



Imagery Library for Intelligent
Detection Systems

i-LIDS AVSS Bag and Vehicle Detection Challenge (AVSS 2007) - Briefing -

Introduction

The challenge will take place during the AVSS 2007 conference in September, when unseen data from the i-Lids dataset will be used to test and rank the algorithms.

An Abandoned Baggage and Parked Vehicle sequence of approximately 20 minutes duration will be supplied to test the algorithms submitted for the challenge. Each unseen sequence will contain no more than five alarm events.

The Home Office Scientific Development Branch (HOSDB) are offering an i-LIDS Abandoned Baggage and Parked Vehicle training dataset as prizes to the group or individual whose algorithm offers the best performance on unseen clips for the respective application. These clips will be from the same cameras as those distributed for the AVSS 2007 conference and participants will be required to detect the events described by the i-LIDS scenario definitions.

Imagery Format

Imagery will be provided in one of the following formats:

- Composite Video (PAL) via coaxial cable with BNC connector
- SDI (Standard Definition) via coaxial cable with BNC connector
- .Mjpeg in Quicktime wrapper (.Mov) transferred from HOSDB hard drive (approximately 7GB per sequence)

Imagery is provided at an image size of 720 x 576 at 25 fps.

A calibration image from each of the sequences is available [here](#).

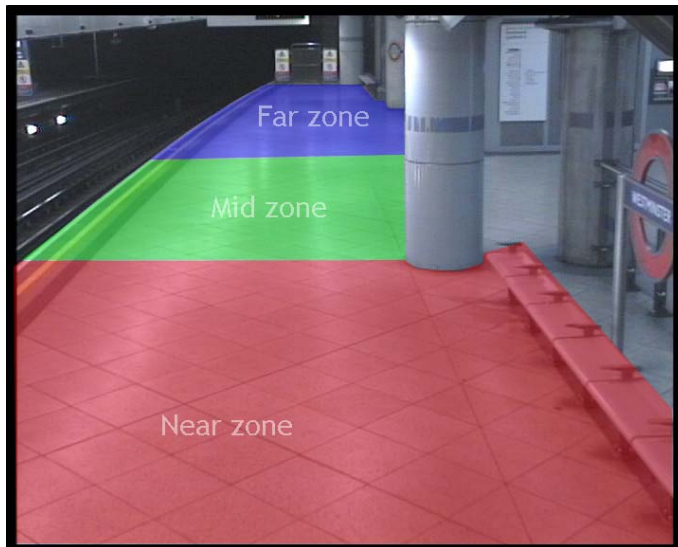
Alarm definition

The alarm definitions for the two scenarios are those defined by the i-LIDS standard and used for the AVSS 2007 dataset:

Abandoned Baggage

- during the current clip, a person has placed an object which was in possession when they entered the clip onto the floor or a seat in the detection area &
- that the person has left the detection area without the object &
- over sixty seconds after they left the detection area, that person has still not returned to the object &
- the object remains in the detection area.

Abandoned Baggage detection area:



Stage 1: Detection area

For indexing purposes the stage 1 detection area is split into 3 arbitrary zones; 'near', 'mid' & 'far'.

Note: The definition of these areas is not mandatory for the AVSS 2007 Challenge

Parked Vehicle

- during the clip, a vehicle stops within a no parking zone &
- the vehicle remains stationary and has not moved since stopping &
- over sixty seconds have passed since the vehicle stopped.

Parked Vehicle detection area:



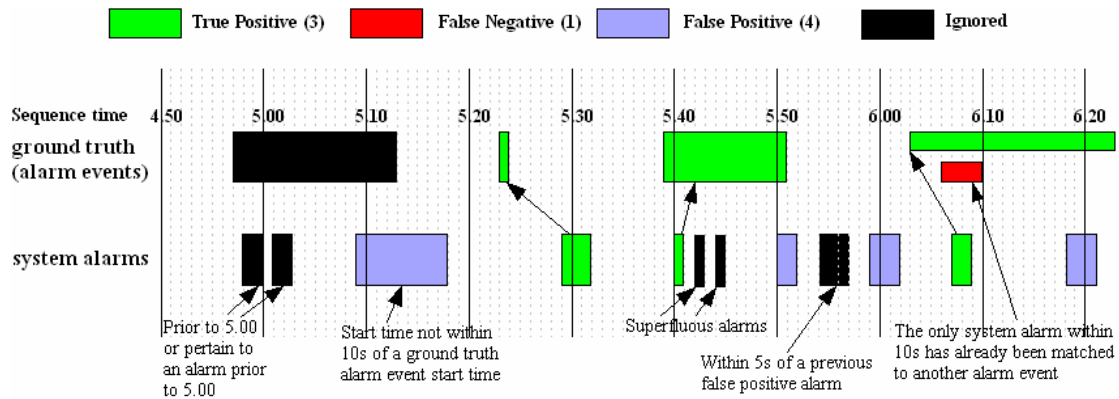
Stage 3: No parking zones

Note: Precise camera alignment can vary due to camera shake in high winds.

