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Instantaneous Object Detection By Blob Assessment

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Abstract: *In recent years, visual surveillance has gained importance in security, law enforcement and military applications. In this paper a novel framework for detecting flat and non-flat abandoned objects at a public place and determines which one remains stationary. In this prototype abandoned objects are detected by matching a reference and a target video sequence. The reference video is taken by a camera when there is no suspicious object in the scene. The target video is taken by a camera following the same route and may contain extra objects .The two videos aligned to find the corresponding frame pairs and finally the abandoned objects are identified. Four simple but effective ideas are proposed to achieve the objective: an inter-sequence geometric alignment is used to find all possible suspicious areas, an intra-sequence geometric alignment to remove false alarms caused by high objects, a local appearance comparison between two aligned intra-sequence frames to remove false alarms in flat areas, and a temporal filtering step to confirm the existence of false alarms.*
Key Words: *Homographies, Frame Exrtraction, Frame Splitting, Abandoned objects.*

I. OBJECTIVE

The main objective of the project is to provide effective surveillance to the society so that no crime or any anti-social activity that may cause any harm or threat for the lives of innocent civilians doesn't takes place.

1.1 Scope

This methodology will help the security people in greater extent in finding the abandoned object present in the monitoring area by giving a alarm sound.

1.2 Overall Description

In recent years, surveillance has attracted increasing interest from homeland security, enforcement, and military agencies. The detection of suspicious items is one of the most important applications. These items can be grouped into two main classes, dynamic suspicious behaviors and static dangerous objects. The scope of this project falls into the latter category. Specifically, we investigate how to detect flat as well as non-flat static objects in a scene using a static camera.

Since these objects may have arbitrary shape, color or texture, state-of-the art category-specific (e.g., face/car/human) objects detection technology. To deal with this, proposing a simple but effective framework based upon matching a reference and a target video sequence. The reference video is taken by a static camera when there is no suspicious object in the scene (i.e.) a background image of the entire space, which has to be monitored, is taken initially. The target video is taken by a second camera and observing the same scene where suspicious objects may have been abandoned in the mean time (i.e.) a new image after the arrival of the objects is taken and is subtracted from the background image [1]. When an object is found to be in the same place for a long time, an alarm sounds to alert the guards.To make things efficient, the videos are initially utilized to roughly align the two sequences by finding the corresponding inter-sequence frame pairs [2].

The following four ideas are proposed to achieve our objective. 1) an inter-sequence geometric alignment based upon homographies to find all possible suspicious areas, 2) an intra-sequence alignment (between consecutive frames of) to remove false alarms on high objects, 3) a local appearance comparison between two aligned intra-sequence 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. In addition to it we use blob detection algorithm. This algorithm tracks objects that pose threat to the scenario based on the object's attributes. Specific objects are identified based on "interest points" of the image. This algorithm also detects flat objects.

By using blob algorithm the objects are detected by its attributes, then pixels are drawn correctly .This algorithm is mainly developed to detect the flat objects which means the objects which look like a similar attributes.

Overall this technique mainly focusing on a new, fast and efficient computer vision application or light weight application to find the suspicious objects using static camera.

II. EXISTING SYSTEM

The existing system involves the detection of non-flat objects. It involves the use of SIFT (Shift Invariant Fourier Transform) algorithm which is initially applied to aligned frame pair. This algorithm cannot be applied to high objects like trees instead it is applied to only the image area which corresponds to ground plane. The four following ideas implemented are 1) an Inter-sequence geometric alignment - based upon homographies to find all possible suspicious areas, 2) Intra-sequence geometric alignment- The procedure for intra-sequence geometric alignment is similar to that for inter-sequence alignment. The difference is that both the reference (the frame to be warped) and target frames are from the same video this time 3) Local appearance comparison- then apply the local appearance comparison process to the result of the intra-sequence alignment. 4) Temporal filtering-We use temporal filtering on to get our final detection. Final detection map is the intersection of this intermediate intersection. We set a threshold for the size of the smallest nonzero cluster in the final detection map.

