Enhanced face detection for biometric security

Abstract

Biometrics is an automated method of recognizing a person based on a physiological or behavioral characteristic. Face recognition works by first obtaining an image of a person. This process is usually known as face detection. In this paper we describe an algorithm for face detection that is able to locate a human face embedded in a complicated background. Segmentation of novel or dynamic objects in a scene, often referred to as background subtraction or foreground segmentation, is a critical early step in most computer vision applications in domains such as surveillance and human-computer interaction. All previously implementations on, real-time methods fail to handle properly one or more common phenomena, such as global illumination changes, shadows, inter-reflections, similarity of foreground color to background, and non-static backgrounds (e.g. active video displays or trees waving in the wind). The recent advent of hardware and software for real-time computation of imagery makes better approaches possible. We propose a method for modeling the background that uses per-pixel, time-adaptive, Gaussian mixtures in the combined input space of pixel neighborhood and luminance invariant color. This combination in itself is novel. Our experiments show that the method possesses much greater robustness to problematic phenomena than the prior state of the art methods, without sacrificing real-time performance, making it well-suited for a wide range of practical applications in video events requiring detection and recognition.   .

Keywords — Background modeling, biometric identification, security system.