



NSAI
Standards

Standard Recommendation
S.R. ISO/IEC TR 24028:2020

Information technology - Artificial intelligence - Overview of trustworthiness in artificial intelligence

S.R. ISO/IEC TR 24028:2020

Relationship with other documents and/or

Incorporating amendments/corrigenda issued since publication:

Published

Withdrawn

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document was published
under the authority of the NSAI
and comes into effect on:
25 May, 2021

ICS number:
35.020

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National foreword

S.R. ISO/IEC TR 24028:2020 is the adopted Irish version of the International Document ISO/IEC TR 24028:2020, *Information technology - Artificial intelligence -- Overview of trustworthiness in artificial intelligence*.

Although this document has been adopted as a Standard Recommendation it has not gone through a public enquiry process.

This Technical Report has been adopted from ISO and contains informative material not suitable to be published as a Standard or a Technical Specification.

A Technical Report may include, for example, data obtained from a survey carried out among the national members, data on work in other organizations, or data on the “state-of-the-art” in relation to national standards on a particular subject.

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

S.R. ISO/IEC TR 24028:2020

This page is intentionally left blank

S.R. ISO/IEC TR 24028:2020

**TECHNICAL
REPORT**

**ISO/IEC TR
24028**

First edition
2020-05

**Information technology —
Artificial intelligence — Overview
of trustworthiness in artificial
intelligence**

*Technologies de l'information — Intelligence artificielle — Examen
d'ensemble de la fiabilité en matière d'intelligence artificielle*



Reference number
ISO/IEC TR 24028:2020(E)

© ISO/IEC 2020



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Overview	7
5 Existing frameworks applicable to trustworthiness	7
5.1 Background.....	7
5.2 Recognition of layers of trust.....	8
5.3 Application of software and data quality standards.....	8
5.4 Application of risk management.....	10
5.5 Hardware-assisted approaches.....	10
6 Stakeholders	11
6.1 General concepts.....	11
6.2 Types.....	12
6.3 Assets.....	12
6.4 Values.....	13
7 Recognition of high-level concerns	13
7.1 Responsibility, accountability and governance.....	13
7.2 Safety.....	14
8 Vulnerabilities, threats and challenges	14
8.1 General.....	14
8.2 AI specific security threats.....	15
8.2.1 General.....	15
8.2.2 Data poisoning.....	15
8.2.3 Adversarial attacks.....	15
8.2.4 Model stealing.....	16
8.2.5 Hardware-focused threats to confidentiality and integrity.....	16
8.3 AI specific privacy threats.....	16
8.3.1 General.....	16
8.3.2 Data acquisition.....	16
8.3.3 Data pre-processing and modelling.....	17
8.3.4 Model query.....	17
8.4 Bias.....	17
8.5 Unpredictability.....	17
8.6 Opaqueness.....	18
8.7 Challenges related to the specification of AI systems.....	18
8.8 Challenges related to the implementation of AI systems.....	19
8.8.1 Data acquisition and preparation.....	19
8.8.2 Modelling.....	19
8.8.3 Model updates.....	21
8.8.4 Software defects.....	21
8.9 Challenges related to the use of AI systems.....	21
8.9.1 Human-computer interaction (HCI) factors.....	21
8.9.2 Misapplication of AI systems that demonstrate realistic human behaviour.....	22
8.10 System hardware faults.....	22
9 Mitigation measures	23
9.1 General.....	23
9.2 Transparency.....	23
9.3 Explainability.....	24
9.3.1 General.....	24

9.3.2	Aims of explanation.....	24
9.3.3	Ex-ante vs ex-post explanation.....	24
9.3.4	Approaches to explainability.....	25
9.3.5	Modes of ex-post explanation.....	25
9.3.6	Levels of explainability.....	26
9.3.7	Evaluation of the explanations.....	27
9.4	Controllability.....	27
9.4.1	General.....	27
9.4.2	Human-in-the-loop control points.....	28
9.5	Strategies for reducing bias.....	28
9.6	Privacy.....	28
9.7	Reliability, resilience and robustness.....	28
9.8	Mitigating system hardware faults.....	29
9.9	Functional safety.....	29
9.10	Testing and evaluation.....	30
9.10.1	General.....	30
9.10.2	Software validation and verification methods.....	30
9.10.3	Robustness considerations.....	32
9.10.4	Privacy-related considerations.....	33
9.10.5	System predictability considerations.....	33
9.11	Use and applicability.....	34
9.11.1	Compliance.....	34
9.11.2	Managing expectations.....	34
9.11.3	Product labelling.....	34
9.11.4	Cognitive science research.....	34
10	Conclusions.....	34
	Annex A (informative) Related work on societal issues.....	36
	Bibliography.....	37

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 Joint Technical Committee ISO/IEC JTC 1, *Information Technology*, Subcommittee SC 42, *Artificial Intelligence*.

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

The goal of this document is to analyse the factors that can impact the trustworthiness of systems providing or using AI, called hereafter artificial intelligence (AI) systems. The document briefly surveys the existing approaches that can support or improve trustworthiness in technical systems and discusses their potential application to AI systems. The document discusses possible approaches to mitigating AI system vulnerabilities that relate to trustworthiness. The document also discusses approaches to improving the trustworthiness of AI systems.

Information technology — Artificial intelligence — Overview of trustworthiness in artificial intelligence

1 Scope

This document surveys topics related to trustworthiness in AI systems, including the following:

- approaches to establish trust in AI systems through transparency, explainability, controllability, etc.;
- engineering pitfalls and typical associated threats and risks to AI systems, along with possible mitigation techniques and methods; and
- approaches to assess and achieve availability, resiliency, reliability, accuracy, safety, security and privacy of AI systems.

The specification of levels of trustworthiness for AI systems is out of the scope of this document.

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:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

accountability

property that ensures that the actions of an *entity* (3.16) may be traced uniquely to that entity

[SOURCE: ISO/IEC 2382:2015, 2126250, modified — The Notes to entry have been removed.]

3.2

actor

entity (3.16) that communicates and interacts

[SOURCE: ISO/IEC TR 22417:2017, 3.1]

3.3

algorithm

set of rules for transforming the logical representation of *data* (3.11)

[SOURCE: ISO/IEC 11557:1992, 4.3]

3.4

artificial intelligence

AI

capability of an engineered *system* (3.38) to acquire, process and apply knowledge and skills

Note 1 to entry: Knowledge are facts, *information* (3.20) and skills acquired through experience or education.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-