2.1. Limitations of Existing System

The following are the few limitations available in the existing system:

- Inter-sequence geometric alignment suffers from false alarms.
- Intra-sequence geometric alignment cannot identify flat objects.
- The main disadvantage of this system is the fact that, it detects all objects present in the target scene.
- People and luggage are not differentiated
- Unreliable in crowded environments
- It cannot discriminate the different type of objects
- A person standing for long time may also be detected.
- Lighting changes will also be a defect.

III. PROPOSED SYSTEM

To deal with these limitations, proposing a simple but effective framework based upon matching a reference and a target video sequence. The reference video is taken by a static camera when there is no suspicious object in the scene (i.e.) a background image of the entire space, which has to be monitored, is taken initially. The target video is taken by a second camera and observing the same scene where suspicious objects may have been abandoned in the mean time (i.e.) a new image after the arrival of the objects is taken and is subtracted from the background image [3]. When an object is found to be in the same place for a long time, an alarm sounds to alert the guards.

The following four ideas are proposed to achieve our objective. 1) an inter-sequence geometric alignment based upon homographies to find all possible suspicious areas, 2) an intra-sequence alignment (between consecutive frames of) to remove false alarms on high objects, 3) a local appearance comparison between two aligned intra-sequence 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 [4][5]. In addition to it we use blob detection algorithm. This algorithm tracks objects that pose threat to the scenario based on the object's attributes. Specific objects are identified based on "interest points" of the image. This algorithm also detects flat objects.

BLOB ALGORITHM:

Step1: Capture a reference video 'R' without objects.
Step2: Store the reference video 'R' in the database.
Step3: Capture the target video 'T' with moving objects.
Step4: Store the target video 'T' in the database.
Step5: Split both the videos 'R' and 'T' into frames.
Step6: Match the frames of reference video 'R' and 'T' videos.
Step7: Implement shift invariance frequency transform [sift] algorithm.
The use of SIFT (Shift Invariant Fourier Transform) algorithm which is initially applied to aligned frame pair.
Step8: Subtract the background of the video 'T'.
Step9: Detect the flat objects 'F1'.
Step10: Compare the objects with the trained dataset.
Step11: Identify the suspicious objects 'F1'.
Step12: Trigger the alarm.

3.1 Benefits of Proposed System

By overcoming the disadvantages faced by the existing system, by adding some methodology we have the merits such as Flat and non flat objects are detected, illumination effects are completely removed. Different types of objects are clearly differentiated and hence the false alarm is avoided.

IV. SYSTEM SPECIFICATIONS

4.1 Hardware Requirements

- Processor Type : Pentium –IV and above.
- Ram : 1 GB RAM and above
- Hard disk : 100 GB HD and above
- Static camera

4.2 Software Requirements

- Operating System :Windows 98/NT/XP
- Programming Package :JAVA
- Tools :Eclipse
- SDK :JDK1.5.0
- Other tools :JMF2.1.1

V. SYSTEM DESIGN

System Design involves identification of classes their relationship as well as their collaboration. In objector, classes are divided into entity classes and control classes.The Computer Aided Software Engineering (CASE) tools that are available commercially do not provide any assistance in this transition.Once the design is over, it is essential to decide which software is suitable for the application.

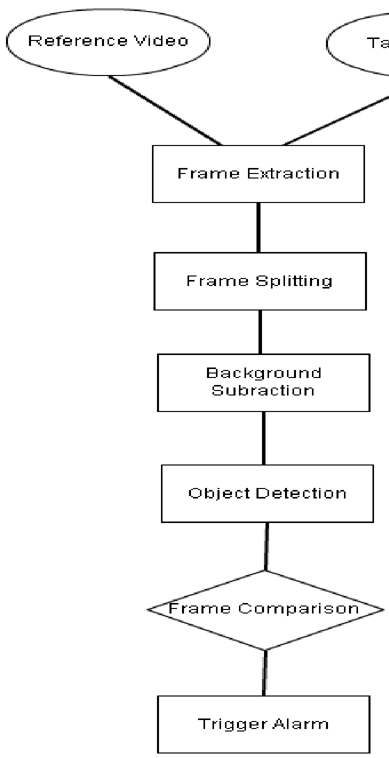

Fig-1: Overall system design

VI. MODULE DESCRIPTIONS

6.1 Modules

- Frame Splitting
- Frame Matching
- Background Subtraction

- Comparison

6.2 Modules Explanation

6.2.1 Frame Splitting

Get the reference and target videos from the user. Split the videos into separate frames.

