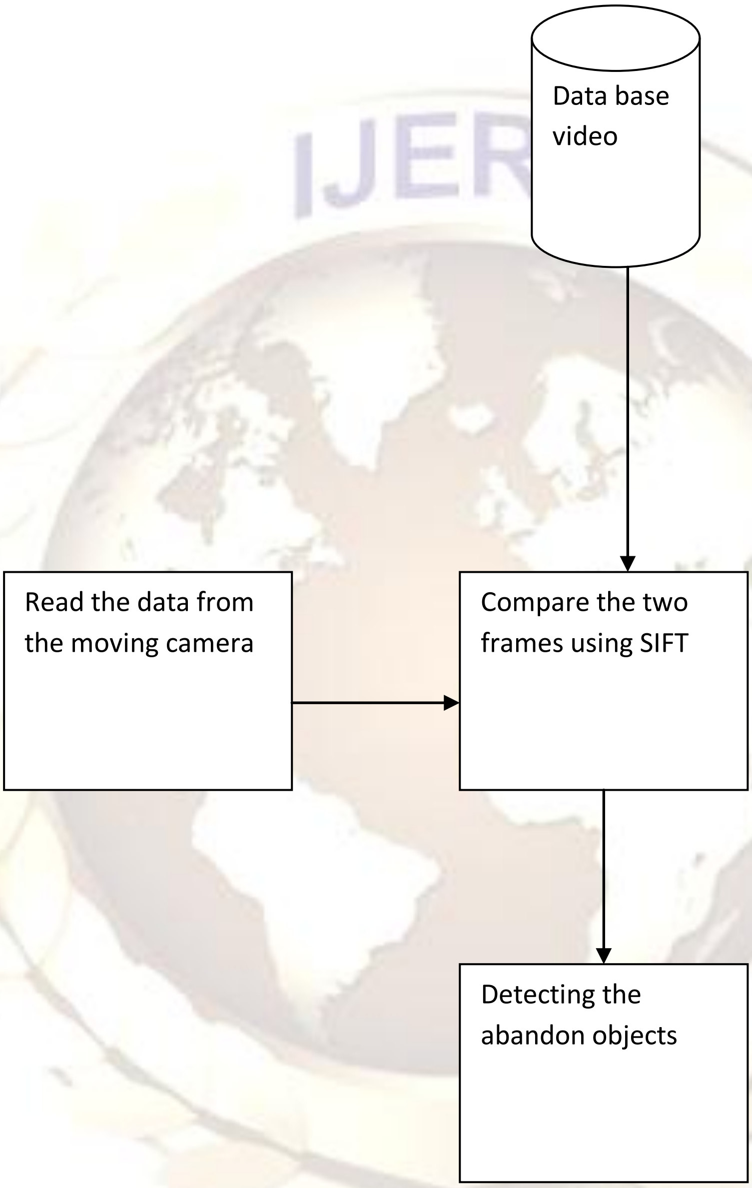

Figure 1 INTER SEQUENCE ALIGNMENT

4.2 **INTRASEQUENCE GEOMETRIC ALIGNMENT**

The procedure for intrasequence geometric alignment is similar to that for intersequence alignment. The difference is that both the reference (the frame to be warped) and target frames are from the same video this time. For the intrasequence alignment on R we align and R^i and R^{i-k}. For the intrasequence alignment on T, we align and T^i and T^{i-k}.

i) Removal of False Alarms on High Objects.

ii) Removal of False Alarms on the Dominant Plane.

