

Real-time face detection and monitoring method via Camera

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Abstract: This thesis presents a real-time face detection and monitoring system optimized for camera-based surveillance environments. Addressing the critical challenges of computational efficiency and accuracy under varying lighting conditions, occlusions, and dynamic backgrounds, the proposed method integrates a lightweight convolutional neural network (CNN) architecture with an adaptive tracking algorithm. The system employs a multi-scale detection pipeline to identify facial regions in each video frame, followed by a Kalman filter-based tracker to maintain identity consistency across frames. Experimental evaluations on benchmark datasets and real-world CCTV footage demonstrate that the method achieves a detection rate exceeding 95% at a processing speed of 30 frames per second on standard hardware. Furthermore, the monitoring module provides robust continuous tracking with minimal identity switches. The results confirm the system's suitability for applications in access control, crowd analysis, and security surveillance, offering a practical balance between high accuracy and real-time performance.

Keywords: Real-time face detection, face monitoring, camera surveillance, computer vision