6.2.2 Frame Matching

Compare the frames pairs that have been extracted.Find out the presence of mismatch frame.If found, direct it for further processing.

6.2.3 Background Subtraction

Take the mismatched frame and remove its background.Obtain only the foreground image.

6.2.4 Comparison

Compare the mismatched object's features with the predefined features.Analyze whether the object is a threat to the scene or not.If NO, do nothing.If YES, TRIGGER alarm and alert the security guards.

VII. TEST REPORT

Module 1: Frame Splitting

Test Case	Expected Result	Actual Result	Pass/Fail	Remarks
Get the videos and extract them in the form of frames	Split the video into separate frames	Split the video into separate frames	Pass	OK

Table-1: Frame splitting

Module 2: Frame Matching

Test Case	Expected Result	Actual Result	Pass/Fail	Remarks
Compare reference and target frames and point the mismatch	Match the extracted frames and point the mismatch	Match the extracted frames and point the mismatch	Pass	OK

Table-2: Frame matching

Module 3: Background Subtraction

Test Case	Expected Result	Actual Result	Pass/Fail	Remarks
Check and extract the Mismatched frames for the possible threat	Find out the possible threat in the scenario and extract its image	Find out the possible threat in the scenario and extract its image	Pass	OK

Table-3: Background Subtraction

Module 4: Comparison

Test Case	Expected Result	Actual Result	Pass/Fail	Remarks
Find out whether it is dangerous. If so, trigger alarm	Analyze the object and if suspicious, produce alarm	Analyze the object and if suspicious, produce alarm	Pass	OK

Table-4: Comparison

VIII. SCREEN SHOTS

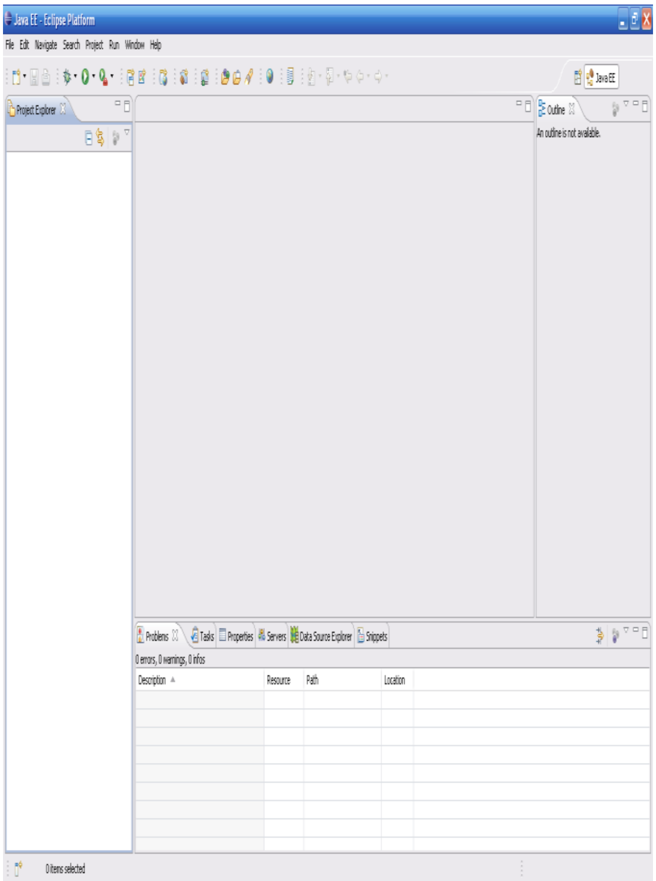

Fig-2: Open the Eclipse tool.

