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Unattended Object Identification

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ABSTRACT

For detecting/finding unattended objects in consume world such a bus stops, railway stations, airports, museums and reception counter is important. There are multiple security persons are employed and multiple CCTV cameras are present in public places then also accidents occur due to unattended objects, still occur due to lack of security negligence. So, we developed an automated system for detecting/finding the unattended objects which would give a text message to the security people who is watching the CCTV footage and it also provided the exact location of the object.

For detecting the unattended objects, we must take a fresh image every day in the public places like bus stops, railway stations etc. The captured images are stored in the database. The CCTV camera sends frames to the system and each frame is subtracted from the background image. Then the new objects of the frame show a bounding box and if the object remains static for some period of time then system generated a message to the security people who are watching the CCTV footage and it also provided the exact location of the object.

I. INTRODUCTION

In recent years, owing to the increasingly ubiquitous presence of cameras, the design of automatic surveillance systems for event recognition in crowded public areas has received much attention. The goal is to equip intelligent systems with the ability to reliably detect the possibility of danger. Such systems must prove their effectiveness in complex situations involving significant crowds, clutter and occlusion. They must be economically feasible and practically realizable in real-time, so as to be able to alert the authorities in a timely fashion to avert potential harm. Like all image processing frameworks, they must be able to successfully overcome the problems of lighting, viewpoint changes, noise and other distortions. The greatest challenge, perhaps, for such threat detection systems is to achieve a low rate of false positives and more importantly, a near-zero rate of false negatives. This is a powerful framework for a system that utilizes multiple spatio-temporal and contextual cues to detect a given sequence of events. Here, we tackle the specific threat posed by baggage abandoned in public areas. Our approach draws inspiration from the typical workings of a human operator. When a curiously unattended object becomes visible, the operator is likely to review the tape closely to determine how it came to be left there and to ascertain whether it has been abandoned or if its owner has simply stepped away momentarily. If the owner is still present in the scene, there may not be a reason to be concerned, but if he or she cannot be

found, it is certainly a cause for the message. Similarly, in our framework, if a lone object is discovered in the scene, the system tracks it backwards through recent video to look for its owner. The owner of the baggage is assumed to be the person who brings the object into the scene and sets it down at the location it is found.

II. EXISTING SYSTEM

The unattended object identification problem has recently attracted considerable interest, and solution has been attempted in many different ways, each inevitable with its own limitations. Several tracking have been proposed based on a variety of techniques. It requires more space and time.

III. PROPOSED SYSTEM

The goal of this module is to detect an object that seems to be unattended. The system track and monitor ongoing activities until the occurrence of such an event. In existing system there is only audio warning but in proposed system, we send a message with location for the specified member.

IV. SYSTEM ANALYSIS

System Analysis is the process of analyzing a system with the potential goal of improving or modifying the system. Analysis is breaking do wn the problem into smaller elements for study and ultimately providing a better solution. During the process of system development, Analysis is an important aspect. This involves gathering and interpreting facts, diagnosing the problem and using the information to recommend improvements to the system. Ultimately, the goal is to give a computerized solution.

Feasibility Study

Feasibility study is an important phase in the software development process. It enables the developer to have an assessment of the product being developed. It refers to the feasibility study of the product in the product in terms of outcomes of the product, operational use and technical support required for implementing it. Feasibility study should be performed on the basis of various criteria and parameters. Here the feasibility study can be performed in four ways such as operational feasibility, technical feasibility, economic feasibility, behavioural feasibility.

Operational Feasibility

It refers to the feasibility of the product to be operational. Some products may work very well at design and implementation but may fail in the real time environment. It includes the study of additional human resource required and their technical expertise. This PURSUIT - EVASION application will also work in any environment without any problem since we are implementing this project in Java language, which is Operating System independent.

System Requirement Specification

The System Requirements Specification (SRS) begins the translation process that converts the software requirements into the language the developers will use. The SRS draws on the use-cases from the User Requirement Document (URD) and analyzes the situations from a number of perspectives to discover and eliminate inconsistencies, ambiguities, and omissions before development progresses significantly under mistaken assumptions.

