

TR 69 : Part 2 : 2019
(ICS 13.320, 35.240.99)

TECHNICAL REFERENCE

Video analytics within video surveillance systems

– Part 2 : Selection, installation and benchmarking



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Cyrus Innovations Pte Ltd

Dou Yee Engineering Pte Ltd

Hikvision Singapore

Infocomm Media Development Authority

ITE College West

NEC Asia Pacific Pte Ltd

NCS Pte Ltd

Panasonic R & D Center Singapore

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Foreword

This Technical Reference (TR) was prepared by the Working Group on Video Analytics and Video Surveillance (Part 2) set up by the Technical Committee on Internet of Things under the purview of ITSC.

TR 69 is intended to support the wider adoption of video analytics technology within video surveillance systems and consists of the following parts under the general title “Video analytics within video surveillance systems”:

Part 1 : Reference architecture and interoperability

Looks at the fundamental concepts that are key to architecting a solution for the use of video analytics, and puts it in the context of the other systems that video analytics need to be interoperable with.

Part 2 : Selection, installation and benchmarking

Sets out practical steps for the selection, installation and benchmarking of video analytics system, to help users size up their requirements systematically in order to match it with the relevant capabilities that current video analytics systems can deliver.

This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

In preparing this TR, reference was made to the following publications:

1. ISO/IEC 19794-5:2011 Information technology – Biometric data interchange formats – Part 5: Face image data
2. ISO/IEC 62676-5:2018 Video surveillance systems for use in security applications – Part 5: Data specifications and image quality performance for camera devices
3. SS ISO/IEC 27001:2019 Information technology – Security techniques – Information security management systems – Requirements
4. SS ISO/IEC 27002:2019 Information technology – Security techniques – Code of practice for information security controls
5. SS 507:2015 Information and communications technology disaster recovery services
6. TR 64:2018 Guidelines for IoT security for smart nation

This TR is expected to be used by suppliers, buyers, service providers, systems integrators, end users and manufacturers of video surveillance systems, testing, inspection and certification bodies, and industry associations.

Attention is drawn to the possibility that some of the elements of this TR may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

NOTE

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "Mature standards". Mature Standards will not be subject to further review, unless there are requests to review such standards.*
2. *An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*
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Video analytics within video surveillance systems – Part 2: Selection, installation and benchmarking

0 Introduction

0.1 Current landscape

Video surveillance captures situational data of a location being surveyed. This footage needs to be perused and made sense of to prevent crime, identify risks or trigger suitable interventions. This process is not only time-consuming, but can be demanding on resources, requiring multiple surveillance operators and a multitude of monitoring equipment as a single location often needs to be covered by multiple monitoring devices. Video analytics (VA) allows the automation of viewing and searching through the surveillance feed for anomalies or pre-set conditions to identify events and help derive meaning or extract intelligence from the recorded material. Effective use of VA to complement video surveillance systems (VSS) can alleviate manpower constraints and drive greater efficiency in surveillance functions.

VA is a relatively new area within the larger, more established framework of VSS. This reference aims to provide guidelines on best practices for the selection, installation, operation, and benchmarking of VA systems.

The advent of VA capabilities in recent years has enlarged the functional role of VSS. VA can deliver motion detection, detection of specific phenomena such as flames or smoke, facial recognition, and vehicle licence plate recognition, to name a few. This enables users to improve the quality of the monitoring, as well as automate some of the monitoring and detection tasks, relieving the manpower crunch in the industry as adoption rates increase.

However, there is a lack of a common language in describing the requirements and expected functionality. There are few international standards established for the selection and benchmarking of VA performance. This can lead to gaps in expectations between different stakeholders and prevent users from deploying the required systems or enjoying the full benefits that the technology can deliver.

0.2 Objectives of this document

The objectives of this technical reference are to:

- Provide a checklist for users to facilitate ease of selection for the various components of a total VA solution. The checklist can help to determine the set-up required to provide images or capture information suitable for the selected analysis type.
- Provide a pre-installation checklist and recommendations for monitoring and maintaining the VA system.
- Provide common guidelines for the benchmarking of the performance of a VA set-up and VSS in general.

0.3 Intended audience

This document serves to guide end-users, who may be technical, operations or procurement personnel from government agencies, educational institutions, or commercial entities. Manufacturers, systems integrators and equipment suppliers are encouraged to align descriptions and language used in sales presentations and solutions documentation with the guidelines and recommendations made in this TR.

In cases where the results or findings of the VA system may be used in particular scenarios such as legal evidence in a court of law or for the purposes of insurance claims, it is important that the set-up of the VA system can fulfil any requirements that are specific to these uses. Users should therefore consider the performance level required by the system and take due note using these guidelines for selection and benchmarking.

1 Scope

This TR provides an overview of VSS and defines the areas that VA systems can cover and makes recommendations for their use. The considerations for video surveillance defined in this TR span from on-premise systems to centrally-controlled systems that cover multiple sites through either private or public cloud, and VA used in VSS that are integrated with other subsystems through a PSIM platform.

VA are typically used in two forms – in real-time and for forensic purposes. There are two types of engines that drive analytics software – rule-based, and non-rule-based.

When used in real-time mode, each frame of the video stream is analysed as soon as it is captured and alarms are generated whenever pre-defined triggers are encountered. When used in forensic mode, analysis software can be used to search through recorded video for pre-defined triggers, or search for points in the video where alerts have been generated.

Most active VA systems are rule-based. This means that the software is given a set of parameters to monitor and when conditions are met, the software generates a pre-defined alert. Therefore, real-time, rule-based systems are designed to look only for particular types of behaviour that have already been predicted and described to the system.

Rule-based forensic analytics allow users to define new rules and apply them to historical recordings to identify events of interest based on new triggers, or to find events not detected by previously defined rules for real-time VA.

For situations which require a more adaptable form of analytics, non-rule based systems can be used. VA not based on pre-defined rules make use of unsupervised machine learning to detect abnormalities in behaviour. The system establishes and learns the norms based on the incoming video feed and makes statistical calculations to determine when content in the feed deviates from the norm, and triggers alerts.

As the title implies, the use of VA within VSS focuses on its real-time applications. While many of the recommendations and guidelines described in this document will also be useful reference for users of forensic or non-real time systems, issues or requirements specific to non-real time systems is not covered in this TR. This TR does not focus on recommendations that are specific to non-rule-based systems as this technology is still in the early stages of adoption. Future revisions of this document will take into consideration developments in the technology and the market.

This scope of TR is not limited to the use of VA for any particular industry or business-use case but aims to provide guidelines that can be adapted to a wide range of uses.

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

SS 645 Code of practice for installation and servicing of electrical fire alarm systems