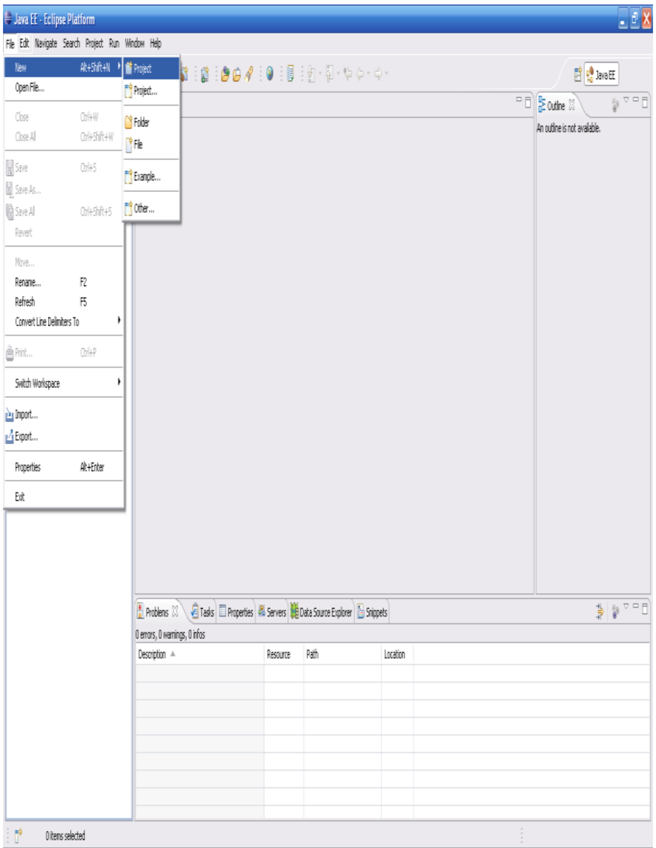

Fig-3: Choose the file to be opened.

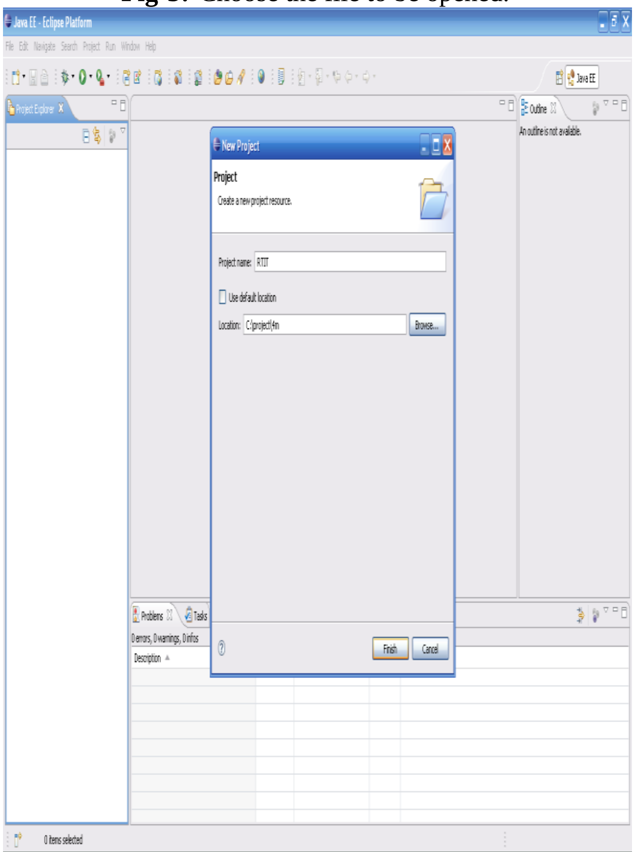

Fig-4: Enter a name and choose the destination path of the project.

