TECHNICAL REPORT

ISO/IEC TR 24030

First edition

Information technology — Artificial intelligence (AI) — Use cases

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

PROOF/ÉPREUVE

Reference number
ISO/IEC TR 24030:2021(E)

© ISO/IEC 2021

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2021

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
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-fdbe1de09078/iso-iec-prf-tr-24030

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC PRF TR 24030

 © ISO/IEC 2021 – All rights reserved

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC TR 24030:2021
https://standards.iteh.ai/catalog/standards/sist/91e0c088-b9b8-4d48-8511-1dbc1de09078/iso-iec-tr-24030

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f0bb-46f8-851f-1abc1de0197b/iso-iec-prf-tr-24030

 © ISO/IEC 2021 – All rights reserved

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

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 or www.iec.ch/members_experts/refdocs).

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 patents.iec.ch).

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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. In the IEC, see www.iec.ch/understanding-standards.

ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e66088-f0bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

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 and www.iec.ch/national-committees.

 © ISO/IEC 2021 – All rights reserved

Introduction

This document provides a collection of use cases of artificial intelligence (AI) applications in a variety of domains.

In total, 132 AI use cases were submitted by experts between July 2018 and the end of November 2019. In this document, the term “use cases” means “collection of submitted use cases”.

The rationale for this document is as follows:

— illustrating the applicability of the AI standardization work across a variety of application domains;

— input to and reference for AI standardization work;

— sharing the collected use cases in support of AI standardization work with external organizations and internal entities to foster collaboration;

— reach out to new stakeholders interested in AI applicability;

— establishment of liaisons organizations to collect requirements for AI via use cases;

— by investigating use cases, it is possible to find the new technical requirements (standardized demand) from the market, accelerating the transformation of science and technology achievements.

While a bottom-up approach was used to collect use cases, a top-down approach is used in this document to identify AI applications, and their deployment models, and their application domains., which is shown in Clause 5.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

The first step taken to collect use cases was to identify applications domains of AI systems (described in Clause 5) and to provide a use case template (described in 6.4 and Annex B). Contributors were requested to submit use cases using the provided template.

ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbe1ae09078/iso-iec-prf-tr-24030

For improving the quality of use cases, a guidance was provided for contributors. The guidance included identified acceptable sources (described in 6.3) and AI characteristics (described in 6.4) for preparing use cases.

In this document, subclause 6.5 includes basic statistics of use cases. Subclause 6.6 and Annex C describe the findings from use case analysis.

The use cases were grouped and categorized according to the identified application domains. In this document, use cases are summarized and grouped according to the application domains in Clause 7. Readers of this document can find use cases of specific application domains and their original submissions at https://standards.iso.org/iso-iec/tr/24030/ed-1/en.

AI is an emerging field with use cases and solutions with a wide range of maturity and success. The descriptions are given for the convenience of users of this document and does not constitute an endorsement by ISO.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

Information technology — Artificial intelligence (AI) — Use cases

1 Scope

This document provides a collection of representative use cases of AI applications in a variety of domains.

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/

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.1
artificial intelligence
AI
ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030
<system> capability to acquire, process, create and apply knowledge, held in the form of a model, to conduct one or more given tasks

3.2
artificial intelligence
AI
<engineering discipline> discipline of developing and studying *artificial intelligence* (3.1)

3.3
quality
conformance to specified requirements

[SOURCE: ISO 13628-2:2006, 3.33]

3.4
machine learning
process using computational techniques to enable systems to learn from data or experience

3.5
deep learning
approach to creating rich hierarchical representations through the training of neural networks with many hidden layers

3.6
service
performance of activities, work, or duties

Note 1 to entry: A service is self-contained, coherent, discrete, and can be composed of other services.

Note 2 to entry: A service is generally an intangible product.

© ISO/IEC 2021 – All rights reserved

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.50]

3.7
classification
task of assigning collected data to target categories or classes.

Note 1 to entry: Machine learning (ML) models can be designed/created either for binary classification, where they can learn to predict one of two different categories/classes; or for multiclass classification, where ML models learn to predict one of many different categories/classes.

Note 2 to entry: An example of classification is to predict if a photograph of an animal is a cat or a dog or even a different species. Classification employs supervised learning. Classification can employ supervised, semi-supervised, or unsupervised learning.

3.8
application
software or a program that is specific to the solution of an application problem

[SOURCE: ISO/IEC 11801:2002, 3.1.2]

3.9
neural network
network of primitive processing elements connected by weighted links with adjustable weights, in which each element produces a value by applying a nonlinear function to its input values, and transmits it to other elements or presents it as an output value

Note 1 to entry: Whereas some neural networks are intended to simulate the functioning of neurons in the nervous system, most neural networks are used in artificial intelligence as realizations of the connectionist model.

Note 2 to entry: Examples of nonlinear functions are a threshold function, a sigmoid function, and a polynomial function.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

[SOURCE: ISO/IEC 2382: 2015, 2120625]

3.10
task
set of activities undertaken in order to achieve a specific goal

Note 1 to entry: These activities can be physical, perceptual and/or cognitive.

Note 2 to entry: While goals are independent of the means used to achieve them, tasks describe particular means of achieving goals.

Note 3 to entry: Examples of tasks include classification, regression, ranking, clustering and dimensionality reduction.

[SOURCE: ISO 9241-11:2018, 3.1.11, modified — Note 3 to entry has been added.]

3.11
parameter
<machine learning> variable of the model that affects its output any characteristic that can help in defining or classifying a particular system

3.12
artificial intelligence system
AI system
engineered information processing system featuring artificial intelligence

Note 1 to entry: AI systems are designed to operate with varying levels of autonomy.