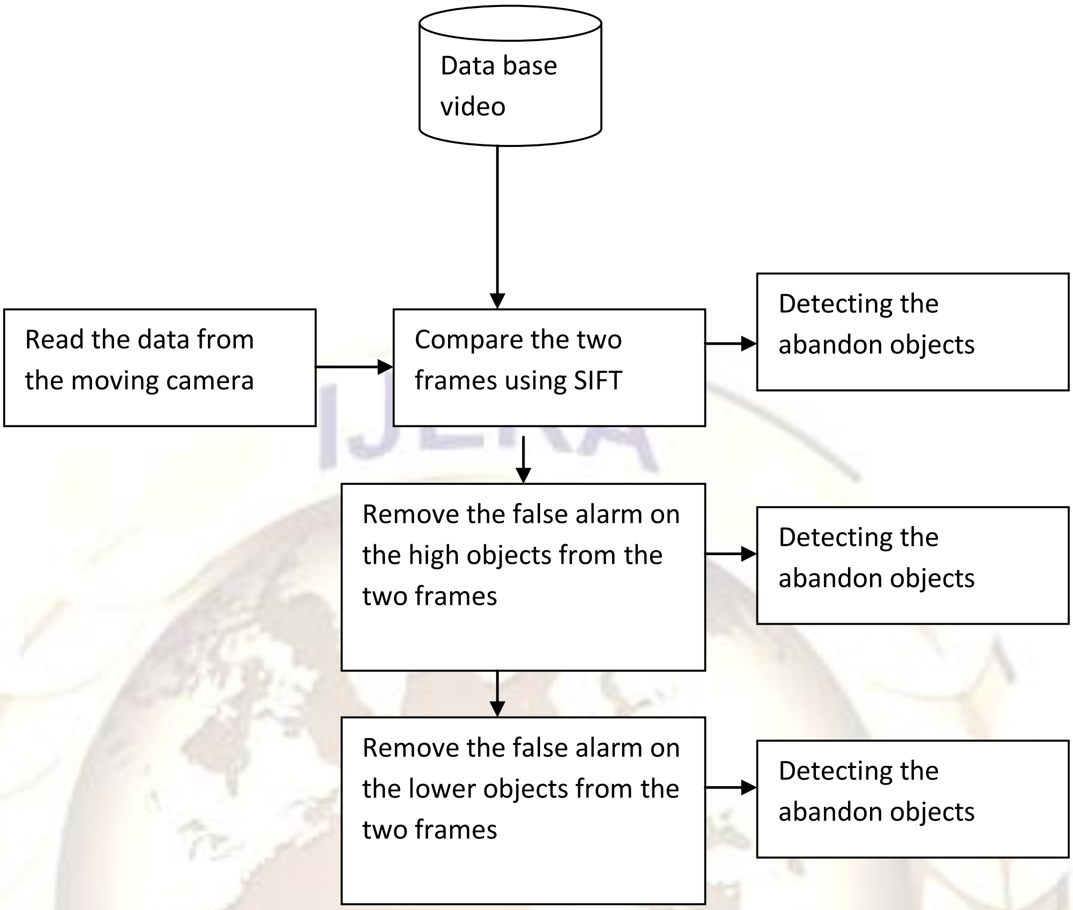

Figure 2 INTRA SEQUENCE ALIGNMENTS

4.3 TEMPORAL FILTERING

We use temporal filtering on B_3 to get our final detection. Let K be the number of buffer frames used for temporal filtering. We assume that T^i is the current frame, and the remaining suspicious object areas in T^i after intersequence and intrasequence alignment is denoted by $B_3{}^i$. We stack $B_3{}^{i-3}$, $B_3{}^{i-2}$, $B_3{}^{i-1}$ and $B_3{}^i$ into a temporal buffer T_{buffer} . We also stack the homography transformations between any two neighboring frames of the buffer into H_{buffer}. Based upon these transformations, $B_3{}^{i-3}$, $B_3{}^{i-2}$, $B_3{}^{i-1}$ and $B_3{}^i$ are respectively transformed to the state which temporally corresponds to the I th frame, and are intersected with $B_3{}^i$ respectively. The final detection map is the intersection of this intermediate intersection.

