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Geographic information - Training data markup language for artificial intelligence - Part 1: Conceptual model (ISO 19178-1:2025)

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NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 19178-1

June 2025

ICS 35.240.70

English Version

Geographic information - Training data markup language for artificial intelligence - Part 1: Conceptual model (ISO 19178-1:2025)

Information géographique - Langage de balisage des données d'entraînement pour l'intelligence artificielle - Partie 1: Modèle conceptuel (ISO 19178-1:2025)

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Ref. No. EN ISO 19178-1:2025 E

European foreword

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Foreword

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This document was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 287, *Geographic Information*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement) and in collaboration with the Open Geospatial Consortium (OGC).

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Introduction

This document aims to develop the UML model and encodings for geospatial machine learning training data. Training data play a fundamental role in Earth Observation (EO) Artificial Intelligence Machine Learning (AI/ML), especially Deep Learning (DL). Training data are used to train, validate and test AI/ML models. This document defines a UML model and encodings consistent with the OGC Standards baseline to exchange and retrieve training data in the Web environment.

This document provides detailed metadata for formalizing the information model of training data. This includes, but is not limited to the following aspects:

— how the training data are prepared, such as provenance or quality;

— how to specify different metadata used for different ML tasks, such as scene/object/pixel levels;

— how to differentiate the high-level training data information model and extended information models specific to various ML applications;

— how to introduce external classification schemes and flexible means for representing labelling.

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Geographic information — Training data markup language for artificial intelligence —

Part 1: Conceptual model

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1 Scope

Within the context of training data for Earth Observation (EO) Artificial Intelligence Machine Learning (AI/ML), this document specifies a conceptual model that:

— establishes a UML model with a target of maximizing the interoperability and usability of EO imagery training data;

— specifies different AI/ML tasks and labels in EO in terms of supervised learning, including scene level, object level and pixel level tasks;

— describes the permanent identifier, version, licence, training data size, measurement or imagery used for annotation;

— specifies a description of quality (e.g. training data errors, training data representativeness, quality measures) and provenance (e.g. agents who perform the labelling, labelling procedure).

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 19101-1, *Geographic information — Reference model — Part 1: Fundamentals*

ISO 19103, *Geographic information — Conceptual schema language*

ISO 19115-1, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19156, *Geographic information — Observations, measurements and samples*

ISO 19157-1, *Geographic information — Data quality — Part 1: General requirements*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions 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

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