**ISO/IEC JTC 1 SC 42 Artificial Intelligence – Working Group 4**

**Use Case Submission Form**

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* <https://www.iso.org/iso/home/standards_development/resources-for-technical-work/data-protection-declaration.htm>
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* ISO/IEC Directives, Part 1, Consolidated ISO Supplement, 2021, 2.13
* ISO/IEC Directives, Part 2, 2021, 32

# Use case template (To be replaced with Use Case Name)

|  |  |  |
| --- | --- | --- |
| 1.[ID](#_ID) | (leave blank, for internal use) | |
| 2. [Use case name](#_Use_case_name) |  | |
| 3. [Application domain](#_Application_domain) | (Select from pull-down menu) | |
| 4. [Deployment model](#_Deployment_model) | (Select from pull-down menu) | |
| 5. [Objective(s)](#_Objective(s)) |  | |
| 6. [Narrative](#_Narrative) |  | |
| 7. [Stakeholders and stakeholder considerations](#_Stakeholders) |  | |
| 8. [Data Characteristics](#_Data_characteristics) |  | |
| 9. [Key performance indicators (KPIs)](#_Key_performance_indicators) |  | |
| 10. [Features of use case](#_Features_of_use) | [Task(s)](#_Task(s)) |  |
| [Level of automation](#_Task(s)_1) | (Select from pull-down menu) |
| [Method(s)](#_Method(s)) |  |
| [Platform](#_Platform) |  |
| [Topology](#_Topology) |  |
| 11. [Threats & vulnerabilities](#_Stakeholders’_assets,_values) |  | |
| 12. [Challenges and issues](#_Challenges_and_issues) |  | |
| 13. [Trustworthiness considerations](#_Trustworthiness_considerations) |  | |
| 14. [Use of standards; standardization opportunities](#_Standardization_opportunities/requi) |  | |
| 15. [Relevant SDGs](#_SDGs_to_be) | (Select from pull-down menu) | |

# Guidance and cautions for use case submission

## Guidance for submitting use cases

Use case submissions will be considered for inclusion in the Technical Report based on the following factors:

* **Diversity and Representativeness.** The Technical Report is meant to represent a range of AI use cases in terms of application domain, deployment model, objectives, stakeholders, autonomy, data characteristics, architecture, and other factors.
* **Completeness.** Submissions should populate as many Table 1 fields as possible.
* **Quality of references (see 3.2).**
* **Positive Impact.** Demonstration of positive outcomes for society, the environment, and stakeholders.

Due to the anticipated volume of submissions, submission of a use case for consideration does not guarantee inclusion in the Technical Report.

## Acceptable Reference Sources of Use Cases

* Peer-reviewed scientific/technical publications on AI applications (e.g. [1])
* Patent documents describing AI solutions (e.g. [2], [3]).
* Technical reports or conference presentations (e.g. [4])
* High quality company whitepapers and presentations
* Publicly accessible sources with sufficient detail

***This list is not exhaustive. Other credible sources may be acceptable as well.***

# Descriptions of the fields and requirements for filling them

## ID

This value is automatically assigned.

## Use case name

Use case name provided by the use case contributor.

## Application domain

Application domain selected by the use case contributor from the list below, based on [5]:

* agriculture;
* home/service robotics;
* media and entertainment;
* construction;
* ICT;
* mobility;
* defence;
* knowledge management;
* public sector;
* digital marketing;
* legal;
* retail;
* education;
* logistics;
* security;
* energy;
* low-resource communities;
* social infrastructure;
* fintech;
* maintenance and support;
* transportation;
* healthcare;
* manufacturing;
* work and life.

## Deployment model

Deployment model selected by the use case contributor from the list below:

* cloud services;
* cyber-physical systems;
* embedded systems;
* hybrid;
* on-premise systems;
* social networks.

## Objective(s)

Objectives of the AI system defined by the use case contributor, including the following:

* what is to be accomplished;
* intended beneficiaries of the AI system; and
* scope, boundaries and limitations.

## Narrative

This field asks the contributor to provide description of optimization or inferences being made with the AI model and what decisions, predictions, recommendations are being applied; capabilities and features that are unique to the domain, decision environment; whose decision is being augmented? the dynamics of the decision environment, etc.

