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Artificial intelligence — Data quality for analytics and machine learning (ML) —

Part 4: Data quality process framework

Intelligence artificielle — Qualité des données pour les analyses de données et l'apprentissage automatique —

Partie 4: Cadre pour le processus de qualité des données

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 42, *Artificial intelligence*.

A list of all parts in the ISO/IEC 5259 series can be found on the ISO and IEC websites.

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.

Introduction

Artificial intelligence (AI)-related products, systems or solutions have developed quickly in recent years. One of the common characteristics of an AI system, especially for systems using supervised machine learning (ML), is whether the AI system can be trained on a dataset before deployment or trained dynamically as the system is used.

Data have been recognized as one of the most important aspects of ML-based AI systems. For all supervised, semi-supervised, unsupervised and reinforcement learning approaches, data quality can be a primary concern in creating and using data for training and evaluating ML systems. It has been shown that with more accurate and richer data, the results of analytics and ML can be more useful and reliable. In addition, for the development of supervised learning-based AI systems, a large number of task-specific labelled training data is needed. This makes accurately labelled data one of the most important resources in the AI industry. Nowadays, there is a verified market of industrial services and tools for training data labelling. This market is now reaching a level of maturity that justifies the development of International Standards for the benefit of providers and users of these services and tools to ensure high-quality labelled data.

This document describes the implementation of a standardized common procedure of data processing with regard to data quality for analytics and ML. Clause 5 describes principles about data quality process and Clause 6 describes a data quality process framework. Clause 7 describes the data quality process for ML approaches, Clause 8 describes data labelling methods and process, Clause 9 provides roles of participants in data quality processes, Clauses 10 and 11 then describe the additional considerations that apply to semi-supervised learning and reinforcement learning. Clause 12 describes how the data quality process framework applies to analytics.

This document provides the process framework on a detailed level which can be used to fulfil the requirements specified in ISO/IEC 5259-3. It also links processes that are mapped on the data life cycle model in ISO/IEC 5259-1.

Artificial intelligence — Data quality for analytics and machine learning (ML) —

Part 4: Data quality process framework

1 Scope

This document establishes general common organizational approaches, regardless of the type, size or nature of the applying organization, to ensure data quality for training and evaluation in analytics and machine learning (ML). It includes guidance on the data quality process for:

— supervised ML with regard to the labelling of data used for training ML systems, including common organizational approaches for training data labelling;

— unsupervised ML;

— semi-supervised ML;

— reinforcement learning;

— analytics.

This document is applicable to training and evaluation data that come from different sources, including data acquisition and data composition, data preparation, data labelling, evaluation and data use. This document does not define specific services, platforms or tools.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 5259-1, *Artificial intelligence — Data quality for analytics and machine leaning (ML) — Part 1: Overview, terminology and examples*

ISO/IEC 22989:2022, *Information technology — Artificial intelligence — Artificial intelligence concepts and terminology*

ISO/IEC 23053:2022, *Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 5259-1, ISO/IEC 22989 and ISO/IEC 23053 and the following apply.

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

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

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