Software Specifications

The minimal software specifications of the proposed system are

- Operating System : Windows 7,8,10
- Software : OpenCV Python
- NumPy (Numerical Python)
- Version- 1.10.2 SciPy (Scientific Python)
- Version – 0.16.1 Matplotlib
- Version-1.5.0

Hardware Specifications

The minimal hardware specifications of the proposed system are,

- Processor : i5
- RAM : 4 GB
- Hard Disk : 1 TB
- Webcam/CCTV cameras

V. SYSTEM DESIGN

ABOUT SYSTEM DESIGN

Once the analysis phase is completed, the next stage is to determine in broad outline form how the problem might solve. During system design, we are beginning to move from logical to physical level.

System design involves architectural and detailed design of the system. Architectural design involves identifying software components, decomposing them into processing modules and

conceptual data structures and specifying the interconnections among components.

Detailed design is concerned with how to package processing modules and how to implement the processing algorithms, data structures and interconnections of standard algorithms, invention of new algorithms and design of data representations and packaging of software products. Two kinds of approaches are available:

- Top down approach
- Bottom up approach

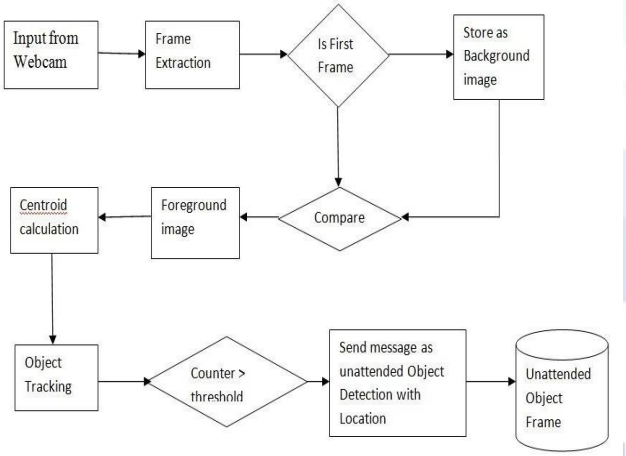
Top down Approach

This type of design starts from upper level modules. Since the detailed activities usually performed in the lower level routines are not provided stubs are written.

Bottom up Approach

Design being performed from smallest and lowest level modules one at a time. For each module in bottom up approach a short idea provided in order the needed approach so, that the module is asked to perform the way it will when embedded within the larger system. When bottom level modules are tested attention turns to those on the next level that use the lower level once they are designed individually and then liked with the previously examined lower level modules.

SYSTEM ARCHITECTURE



UML DIAGRAMS

USE CASE DIAGRAM

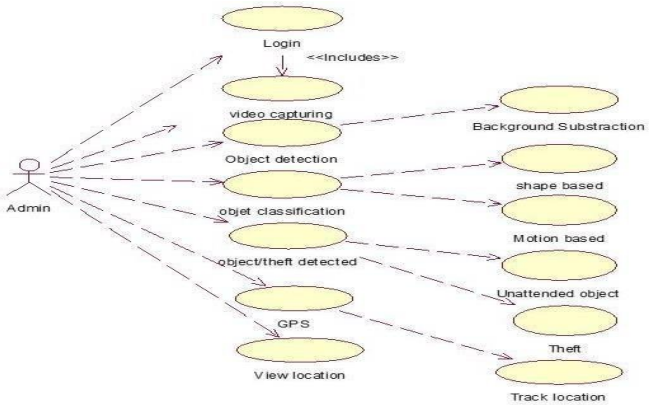


Fig : Use Case Diagram for Unattended object identification

SEQUENCE DIAGRAM

A sequence diagram emphasizes the time ordering of messages. These are used to model the dynamic aspects of the system. A sequence diagram shows a set of objects and messages that are dispatched between those objects based on time ordering.