## Stakeholders and stakeholder perspectives

ISO/IEC DIS 22989 [6] defines a stakeholder as any individual, group, or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity. This can include organizations, customers, third parties, end users, the community, the environment, developers and other entities. The use case can describe AI system stakeholders and how their perspectives are taken into consideration. Stakeholder perspectives include stakeholder assets, values and effects.

AI stakeholder roles includes:

* AI provider: provides products or services that use AI system.
* AI producer: designs, develops, tests and deploys products or services that use AI system.
* AI Customer: uses an AI product or service either directly or by its provision to AI users.
* AI partner: provides services in the context of AI.
* AI subject: impacted by an AI system, service, or product.

Details of AI stakeholder roles could be found in ISO/IEC DIS 22989, 5.15 [6].

## Data characteristics

### General

This field describes the data characteristics that are defined in 4.8.2 to 4.8.7.

### Source

Origin of data processed by the AI system, e.g. customers, instruments, IoT, web, surveys, commercial activity, simulations, or other sources.

### Variety

Types of data processed by the AI system, e.g. structured/unstructured text, images, voices, gene sequences, numbers, composite: time-series, graph-structures. This field can also briefly discuss formats, logical models, timescales, and semantics.

### Velocity

The rate of flow at which the data in the AI system is created, stored, analysed, or visualized. Could be in real time.

### Variability

Changes in data rate, format/structure, semantics, and/or quality.

### Quality

Completeness and accuracy of the data with respect to semantic content as well as syntax of the data (such as presence of missing fields or incorrect values).

### Protected attributes

An attribute by which groups separated by this attribute are required to be equal. For example, gender, race, religion, legally regulated attribute.

## Key performance indicators (KPIs)

This field describes the KPIs for evaluating the performance or usefulness of the AI system.

## Features of use case

### General

This field describes the features and AI characteristics of the use case.

### Task(s)

The main task of the use case. A pull-down list includes recognition, natural language processing, knowledge processing and discovery, inference, planning, prediction, optimization, interactivity, recommendation and others.

### Level of automation

The level of automation of AI systems used in this use case.

AI systems can be compared based on the degree of automation and whether they are subject to external control. Autonomy is at one end of a spectrum and a fully human controlled system on the other, with degrees of heteronomy in between.

The level of automation includes the following options:

* full automation: The system can modify its operating domain or its goals without external intervention, control or oversight.
* high automation: The system can perform its entire mission without external intervention.
* conditional automation: The system performs parts of its mission without external intervention.
* partial automation: Sustained and specific performance by a system, with an external agent being ready to take over when necessary.
* assistance: Some sub-functions of the system are fully automated while the system remains under the control of an external agent.
* no automation: The system assists an operator.

See ISO/IEC DIS 22989, 5.12 [6] for more details on the levels of automation.

### Method(s)

AI method(s), model(s) or framework(s) used in development.

### Platform

Platform (includes hardware system) used in development and deployment.

### Topology

Topology of the deployment network architecture.

## Threats and vulnerabilities

This field describes threats and vulnerabilities relevant to the use case, such as unwanted bias, incorrect AI system use, security threats, challenges to accountability and privacy threats (hidden patterns).

## Challenges and issues

Descriptions of challenges and issues of the use case.

## Trustworthiness considerations

### General

AI system trustworthiness can be considered from several perspectives. This field is used to describe how the use case addresses trustworthiness elements including bias mitigation, ethical and societal concerns, explainability, controllability, predictability, transparency, verification, robustness, reliability, and resilience.

### Bias mitigation

ISO/IEC TR 24027:2021 defines bias as systematic difference in treatment of certain objects, people, or groups in comparison to others. In this part of the trustworthiness field, the use case can describe how biases such as human cognitive bias, confirmation, data bias and statistical bias are detected and mitigated in the AI system. The use case can also discuss how the organization has approached bias goals and challenges.

See ISO/IEC TR 24027:2021 for further information.