Alarm handling

During the title blocks and for the first 5 minutes of each sequence any alarms reported will be ignored. Likewise, any alarm events present in the first 5 minutes of each sequence will not contribute towards the calculation of algorithm performance.

For the remainder of each sequence the start time of any alarms will be logged and compared to ground truth data to evaluate the number of 'true positive', 'false positive' and 'false negative' alarms. This comparison process is illustrated below.



Algorithms have 10 seconds to report an alarm state after an alarm event begins in the unseen footage. During this time multiple alarm reports will be disregarded; an alarm event is either detected or not. After this 10 second window, any further alarms reported will be deemed 'false positives'.

NB. Algorithms should NOT continue to provide alarm outputs over the duration of alarm events.

Where an algorithm generates false alarms several times in quick succession, only one false positive alarm will be logged every 5 seconds.

Alarm output format

Two output options are available to participants.

1. Normally open (going closed on alarm) or normally closed (going open) volt free contacts
 - For participants who do not have a commercial or prototype system, HOSDB recommend configuring the parallel port to switch a reed relay using the parport.dll.
 - Participants are required to provide the associated cabling and connectors. Cables will be connected to an interface card via screw terminals.
2. Tab delimited .txt file containing alarm times in milliseconds relative to the start of the sequence.
 - Files must include a header with Participant Name and sequence description ([AVSS 2007 Parked Vehicle] or [AVSS 2007 Abandoned Baggage])

Participants using the composite video and SDI inputs should provide a NO/NC output. Those using .Mov should provide alarm times in .txt format.

All participants are required to provide a visual display indicating alarm condition.

Performance metric

Algorithm performance will be assessed using the F1 weighted harmonic mean of 'recall' and 'precision' as described below:

When presented with a sequence each algorithm or system yields a number of

- (a) True positive alarms (system alarms in response to a genuine alarm event)
- (b) False positive alarms (system alarms without the presence a genuine alarm event)
- (c) False negative alarms (genuine alarm events not resulting in a system alarm)

Recall, $r = a / (a+c)$
Precision, $p = a / (a+b)$

$$F_1 = \frac{(\alpha + 1)rp}{r + \alpha p}$$

where α is the 'recall bias'; a weighting of recall relative to precision declared in each i-LIDS scenario definition.

The weighting to be used for the i-LIDS AVSS Bag and Vehicle Detection Challenge are:

Abandoned Baggage	35
Parked Vehicle	60

The system or algorithm demonstrating the highest F1 score for each sequence will be deemed the winner.

Challenge rules

1. To enter the challenge participants must send notification of which scenario they are submitting against and specify which imagery input format they require by emailing challenge@avss2007.org by 15 August 2007.
2. Participants must be present at the session. Imagery may not be streamed or sent to another location for processing.
3. One hour will be provided for setup at the beginning of the session. It is the responsibility of the participant to ensure that provision is made for all hardware, software, media and cabling required.
4. No further changes to algorithm or system parameters may be made until the time allocated for testing for each participant.
5. At their allocated time each participant will be provided with the unseen imagery. Each participant will have one attempt to process the sequence in real time.
6. Should the system or algorithm provide significant spurious alarms within the five minute lead in period the participant may choose to stop the sequence and re-start the test. In this situation the participant will have a maximum of five minutes to make configuration changes before re-commencing the test. At this stage the whole sequence will be delivered, i.e. each participant may stop the test and make configuration changes once only.
7. At the end of the sequence participants have a 10 minute extraction period in which to provide HOSDB with any alarm log files that are generated.
8. Participants wanting to enter against both Abandoned Baggage and Parked vehicle sequences will be provided time to change detection parameters between sequences. A timetable will be issued once the conference programme has been finalised.

Notes

The sequences used for the unseen challenge were captured from the same cameras as the dataset distributed for AVSS 2007. Thus sequences from the main dataset (with the exception of AVSS PV Night) may be used as training data for the unseen challenge.

The i-LIDS AVSS Bag and Vehicle Detection Challenge is a special session arranged specifically for the AVSS 2007 conference. The clips that are provided as the seen and unseen dataset represent a small fraction of the [i-LIDS imagery library](#). Participation in this challenge does not constitute evaluation against the i-LIDS standard or recommendation by HOSDB. By entering the challenge, participants tacitly agree not to refer to their involvement in any way as being evaluated or tested by HOSDB against i-LIDS or recommended by the Home Office. When citing results participants should use *i-LIDS dataset for AVSS 2007* or *i-LIDS Bag and Vehicle Detection Challenge (AVSS 2007)*.

Prizes

Following the judging of the challenge the following prizes will be awarded to the best performing system or algorithm:

Abandoned Baggage i-LIDS Abandoned Baggage Training Dataset
Parked Vehicle I-LIDS Parked Vehicle Training Dataset

Each of these datasets is part of the full i-LIDS imagery library and contains approximately 500GB of CCTV imagery from the relevant scenario in .Mov format. Prize winners will be required to sign the End User Licence Agreement that governs the terms of use of the datasets. A copy of this licence document can be found on the i-LIDS section of the [HOSDB website](#).

In judging the winner for each of the prizes and the administration of the challenge the decision of HOSDB will be final.