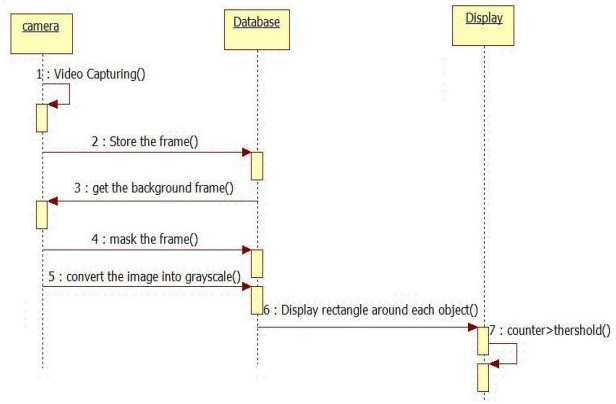


Fig : Sequence Diagram for Unattended Object Identification

ACTIVITY DIAGRAMS

Activity diagrams are graphical representations of workflows of stepwise

activities and actions with support for choice, iteration and concurrency. In the

Unified Modelling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activitydiagram shows the overall flow of control.

Activity diagrams are mainly used as a flow chart consists of activities performed by the system. But activity diagram is not exactly a flow chart as they

have some additional capabilities. These additional capabilities include branching, parallel flow, etc.

Before drawing an activity diagram, we must have a clear understanding about the elements used in activity diagram. The main element of an activity diagram is the activity itself. An activity is a function performed by the system. After identifying the activities, we need to understand how they are associated with constraints and conditions.

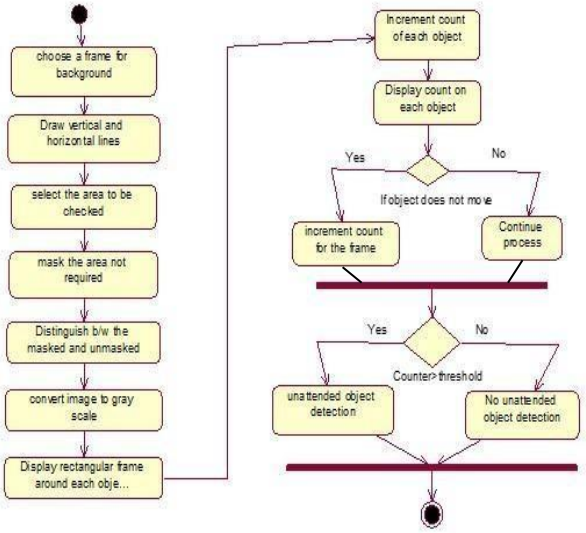


Fig : Activity Diagram for Unattended object identification

VI. IMPLEMENTATION

Implementation is the stage where the theoretical design is turned into a working system. The most crucial stage in achieving a new successful system and in giving confidence is implementing the system.

It involves careful planning, investigation of the current system and its constraints on implementation, design of methods to achieve the changeover and an evaluation of change over methods a part from planning. Two major tasks of preparing the implementation are education and training of the users and testing of the system.

The more complex the system being implemented, the more involved will be the system analysis and design effort required just for implementation.

The implementation phase comprises of several activities. The required hardware and software acquisition is carried out. The system may require some software to be developed. For this Programs are written and tested. The user then changes over to his new fully tested system and the old system is discontinued.

MODULES

The system after careful analysis has been identified to be presented with the following modules:

Unattended Object Identification

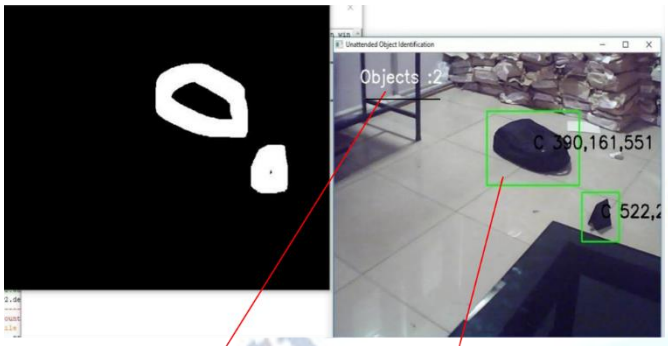
In this module we write the code on unattended object identification. Here we use the different tools to implement this module. They are Numpy, Matplotlib, and OpenCv with Python. Everyday a fresh background image of the environment is stored in the database. The CCTV camera sends frames to the system and each frame is subtracted from the background image. The new objects of the frame are shown by a bounding box and if the objects remain static for specified time, system generates a message to the security personnel viewing the footage along with the location of the object.