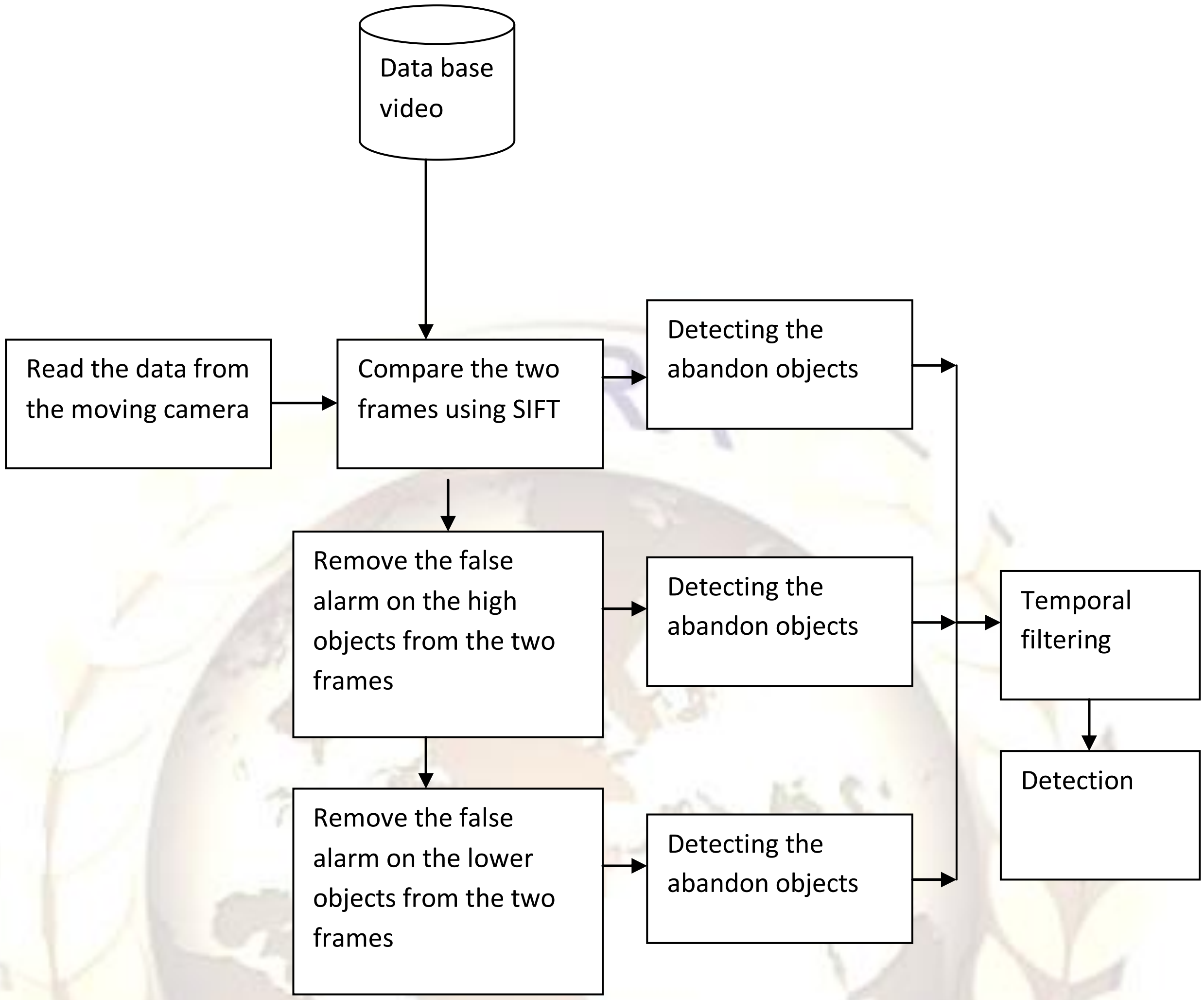

Figure 3 TEMPORAL FILTERING

5. CONTEXT DIAGRAM

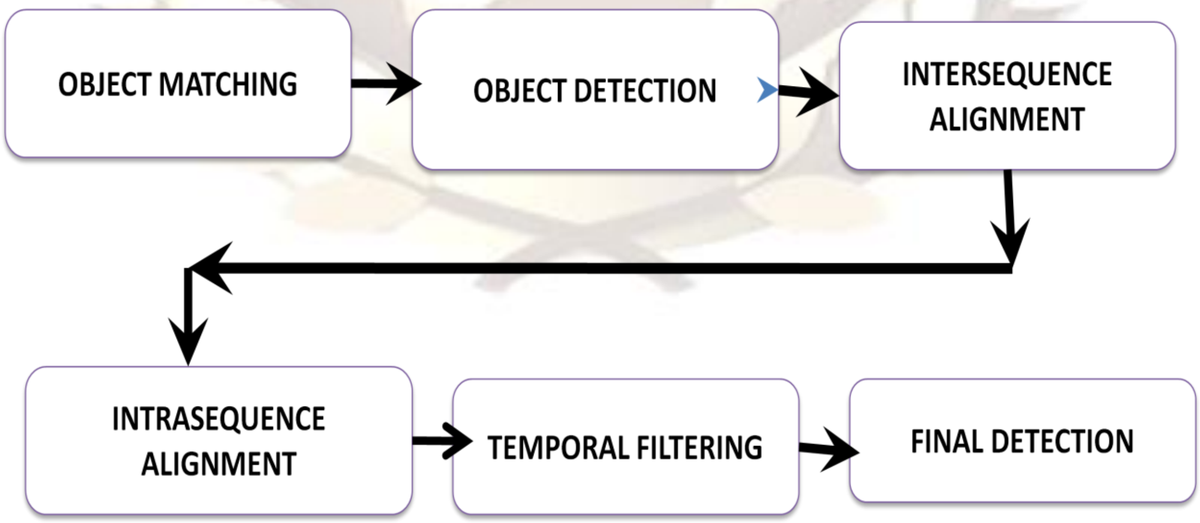

Figure 4 CONTEXT DIAGRAM

