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# Harmonizing AI Data Governance: Profiling ISO/IEC 5259 to Meet the Requirements of the EU AI Act

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**Abstract.** This paper explores the alignment between ISO/IEC 5259 data quality standards and the mandatory data governance requirements of EU AI Act, Article 10. It introduces the concept of *qualifiedCompliance*, based on the W3C PROV-O model, to connect compliance activities with legal obligations. This approach enhances tracking, transparency, and accountability, enabling organizations to demonstrate adherence to both legal and technical norms.

**Keywords.** Artificial intelligence, ontology, ISO SC42 5259, EU AI Act Article 10, data governance, ontology mapping, AI regulation, regulation and standards

## 1. Introduction

The rapid deployment of AI in decision-making processes necessitates stringent governance. The EU AI Act focuses on ensuring data quality, transparency, and accountability, particularly in high-risk AI systems, and offers compliance to harmonized European Standards to offer a presumption of conformity with these requirements. However, the technical guidelines of existing candidate international standards such as ISO/IEC 5259 on data quality for machine learning pose alignment challenges against mandatory legal requirements[2]. This paper proposes a methodology using *qualifiedCompliance* to bridge the gap between these frameworks, offering a pathway to effective governance and compliance[1].

## 2. Background

The growing use of AI systems has raised concerns about fairness, transparency, and accountability, highlighting the need for data governance frameworks that balance innovation with ethical practices [3]. However, aligning ISO/IEC 5259's combination of best practices and requirements with the legal requirements of the AI Act is challenging[1][3]. For example, ISO suggests data quality assessments "should" be done, while the AI Act mandates they "must" be carried out regularly[2]. Another issue is traceability—organizations might follow ISO guidelines but struggle to demonstrate compliance with the AI Act during audits. To bridge this gap, the concept of *qualifiedCompliance* links compliance activities (e.g., data audits) with specific legal

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obligations under the AI Act, inspired by the W3C PROV-O ontology [4]. This framework provides a clear, traceable connection between technical actions and regulatory mandates, helping.

## 3. Methodology

The process of profiling includes examining the rules outlined in ISO 5259 and adapting their normative language to align with the requirements of the AI Act. For example, suggestions stated as "should" in ISO 5259 may be adjusted to "must" to emphasize the mandatory requirement of the Act. This allows ISO 5259 technical guidelines to fulfills the obligations of the AI Act. The methodology involves:

**Requirement Identification:** Identifying areas of overlap between ISO/IEC 5259 and the AI Act.

**Language Adjustment:** Replacing "should" with "must" to reflect the mandatory nature of the AI Act.

**Validation:** Cross-referencing modifications with both ISO and AI Act requirements to ensure consistency.

**Table 1.** Profiling Adjustments for AI Act Compliance

| ISO/IEC 5259 Requirement | Profiling Adjustment for AI Act Compliance |
|---|---|
| "The organization should implement processes to monitor, evaluate, and improve data quality." | "The AI provider must implement processes to monitor, evaluate, and improve data quality." |
| "Organizations should ensure that personnel possess the necessary skills and knowledge." | "The AI provider must ensure that personnel possess the necessary skills and knowledge." |

The ontology, inspired by the W3C PROV-O model was manually developed to map the requirements of ISO/IEC 5259 to the EU AI Act[4]. This process involved several key steps. First, relevant concepts were extracted from both the ISO standard and the AI Act to identify terms pertinent to data quality requirements. Next, terms were normalized to ensure consistency, with SKOS used to align terminology, such as mapping ISO's "should" to the AI Act's "must." The *qualifiedCompliance* property was then defined to establish connections between specific compliance activities and corresponding legal obligations. This offers transparent mappings that can be subject to expert validation and refinement by bodies responsible for ensuring AI Act complaince. This approach aims to create an open structured framework that helps organizations, especially SME demonstrate their implementation of ISO/IEC 5259 satisfies requirements of the EU AI Act. All the results and mapping are detailed in www.aidgo.eu.

## 4. Conclusion and Future Work

This study introduces *qualifiedCompliance* as a tool to bridge gaps between ISO/IEC 5259 and the AI Act. By adapting ISO's flexible guidelines to meet the legal mandates of the AI Act, the profiling method ensures that AI providers can demonstrate compliance across both technical and legal domains. Future research should focus on automating the compliance mapping process and expanding this approach across multiple jurisdictions.

## References

[1] International Organization for Standardization. "ISO/IEC 5259:2020 - Information technology -- Guidelines for the management of data quality." ISO, Geneva, Switzerland.
[2] Gangemi, Aldo, and Valentina Presutti. "Ontology design patterns." Handbook on ontologies (2009): 221-243.
[3] Soler Garrido, J., Fano Yela, D., Panigutti, C., Junklewitz, H., Hamon, R., Evas, T., & André, A. (2023). "AI Watch: Artificial Intelligence Standardisation Landscape Update." Publications Office of the European Union.
[4] Tartaro, A. (2023). "Regulating by standards: current progress and main challenges in the standardisation of Artificial Intelligence in support of the AI Act." Eur. J. Privacy L. & Tech., 147.
[5] W3C. "Qualified Terms and Relations in PROV." Available at: https://www.w3.org/TR/prov-o/#qualified-terms-figure.
[6] W3C. "Profile Context for Standards." Available at: https://www.w3.org/2017/dxwg/wiki/ProfileContext#.
[7] COMMISSION IMPLEMENTING DECISION of 22.5.2023 on a standardisation request to the European Committee for Standardisation and the European Committee for Electrotechnical Standardisation in support of Union policy on artificial intelligence, C(2023)3215, https://ec.europa.eu/transparency/documents-register/detail?ref=C(2023)3215&lang=en
[8] Julio Hernandez, & Dave Lewis. (2023). Open Requirements Modelling for Compliance and Conformity of Trustworthy AI. Zenodo. https://doi.org/10.5281/zenodo.7569540