3.13
training data
samples for training used to fit a machine learning model

 © ISO/IEC 2021 – All rights reserved

3.14
cloud service
one or more capabilities offered through cloud computing invoked using a defined interface

[SOURCE: ISO/IEC 17788:2014, 3.2.8]

3.15
cloud computing
paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with self-service provisioning and administration on-demand

Note 1 to entry: Examples of resources include servers, operating systems, networks, software, applications, and storage equipment.

[SOURCE: ISO/IEC 17788:2014, 3.2.5]

3.16
automation
characteristic of a system where work is performed that might previously have been done by a living being and that is governed by rules determined outside of the system

Note 1 to entry: Such systems are subject to external control and oversight.

Note 2 to entry: Automation implies the (revocable) delegation to a machine of a specific and defined set of "skills", operations, processes, or procedures.

3.17
bias
systematic difference between true (or accepted) value and measured value

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SOURCE: ISO 14488:2007, 3.1]

ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

3.18
data set
identifiable collection of data available for access or download in one or more formats

[SOURCE: ISO/IEC 20546:2019, 3.1.11]

3.19
natural language processing
<system> information processing based upon natural-language understanding

3.20
natural language processing
<engineering discipline> field of study within computer science and linguistics concerning automated processing, in whole or in part, of natural language

3.21
retraining
updating a trained model by training with different training data

3.22
computer vision
capability of a functional unit to acquire, process, and interpret visual data

Note 1 to entry: Computer vision involves the use of visual sensors to create an electronic or digital image of a visual scene.

Note 2 to entry: Not to be confused with machine vision.

Note 3 to entry: computer vision; artificial vision: terms and definition standardized by ISO/IEC [ISO/IEC 2382-28:1995].

© ISO/IEC 2021 – All rights reserved

Note 4 to entry: 28.01.19 (2382)

[SOURCE: ISO/IEC 2382:2015, 2123787]

3.23
trained model
result of model training

3.24
robot
automation system with actuators that performs intended tasks in the physical world, by means of sensing its environment and a software control system

Note 1 to entry: A robot includes a control system and interface of a control system.

Note 2 to entry: The classification of robot into industrial robot or service robot is done according to its intended application.

Note 3 to entry: In order to properly perform its tasks, a robot makes use of different kinds of sensors to confirm its current state and perceive the elements composing the environment in which it operates.

[SOURCE: ISO 18646-2:2019, 3.1, modified — Note 3 to entry has been added]

3.25
big data
extensive datasets — primarily in the data characteristics of volume, variety, velocity, and/or variability — that require a scalable technology for efficient storage, manipulation, management, and analysis

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Note 1 to entry: Big data is commonly used in many different ways, for example as the name of the scalable technology used to handle big data extensive datasets.

[SOURCE: ISO/IEC 20546:2019, 3.1.2]

ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

3.26
end user
individual person who ultimately benefits from the outcomes of the system

Note 1 to entry: The end user may be a regular operator of the software product or a casual user such as a member of the public.

[SOURCE: ISO/IEC 25000:2014, 4.7]

3.27
data analysis
systematic investigation of the data and their flow in a real or planned system

[SOURCE: ISO/IEC 2382:2015, 2122686]

3.28
pattern recognition
identification, by a functional unit, of physical or abstract patterns, and of structures and configurations

Note 1 to entry: This is an improved version of the definition in ISO/IEC 2382-12:1988.

Note 2 to entry: Pattern recognition: term and definition standardized by ISO/IEC 2382-28:1995.

Note 3 to entry: 28.01.13 (2382)

[SOURCE: ISO/IEC 2382:2015, 2123781]

 © ISO/IEC 2021 – All rights reserved

3.29
anomaly detection
task of identifying data samples that do not conform to an expected pattern distribution, especially within data sets that appear to be homogeneous.

Note 1 to entry: Anomaly detection is mostly used for outlier detection, for example, fraud detection, detecting suspicious activities, etc. It may, therefore, also be called 'outlier detection'.

Note 2 to entry: With anomaly detection, the input data is all of one class and the ML model predicts if a data point is typical for a given distribution or not.

Note 3 to entry: Anomaly detection typically employs unsupervised learning.

3.30
stakeholder
person or organization that can affect, be affected by, or perceive themselves to be affected by a decision or activity

[SOURCE: ISO 35001:2019, 3.2]

3.31
model
physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, process or data

[SOURCE: ISO/IEC 18023-1:2006, 3.1.11, modified — In the definition, "or data" has been added.]

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.32
knowledge
<artificial intelligence> information about objects, events, concepts or rules, their relationships and properties, organized for goal-oriented systematic use

ISO/IEC PRF TR 24030
https://standards.iteh.ai/catalog/standards/sist/91e6c088-f9bb-46f8-851f-1dbc1de09078/iso-iec-prf-tr-24030

Note 1 to entry: Information can exist in numeric or symbolic form.

Note 2 to entry: Information is data that has been contextualized, so that it is interpretable. Data is created through abstraction or measurement from the world.

4 Abbreviated terms

ANN	artificial neural networks	LSTM	long short-term memory networks
API	application programming interface	MAE	mean absolute error
AR	augmented reality	ML	machine learning
AUC	area under the curve	MRI	magnetic resonance imaging
BDEC	big data and extreme-scale computing	NLP	natural language processing
BNN	binarized neural network	NLU	natural language understanding
CG	computer graphics	OLAP	online analytical processing
CNN	convolutional neural network	PoC	proof of concept
CPU	central processing unit	PSNR	peak signal-to-noise ratio
CT	computed tomography	QA	quality assurance
CV	computer vision	RAM	random access memory

© ISO/IEC 2021 – All rights reserved