ARCHITECTURE DESIGN

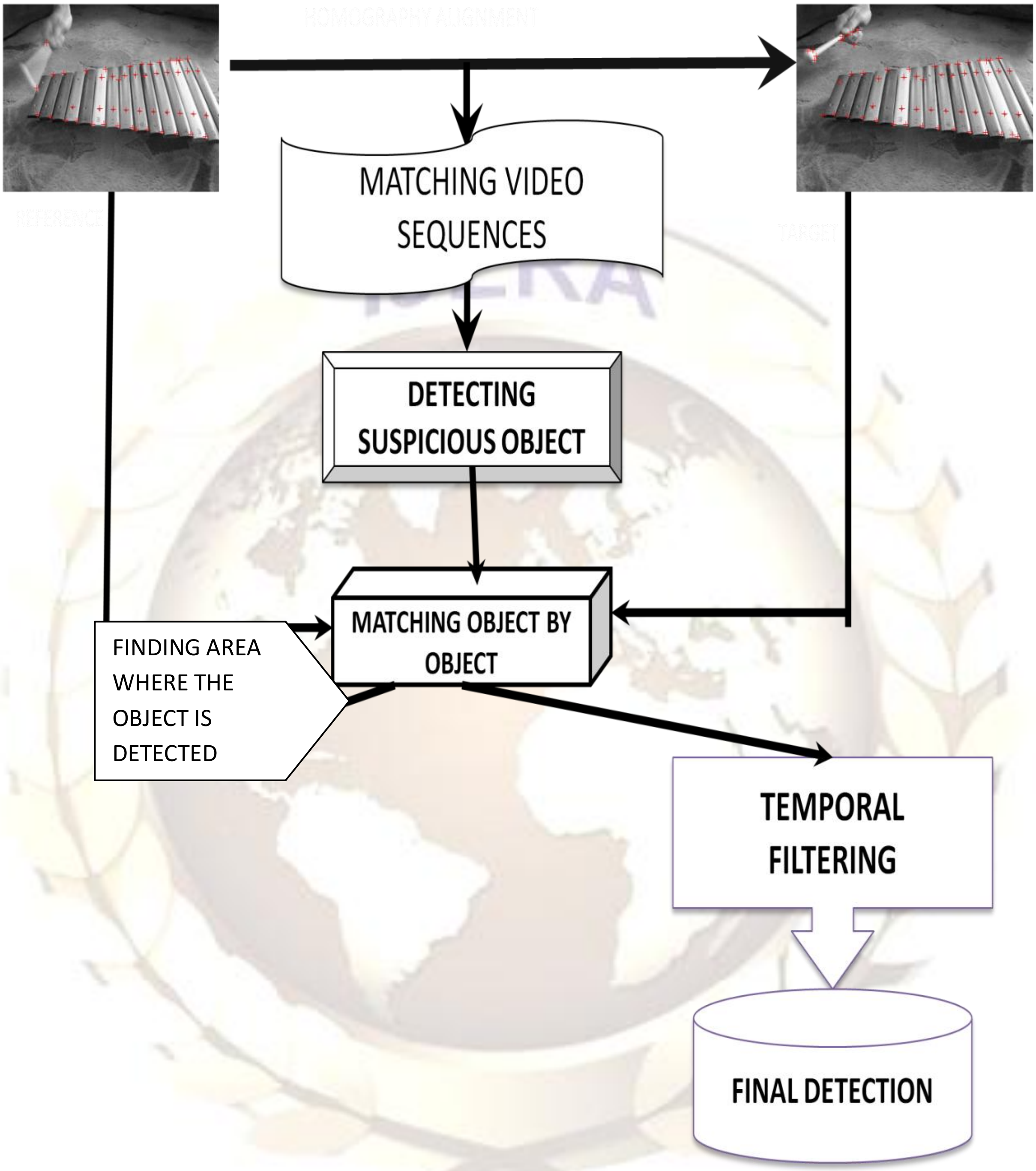

Figure 5 ACHITECTURE DESIGN

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NO OBJECT DETECTED IN THE SCENE

