Selection of 6 scientific articles

[1] G. Médioni, I. Cohen, F. Brémond, S. Hongeng et R. Nevatia. Event Detection and Analysis from Video Streams. Dans *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. 23. No. 8, pp. 873-889, Aug 01.

This paper proposes a global approach for the analysis of the behavior of the moving objects (i.e. vehicles) in a scene observed by an airborne moving platform. The originality of the event recognition process is the combination of probabilistic state automata (similar to HMMs structured by a priori knowledge on events of interest) with user-provided information in the form of geospatial. Results are described on a number of real video sequences with a quantitative analysis of the results.

[2] S. Hongeng, R. Nevatia and F. Bremond. Video-Based Event Recognition: Activity Representation and Probabilistic Recognition Methods. In *Computer Vision and Image Understanding (CVIU),* Volume 96, Issue 2 , November 2004, Pages 129-162, Special Issue on Event Detection in Video 2004.

The paper focuses on the representation and recognition of human activities based on Bayesian inferences. An activity is defined as a set of action threads, where each thread is executed by a single actor corresponding usually to a person. Single-thread actions are represented by a probabilistic finite automaton of event states, which are recognized from the characteristics of the trajectory and shape of the actor using Bayesian methods. This paper is one of the first combining probabilistic, logical and temporal inferences for complex event recognition.

[3] Alberto Avanzi, Francois Bremond, Christophe Tornieri and Monique Thonnat, Design and Assessment of an Intelligent Activity Monitoring Platform, in *EURASIP Journal on Applied Signal Processing, special issue in "Advances in Intelligent Vision Systems: Methods and Applications"*, 2005:14, pp.2359-2374.

This paper describes an architecture design for a reusable and robust activity monitoring platform characterised by three properties: 1) modularity and flexibility of the architecture, 2) separation between the algorithms and the a priori knowledge they use, and 3) automatic evaluation of algorithm results. The design quality is ensured by the continuous interaction between end-users and developers during the whole development of the monitoring system dedicated to a new application. We describe in details the technical validation and the end-user assessment of three automatic monitoring systems built with the platform for metro surveillance, bank agency monitoring and building lock chamber access control. This paper is one of the first publications exploring design issues for video monitoring systems.

[4] B. Boulay, F. Brémond and M. Thonnat, Applying 3D Human Model in a Posture Recognition System. In *Pattern Recognition Letter , Special Issue on vision for Crime Detection and Prevention*, Vol.27, No15, pp. 1788-1796, Nov 2006.

This paper proposes an approach for recognising human postures in video sequences, which combines 2D techniques with a 3D human model. The 3D model is a realistic articulated human model which is used to obtain reference postures to compare with test postures. Several 2D techniques using different silhouette representations are compared with each other: projections of moving pixels on the reference axis, Hu moments and skeletonisation. We are interested in a set of specific postures which are representative of typical video understanding applications. We describe results for recognition of general postures (e.g. standing) and detailed postures (e.g standing with one arm up) in ambiguous/optimal viewpoint with good/bad segmented silhouettes to show the effectiveness of the approach.

[5] B. Georis, F. Brémond and M. Thonnat, Real-Time Control of Video Surveillance Systems with Program Supervision Techniques. In *the Machine Vision and Applications Journal*, 18:189-205, Jan 2007.

This article explores a video monitoring platform controlled by knowledge-based program supervision techniques. This platform eases the creation and the configuration of video surveillance systems and it is composed of three main components: a library of programs, a knowledge base and a control component. The knowledge is either given by experts or learnt by the system. The control is generic in the sense that it is independent of application. To validate this platform, we have built and evaluated six video surveillance systems which are featured with three properties: adaptability, reliability and real-time processing.

[6] L. Patino, H. Benhadda, E. Corvee, F. Brémond and M. Thonnat, Extraction of activity patterns on large video recordings. In *Computer Vision, IET,* Volume 2, Issue 2, Page(s): 108 - 128, June 2008.

Knowledge discovery is achieved for extracting frequent/abnormal people activities using video understanding. First, the objects of interest and their semantic are detected in real-time. Next, two clustering processes are applied to derive the knowledge from the video data. Agglomerative hierarchical clustering is used to find the main trajectory patterns of people and relational analysis clustering is employed to extract the relationship between people, contextual objects and events. Also, an original evaluation method validates the clustering quality using more than one week of real video sequences from two underground metro networks (CARETAKER). Finally end-users have assessed that the main activities have been extracted as well as several abnormal behaviours.