### Ethical and societal concerns

In this part of the trustworthiness field, the use case can describe how societal and ethical concerns related to the AI system are understood, identified, controlled and mitigated. Current or future measures to address potential ethical and societal risks can also be described, along with protected attributes.

Societal concerns might be a factor when an organization is choosing or recommending an AI technology. Taking context, scope, nature and risks into consideration can mitigate undesirable societal outcomes. In the absence of such considerations, the technology itself could perform flawlessly from a technical perspective but have undesirable social or ethical impacts.

AI ethics is one important aspect of societal concerns that addresses the ethical issues arising from the use of AI systems. AI ethics are being considered in various countries and organizations in the form of principles, guidelines, or regulations that ethical AI can follow [8][9][10][11].

AI ethics and ethical risks is based on the four ethical principles of trustworthy AI of EU HLEG [11];

* respect for human autonomy;
* prevention of harm;
* fairness; and
* explicability.

The four ethical principles cover other ethical principles described by other AI principles or guidelines. Ethical risk could be defined as a problem caused by an AI system that does not follow the above ethical principles.

### Explainability

ISO/IEC DIS 22989, 5.14.6 [6] defines explainability as a property of an AI system to express important factors influencing the AI system results in a way that humans can understand. In this part of the trustworthiness field, the use case can describe the degree to which AI system results are explainable and discuss how the organization has approached explainability goals and challenges.

### Controllability

ISO/IEC DIS 22989, 5.14.5 [6] defines controllability as a property of an AI system that a human or other external agent can intervene in the system’s functioning. A key aspect of controllability is the determination of which agent(s) can control which components of the AI system (e.g. the service provider or product vendors, the provider of the constituent AI, the user or an entity with regulatory authority). In this part of the trustworthiness field, the use case can describe the degree to which AI system is controllable and discuss how the organization has approached controllability goals and challenges.

### Predictability

ISO/IEC DIS 22989, 5.14.7 [6] defines predictability as a property of an AI system that enables reliable assumptions by stakeholders about the output. In this part of the trustworthiness field, the use case can describe the degree to which AI system results are predictable and discuss how the organization has approached predictability goals and challenges.

### Transparency

ISO/IEC DIS 22989, 5.14.8 [6] defines transparency as a property of a system that appropriate information about the system is communicated to relevant stakeholders in system domain. In this part of the trustworthiness field, the use case can describe the degree to which AI system results are transparent and discuss how the organization has approached transparency goals and challenges.

### Verification

ISO/IEC DIS 22989, 5.14.9 defines verification as confirmation, through the provision of objective evidence, that specified requirements have been fulfilled. In this part of the trustworthiness field, the use case can discuss how the organization has approached verification goals and challenges.

### Robustness, reliability and resilience

ISO/IEC DIS 22989 [6] defines robustness (5.14.2), reliability (5.14.3) and resilience (5.14.4) as follows:

* Robustness: Ability of a system to maintain its level of performance under any circumstances.
* Reliability: Property of consistent intended behaviour and results.
* Resilience: Ability of a system to recover operational condition quickly following an incident.

In this part of the trustworthiness field, the use case can describe the degree to which AI system is robust, reliable and resilient, and discuss how the organization has approached goals and challenges of these characteristics.

## Use of standards; opportunities for future standardization

Descriptions of standardization opportunities or requirements associated with use case.

## SDGs to be achieved

The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a collection of 17 global goals set by the United Nations General Assembly. SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. The goals are as follows:

(1) No Poverty

(2) Zero Hunger

(3) Good Health and Well-being

(4) Quality Education

(5) Gender Equality

(6) Clean Water and Sanitation

(7) Affordable and Clean Energy

(8) Decent Work and Economic Growth

(9) Industry, Innovation and Infrastructure

(10) Reducing Inequality

(11) Sustainable Cities and Communities

(12) Responsible Consumption and Production

(13) Climate Action

(14) Life Below Water

(15) Life On Land

(16) Peace, Justice, and Strong Institutions

(17) Partnerships for the Goals.

Information on the SDGs can be found at [www.undp.org/content/undp/en/home/sustainable-development-goals.html](http://www.undp.org/content/undp/en/home/sustainable-development-goals.html)

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