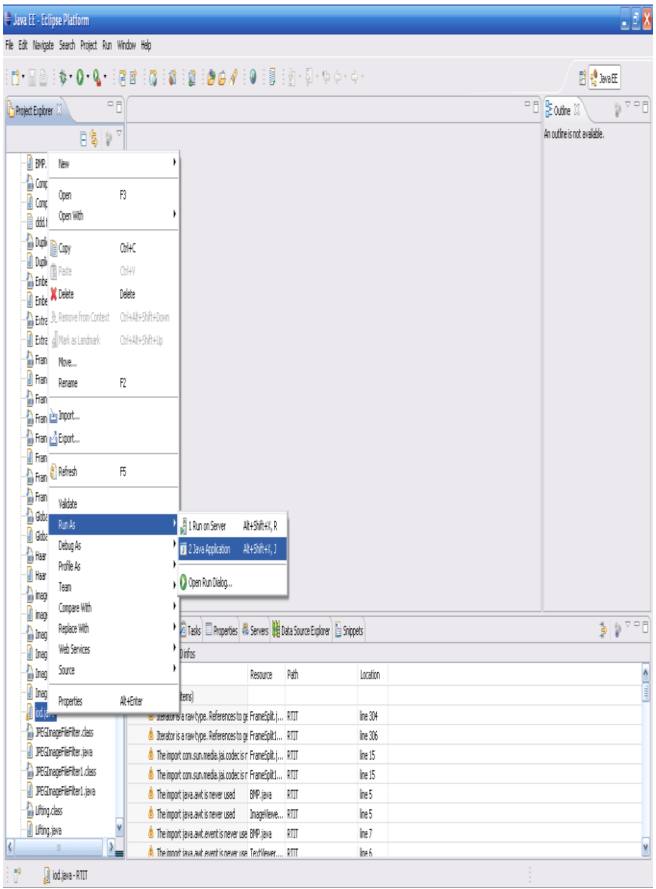

Fig-5: Run the java application

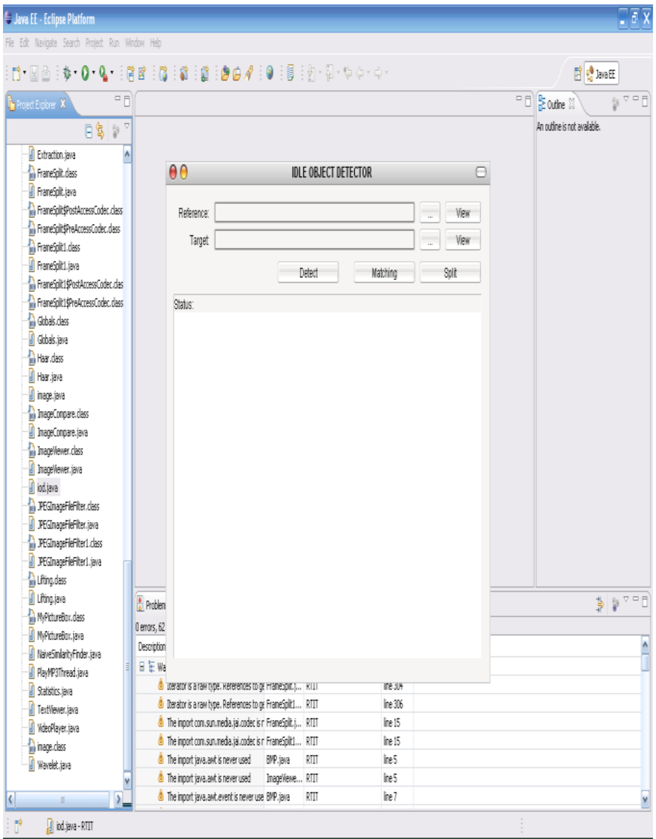

Fig-6: Choose the reference video from the destination.

