INTERNATIONAL STANDARD

ISO/IEC 30137-1

First edition
2019-05

Information technology — Use of biometrics in video surveillance systems —

Part 1: System design and specification

Technologies de l'information — Utilisation de la biométrie dans les systèmes de vidéosurveillance —

Partie 1: Conception et spécification

Reference number
ISO/IEC 30137-1:2019(E)

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Published in Switzerland

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

A list of all parts in the ISO 30137 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Considerable improvements in the performance of automatic facial recognition (AFR) technologies have resulted in applications such as automated border control using the facial images encoded in e-passports and implemented in systems whereby the identity of a co-operative traveller is verified in an environment designed for the collection of uniformly illuminated and optimally posed images. The success of these first generation AFR systems has encouraged suppliers to consider other applications where the environment for collection of images may be far from optimal. The inferior performance in such less-controlled identification applications may necessitate a greater involvement by trained personnel.

The ISO 30137 series provides guidance on the use of biometric technologies in video surveillance systems (VSS), a framework for performance testing and reporting of such systems, and procedures for establishing ground truth and annotating video data for testing purposes.

This document provides the architecture, use cases and system design. The use cases include real time alerting to the presence of individuals of interest, law enforcement applications such as reviewing post-event video footage from one or more cameras against pre-populated watchlists, commercial uses such as the identification of individuals who are to be given preferential service, and faces added to (enrolled in) a watchlist following observation of behaviours in the video material.

Other scenarios include measurement of crowd densities and determining numbers of individuals traversing a given point. While these are not the focus of this document, they are closely related and information on these is therefore included in Annex A.

Information technology — Use of biometrics in video surveillance systems —

Part 1: System design and specification

1 Scope

The ISO 30137 series is applicable to the use of biometrics in VSS (also known as Closed Circuit Television or CCTV systems) for a number of scenarios, including real-time operation against watchlists and in post event analysis of video data. In most cases, the biometric mode of choice will be face recognition, but this document also provides guidance for other modalities such as gait recognition.

This document:

— defines the key terms for use in the specification of biometric technologies in a VSS, including metrics for defining performance;

— provides guidance on selection of camera types, placement of cameras, image specification etc. for the operation of a biometric recognition capability in conjunction with a VSS;

— provides guidance on the composition of the gallery (or watchlist) against which facial images from the VSS are compared, including the selection of appropriate images of sufficient quality, and the size of the gallery in relation to performance requirements;

— makes recommendations on data formats for facial images and other relevant information (including metadata) obtained from video footage, used in watchlist images, or from observations made by human operators;

— establishes general principles for supporting the operator of the VSS, including user interfaces and processes to ensure efficient and effective operation, and highlights the need to have suitably trained personnel;

— highlights the need for robust governance processes to provide assurance that the implemented security, privacy and personal data protection measures specific to the use of biometric technologies with a VSS (e.g. internationally recognizable signage) are fit for purpose, and that societal considerations are reflected in the deployed system.

This document also provides information on related recognition and detection tasks in a VSS such as:

— estimation of crowd densities;

— determining patterns of movement of individuals;

— identification of individuals appearing in more than one camera;

— use of other biometric modalities such as gait or iris;

— use of specialized software to infer attributes of individuals, e.g. estimation of gender and age;

— interfaces to other related functionality, e.g. video analytics to measure queue lengths or to alert for abandoned baggage.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1 Target subject related terms

3.1.1
operator
individual(s) responsible for day to day operation of the system

Note 1 to entry: This may include adjustment of the video surveillance cameras, selecting data suitable for use by the biometric application, and acting on the output of the biometric comparison process.

3.1.2
presentation attack
presentation of an artefact or of human characteristics to a biometric capture subsystem in a fashion that could interfere with the intended policy of the biometric system

3.1.3
target subject(s)
target(s)
individual(s) of interest

Note 1 to entry: A target subject will normally be someone already enrolled in a *watchlist* (3.1.4). However, this is not always the case; in some scenarios they are a target because they are to be enrolled in a watchlist.

3.1.4
watchlist
list of *individuals of interest* (3.1.3) (and their associated reference images) for detection by the video surveillance application

Note 1 to entry: The watchlist may be of individuals for whom an added service level is to be offered (e.g. VIPs or premium customers). This is sometimes referred to as a "whitelist".

Note 2 to entry: The watchlist may be a list of "wanted" individuals, e.g. individuals who should be denied access to premises or services. This is sometimes referred to as a "blacklist".

Note 3 to entry: A system may have multiple watchlists of different groups of target subjects, and with different performance goals.

Note 4 to entry: In the case of target subject *back-tracking* (3.3.1) the watchlist will normally contain only one *target subject* (3.1.3) (or in the case of a group of individuals of interest, a few target subjects).

3.2 VSS related terms

3.2.1
codec
computer program capable of encoding or decoding a digital data stream or signal