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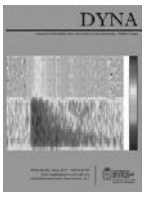

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Pedestrian tracking using probability fields and a movement feature space

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Abstract
Retrieving useful information from video sequences, such as the dynamics of pedestrians, and other moving objects on a video sequence, leads to further knowledge of what is happening on a scene. In this paper, a Target Framework associates each person with an autonomous entity, modeling its trajectory and speed by using a state machine. The particularity of our methodology is the use of a Movement Feature Space (MFS) to generate descriptors for classifiers and trackers. This approach is applied to two public sequences (PETS2009 and TownCentre). The results of this tracking outperform other algorithms reported in the literature, which have, however, a higher computational complexity.

Keywords: pedestrian tracking, movement feature space, target framework

Seguimiento de peatones utilizando campos probabilísticos y un espacio de descriptores dinámicos

Resumen
Recuperar información de secuencias de video, como la dinámica de peatones u otros objetos en movimiento en la escena, representa una herramienta indispensable para interpretar que está ocurriendo en la escena. Este artículo propone el uso de una Arquitectura basada en Targets, que asocian a cada persona una entidad autónoma y modeliza su dinámica con una máquina de estados. Nuestra metodología utiliza una familia de descriptores calculados en el Movement Feature Space (MFS) para realizar la detección y seguimiento de las personas. Esta arquitectura fue evaluada usando dos bases de datos públicas (PETS2009 y TownCentre), y comparándola con algoritmos de la literatura, arrojó mejores resultados, aun cuando estos algoritmos poseen una mayor complejidad computacional.

Palabras clave: seguimiento de peatones, espacio de descriptores dinámicos, target framework.

1. Introduction

Vision-based object tracking is an important task and a useful source of information. It analyzes video sequences to retrieve the motion of an object at each frame [1]. Recovered metrics can consist of location, orientation, speed, and acceleration, computed on the image plane (2D) or real world (3D) reference coordinates. In general, the complexity is closely related to the object tracked: its articulated nature, or abrupt motion changes. Complex scenarios with illumination changes, noise, and object-to-object and/or object-to-scene occlusions will also degrade the tracking performance, particularly on non-controlled real life video sequences. Some examples of object tracking applications include: motion-based recognition [2], automatic surveillance [3], traffic monitoring [4], and vehicle navigation [5]. In this list, pedestrians or people are one of the most interesting objects to track for researchers and developers. In addition, it is an open subject because of its high complexity given a person's changing appearance, non-rigid structure, and occasional hazardous motion.

1.1. Related work

There are different approaches to tackle human tracking. Some trackers use a bounding box at an initial frame of the

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