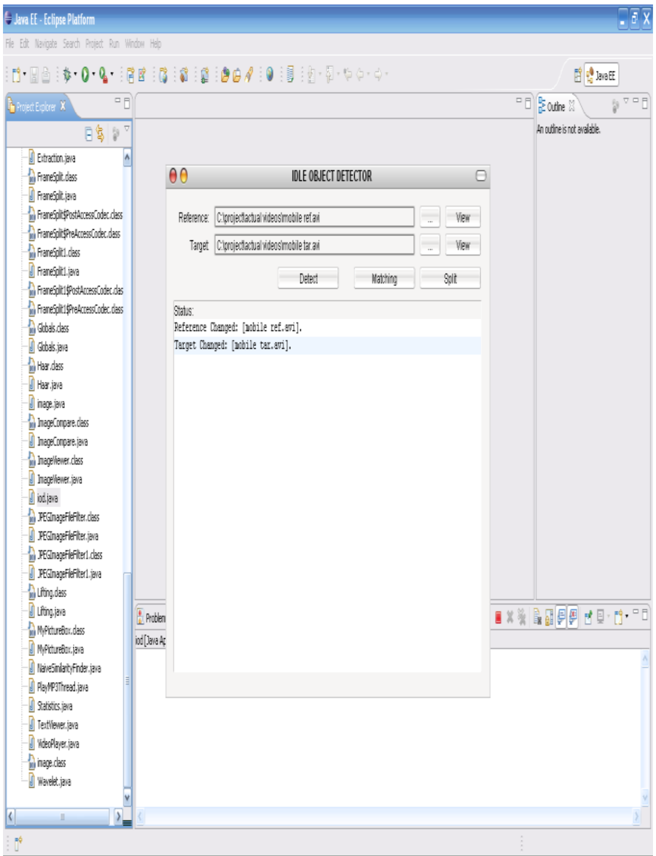

Fig-7: Choose the target video.

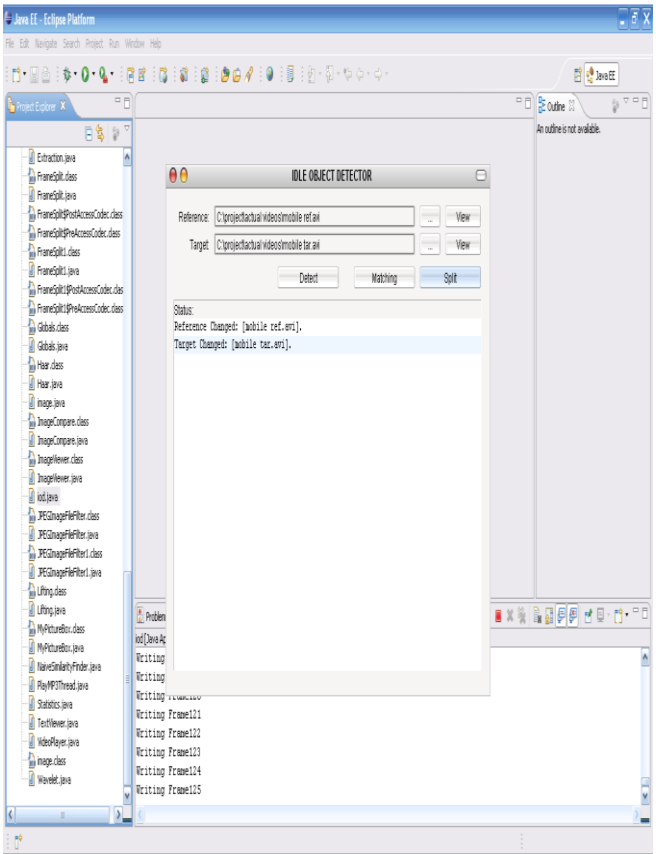

Fig-8: Select the Split option.

