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ISO/IEC 27572 has been prepared by subcommittee 43: Brain–computer interface, of ISO/IEC joint technical committee 1: Information technology. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
JTC1-SC43/211/FDIS	JTC1-SC43/225/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1, and the ISO/IEC Directives, JTC 1 Supplement available at www.iec.ch/members_experts/refdocs and www.iso.org/directives.

INTRODUCTION

Brain–computer interface (BCI) is a revolutionary technology that aims to establish a direct communication pathway between the brain and an external device, such as a computer or a prosthetic limb. It holds immense potential for enhancing capabilities, enabling individuals with disabilities to regain lost functions, and providing new avenues for human–computer interaction.

The development of a BCI system involves the integration of various components. These components work in synergy to decode the electrical or neurochemical signals generated by the brain, translating them into meaningful commands or actions that can be used to control external devices.

This document presents a comprehensive reference architecture (RA) for BCI. The BCI RA identifies and highlights architectural concerns commonly found in BCI systems across industrial sectors and classifies them into viewpoints along with their respective stakeholders. It describes, analyses and, where appropriate, provides guidance to resolve these concerns in these viewpoints, resulting in a certain abstract architecture representation.

1 Scope

This document specifies the brain–computer interface (BCI) reference architecture (RA). The BCI RA defines the key characteristics of BCI systems, provides a common language for stakeholders, and addresses their concerns. It also provides guidance to system architects on efficient BCI system design, typical implementation categories and effects of using BCI technology in developing applications. Additionally, this document serves as a technical reference for architects, manufacturers, vendors, service providers, regulators and the public to better understand the BCI architecture, its functions and the underlying technology that supports the BCI systems.

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 8663, *Information technology - Brain–computer interfaces - Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 8663 apply.

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

– ISO Online browsing platform: available at https://www.iso.org/obp
– IEC Electropedia: available at http://www.electropedia.org/

4 Abbreviated terms

BCI	brain–computer interface
DBS	deep brain stimulation
EEG	electroencephalography
EMG	electromyography
EOG	electrooculography
ERD	event-related desynchronization
ERP	event-related potential
ERS	event-related synchronization
MI	motor imagery
MRI	magnetic resonance imaging
NIRS	near-infrared spectroscopy
RA	reference architecture
SSVEP	steady state visual evoked potential
tACS	transcranial alternating current stimulation
tDCS	transcranial direct current stimulation
TMS	transcranial magnetic stimulation
tUS	transcranial ultrasound stimulation
VEP	visual evoked potential