AVITRACK

Contract n° AST3-CT-2003-502818

D.6.2
Scenes interpretation evaluation

Project is co-funded by Industry and the European Commission within FP6 Aeronautics

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1. EVALUATION PRESENTATION

1.1. STATUS

This document presents the first evaluation of the AVITRACK scenes interpretation.

A previous evaluation has been done on the ability of the prototype to track object (D 6.1). The step after is to evaluate how the system can interpret and understand the movement of objects on the apron.

As explain in deliverables D1.4: “Actors, scenes and events Models” and in D4.1-4.2: “Scene Understanding”, the system is based on scenarios that model the activities of the turnover. Thus, the scenes interpretation evaluation consists to measure the amount of scenarios recognized by the system.

This evaluation addresses the following items:

- Single vehicle movement interpretation results
- Basic event recognition results.
- Operational evaluation of the complete chain from acquisition, tracking, understanding to HCI reporting,

It does not cover:

- Tracking
- And complex tasks that are still running during this evaluation:
    - Complex Scenes Tracking
    - Complex Activity Recognition

Also Data-fusion module was not used in this evaluation (but for the pushback scenarios) as it was still in development and categorization was done without a sub-type category for the same reasons.

1.2. OVERVIEW

The evaluation is done by selecting a set of videos that represent the activities and by measuring statistically the percent of recognized scenarios.

The scenarios evaluated are:

- Arrival preparation,
- Refueling,
- Front cargo operations,
- Pushback.

For each of them, the dataset should reflect different outdoor conditions that may be encounter in a real system. These conditions include:

- Light conditions (stable / variable/ extreme),
- Shadows presence,
- Reflections on the apron.

The statistics will then reflect the performances of the system in standard and difficult conditions.

2. SUMMARY

2.1. RESULTS

Number of scenario	Mean of recognition	Difficulties encountered
9	80%	- Ghost - Shadows - Categorisation error - Merging / splitting error

2.2. EVALUATION CONCLUSION

The evaluation processed has shown that the system is able to recognize the above scenarios with a good detection rate about 80 %.

The conditions in which the system fails are of several types:

- **Ghosts**: when an object stays a long period before moving a ghost (false object) often appears in the scene.
- **Shadows** that affect observed objects,
- **Split / Merging**: the same “real” object is segmented in several objects or several objects merge into one.
- **Categorization** errors,

Solutions to these problems have been already designed:

- Ghost: Since then, we have developed a specific “Ghost buster” module and integrated it in the Frame trackers. New Long Term and Global Trackers filtering planned in the Understanding module should also solve this problem.
- Shadows: a shadow removal plug-in is today operational and fully integrated in the prototype.

- Split and merge: a new module that computes the “motion” of tracked features is implemented. It now uses this additional information in the process of splitting and merging blobs resulting in much better results.
- Object categorization is being improved by adding several methods: appearance model detection, hierarchical method…. They have been fully integrated and first results are promising.

Next work will focus on scenarios involving complex scenes and group interactions. New results with improved categorization are also expected for the next evaluation.