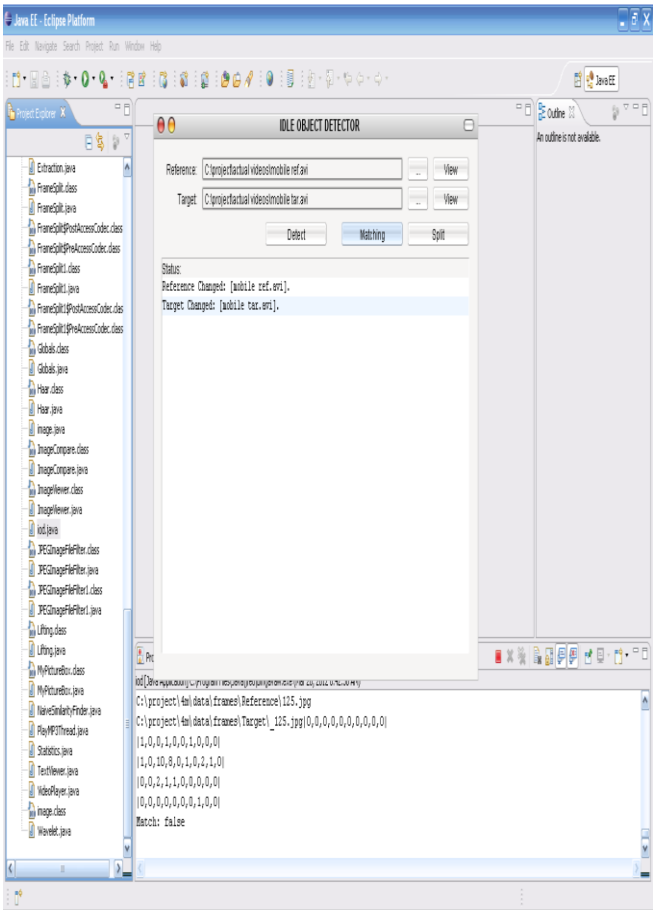

Fig-9: Press the matching button.

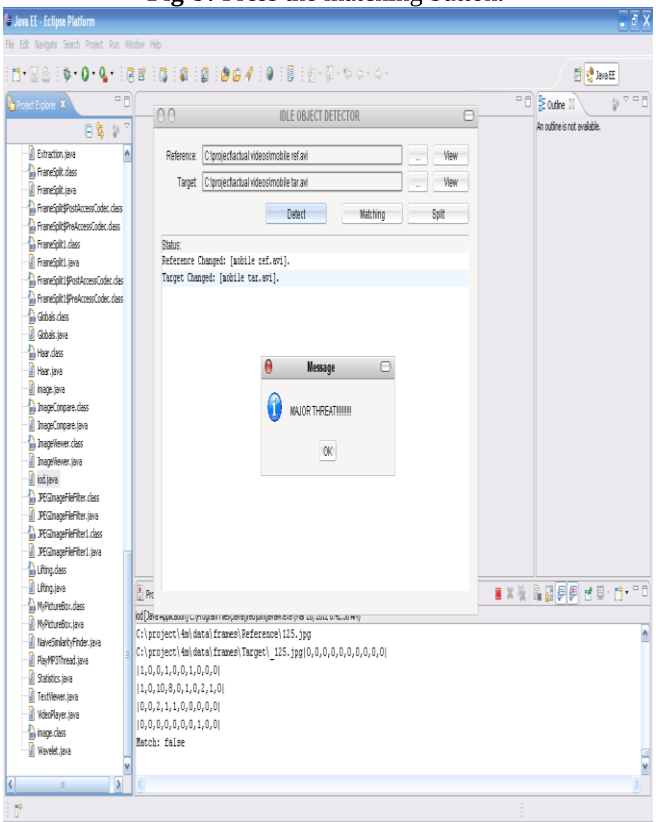

Fig-10: Select the detect button

IX. CONCLUSIONS

This paper proposes a novel framework for detecting flat and non-flat abandoned objects by a static camera. Our algorithm finds these objects in the target video by matching it with a reference video that does not contain them. Our framework is robust to large illumination variation, and can deal with false alarms caused by shadows, rain, and saturated regions on road.The future enhancements of our project will help to regulate traffic on roads. The system can be enhanced to function effectively with moving camera.

X. FUTURE ENHANCEMENT

The future enhancements of our project will help to regulate traffic on roads. The system can be enhanced to function effectively with moving camera.

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BIOGRAPHIES

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