VII. RESULTS

Fig: Background Frame is used for subtraction of current frame.

Fig : Background Frame Blur

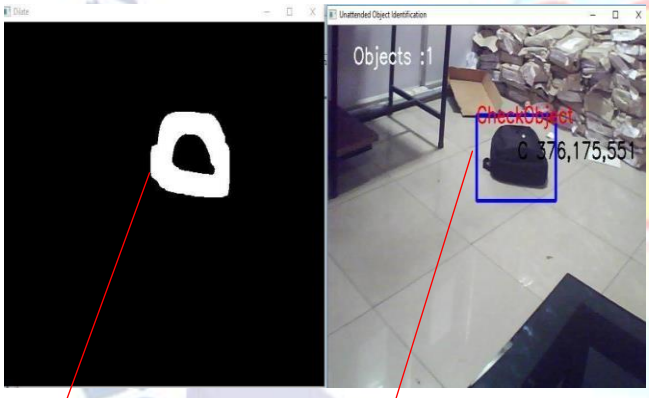
Background Frame Blur: We can blur an entire image, non-background scene elements, by luminance value or by using a map mask. Blur can give you animation added realism by rendering the illusion of a frame.



It counts the number of objects present

If the object is placed then it first in the frame highlights with green colour.

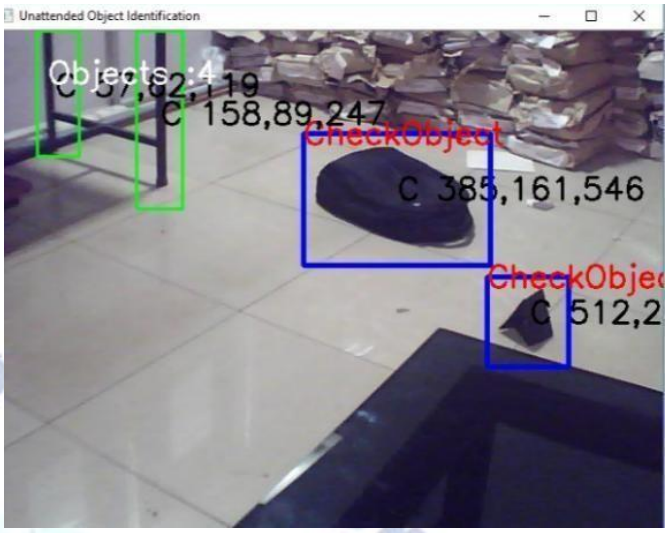
Fig: Counting the number of objects and highlighting the object.



Dilation is usesa combination of background subtraction and object tracking to look for certain patterns.

It identifies the unattended object after specified time then object gets highlighted with blue colour rectangle and sends message to the specified phone number.

Fig : Apply Dilation on objects and highlighting the unattended object



It can also identify multiple objects at a time and it sends message only for unattended objects which are highlighted with blue colour.

Fig : Multiple unattended objects are detected

VIII. CONCLUSIONS AND FUTURE SCOPE

Technology for detecting unattended objects in consumer world such as bus stops, railway stations, museum, airport and reception counter is of utmost importance. There are multiple CCTV cameras and multiple security personnel employed in public places but accidents due to unattended objects still occur due to security personnel's negligence. So we developed an automated system for detecting unattended objects which would give a text message to security personnel who is viewing the CCTV footage along with the location of the object

Everyday a fresh background image of the environment (railway stations, bus stops) is stored in the database. The CCTV camera sends frames to the system and each frame is subtracted from the background image. The new objects of the frame are shown by a bounding box and if the objects remain static for some amount of time, system generates a message to the security personnel viewing the footage along with the location of the object.

FUTURE SCOPE

In future work includes identification of the personnel using face,palm recognition. Identifying moving objects when video captured by moving camera. Activity recognition is an important step in visual surveillance system. So, that identify the

behaviour of the person can be done in our future task.

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