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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*.

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Introduction

Machine learning (ML) is a key branch of artificial intelligence (AI). To apply ML across diverse domains, ML models are trained, validated and deployed in production environments. As model complexity and dataset size continue to grow, the time, hardware resources, human effort and financial costs associated with ML model training are escalating.

ML platforms, services and products are now widely available and adopted. Both AI providers (who offer ML platforms, services or products) and AI producers (who build ML-based solutions) seek to optimize training efficiency to minimize resource consumption and cost, without compromising model or dataset scale. For instance, AI providers aim to reduce hardware usage per training task to support more customers and improve resource utilization. AI producers prioritize faster training cycles to accelerate deployment of validated models.

This document provides guidance to help AI providers and producers achieve faster training and reduced resource consumption, given specific models, dataset and infrastructure.

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Information technology — Artificial intelligence — Guidance on machine learning model training efficiency optimization

1 Scope

This document outlines key factors affecting machine learning model training efficiency and presents corresponding optimization approaches.

It provides guidance for AI providers and producers through a structured set of characteristics and related optimizations to improve training efficiency. This information can support the evaluation and comparison of various ML training strategies.

This document does not specify any training accelerating mechanisms provided and implemented within machine learning computing device described in ISO/IEC TR 17903.

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 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)*

ISO/IEC TR 17903:2024, *Information technology — Artificial intelligence — Overview of machine learning computing devices*

ISO/IEC TS 4213, *Information technology — Artificial intelligence — Assessment of machine learning classification performance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 22989, ISO/IEC 23053, ISO/IEC TR 17903, ISO/IEC TS 4213 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/

3.1
artificial intelligence platform
AI platform
set of services that are provided by AI platform provider and enable other stakeholders to produce artificial intelligence (AI) services or products

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