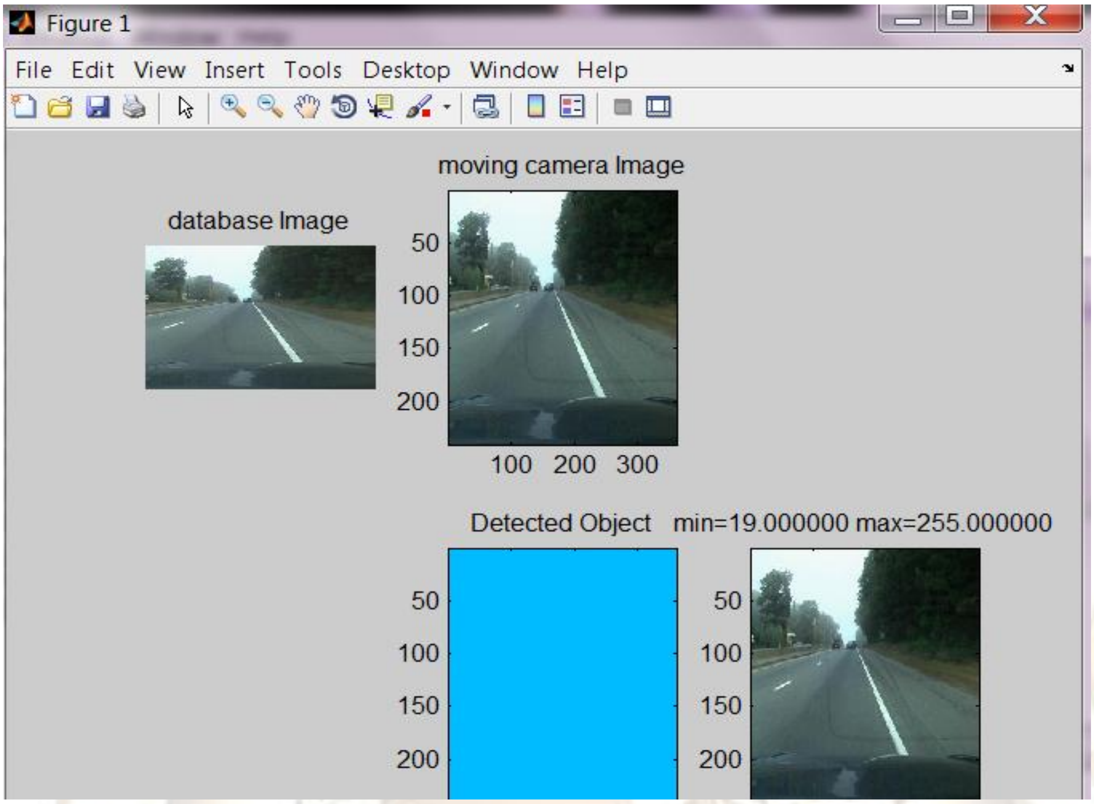

Figure 6 NO OBJECT DETECTED IN THE SCENE

OBJECT DETECTED IN THE SCENE

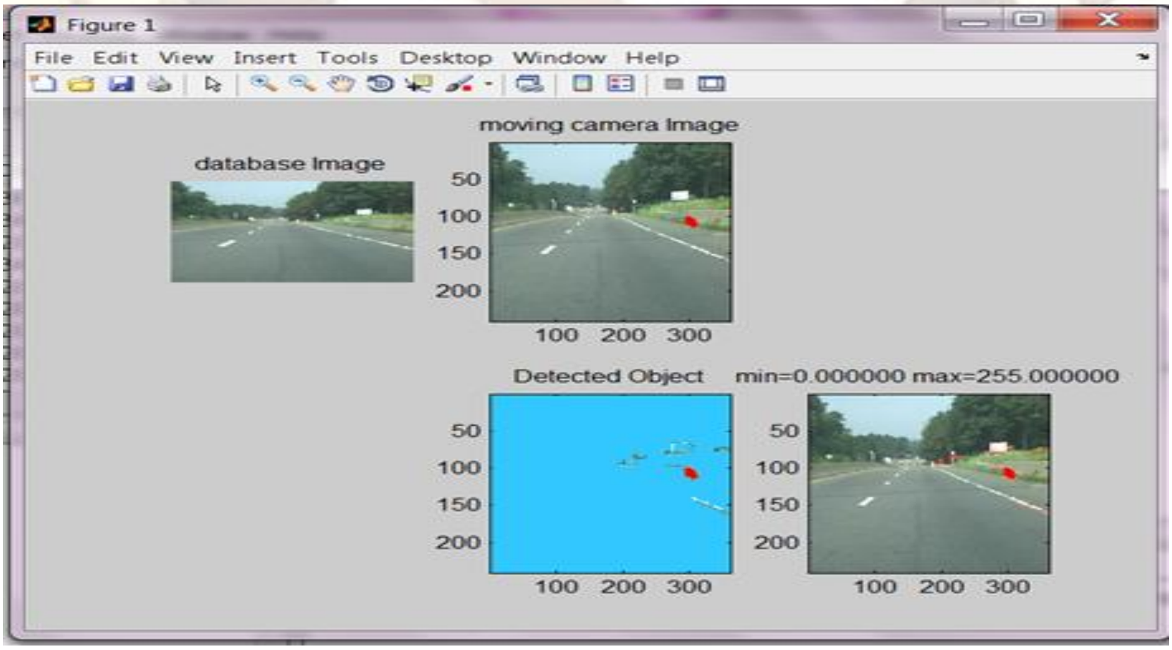

Figure 7 OBJECT DETECTED IN THE SCENE

RESULT

This paper proposes a novel framework for detecting non flat abandoned object by a moving camera. The purpose was to find suspicious objects. We have fulfilled it by matching target and video sequences.

Alarm or any signal can be sent to the owner or responsible person during detection. It can be used in cyber crime purpose/security. It can also be used in such a way that showing the identification of the unknown person.

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CONCLUSION

In this paper, Detecting non-flat abandoned objects by a moving camera. Our algorithm finds these objects in the target video by matching it with a reference video that does not contain them. We use four main ideas: the intersequence and intrasequence geometric alignment, the local appearance comparison, and the temporal filtering based up homography transformation. Our framework is robust to large illumination variation, and can deal with false alarms caused by shadows, rain, and saturated regions on road. It has been validated on fifteen test videos.

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