Technical Report

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

Part 6: Visualization framework for data quality

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

Partie 6: Cadre de visualisation pour la qualité des données

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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

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Foreword

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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 ISO documents 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).

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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 Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 42, *Artificial intelligence*.

This document is intended to be used in conjunction with all parts of the ISO/IEC 5259 series.

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

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

Visualization can be used to augment data quality management by displaying a data quality measure generated by the measurement function in a tangible and meaningful manner for assessment by the stakeholder. Visualization can be used in any data quality management process in a data quality management life cycle as part of the development and making of the artificial intelligence (AI) system. For example, it is useful as part of data quality reporting for documenting the data quality management process. It can also stimulate cognitive responses from the stakeholder in exploratory data analysis which can lead to more insights (e.g. detection of missing data, outliers, anomalies, deviations, errors, making comparisons and potential relationships among the observations). On the other hand, visualization also has its pitfalls that stem from cognitive biases such as pareidolia and apophenia.

Visualization can also help in explaining to stakeholders how the application built from the data makes its predictions by providing some transparency to the choice of and input to machine learning (ML) algorithms. This can contribute to the trustworthiness of an AI system by stakeholders who use the AI system and have different expectations.

The background of data quality management is described in Clause 5. A visualization framework for data quality based on data quality management concepts is described in Clause 6. Illustration of the application of the visualization framework with practical use cases is presented in Clause 7. Annex A provides information on AI stakeholders' perspectives and Annex B provides information on database properties.

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

Part 6:
Visualization framework for data quality

1 Scope

This document describes a visualization framework for data quality in analytics and machine learning (ML). The aim is to enable stakeholders using visualization methods to assess the results of data quality measures. This visualization framework supports data quality goals.

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 5259-1:2024, *Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 1: Overview, terminology, and examples*

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

3 Terms and definitions

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

4 Symbols and abbreviated terms

AI	artificial intelligence
DQMLC	data quality management life cycle
ML	machine learning