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**Intelligence grading of artificial intelligence terminal - Part 1:
Reference framework**

人工智能终端智能化分级 第1部分：参考框架

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020, Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents.

This document is Part 1 of GB/Z 177, Grading of intelligence for artificial intelligence terminals.

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This document was proposed by and is under the jurisdiction of the National Information Technology Standardization Technical Committee (SAC/TC 28).

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1 Scope

This document provides a reference framework for artificial intelligence terminals and sets out the elements of their intelligence capability.

This document is intended to guide the grading of intelligence for artificial intelligence terminals of every kind, and provides a reference for their design, development, application, selection and evaluation.

2 Normative references

The following documents contain provisions which, through normative reference in this text, constitute indispensable provisions 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.

GB/T 32400, Information technology - Cloud computing - Overview and vocabulary

GB/T 41867, Information technology - Artificial intelligence - Terminology

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 32400 and GB/T 41867 and the following apply.

3.1 artificial intelligence terminal - a terminal product that has the capability of active perception and understanding, multimodal interaction, intelligent services and learning and evolution, and that completes specific tasks. Note 1: the flow of an intelligent task generally involves perception, planning, decision, execution and learning. Note 2: an artificial intelligence terminal is made up of software and hardware; the software includes the artificial intelligence model, the intelligent applications, the operating system, the user interface and the device-cloud collaboration interface, and the hardware includes the communication module, the processor, the internal storage, the peripheral input and output devices and the display.

3.2 user - the person who uses the artificial intelligence terminal. Note: in some interaction scenarios the user is an intelligent system, such as an artificial intelligence terminal or an agent.

3.3 multimodal interaction - a mode of interaction in which information is input and output between the user and the terminal through several means of communication. Note: those means include speech, text, images, gestures, touch, eye movement and expression.

3.4 context awareness - acquiring, understanding and using information about the user, the environment, the task and the state of the device itself.

3.5 intent understanding - recognizing the underlying goal or need from the input of the user, combined with context awareness.

5 Reference framework

5.1 Overview. An artificial intelligence terminal combines the artificial intelligence capability of the device side and of the cloud side, and comprises the hardware devices, the operating system, the typical applications, the intelligence modules and the security management, as shown in Figure 1. The terminal receives the input of the user, perceives the operating environment, understands the instructions and the operating intent of the user and carries them out; where necessary it connects over the network to the AI cloud and to information on the internet for collaborative enhancement, and it connects to external devices for device control and interaction. Depending on the class of terminal (see Clause 6) the modules are tailored, and the capability is delivered on the device side, on the cloud side or by a device-cloud mix.

5.2 Hardware devices provide the computing, storage, interaction and interconnection the terminal needs, and are the foundation of the artificial intelligence terminal: the computing unit, the storage unit, the interaction unit and the communication unit.

a) The computing unit is responsible for general computing and for AI computing, and includes the general-purpose processor (CPU), units designed specifically for neural network computing (NPU), digital signal processors for audio and images (DSP), graphics processors for general parallel computing (GPGPU) and accelerated processors combining

CPU and GPU (APU). b) The storage unit carries the operating system, the applications, the AI models and the user data, and includes chip flash such as eMMC and UFS, solid-state disks and memory (RAM).

c) The interaction unit is the entry point through which the terminal perceives the physical world and acquires data, and includes but is not limited to: standard input devices such as keyboard and mouse; visual sensors such as CMOS image sensors (CIS) and infrared thermal imaging sensors; audio sensors such as microphone arrays; motion sensors such as accelerometers, gyroscopes, magnetometers and vibration motors; biological sensors such as heart rate, blood oxygen saturation and body temperature sensors; and environmental sensors such as light, distance, barometric and temperature and humidity sensors. d) The communication unit is the key to connecting the terminal to the network, to device-cloud collaboration and to device interconnection, and includes but is not limited to network links such as wired networks, wireless LAN and mobile networks (4G, 5G), and short-range wireless communication such as Bluetooth, NearLink, NFC and ZigBee.

6 Classification of terminals

6.1 Overview. This document gives a classification reference along the dimensions of computing power, scenario of use, number of users, AI operating mode, interaction mode and manner of use; the class to which each kind of terminal product belongs is given in Annex A.

6.2 Computing power. By the strength of their computing power, artificial intelligence terminals are divided into: a) devices of strong AI computing power, which integrate dedicated and extensible processor units such as GPU, NPU and APU and can complete complex AI tasks independently or mainly on the device side, such as running medium and large local models, real-time high-definition image or video analysis and complex multimodal interaction (Note 1: generally running large language models of not fewer than one billion parameters); b) devices of weak AI computing power, which have some local AI computing power, achieve limited acceleration through the CPU and the DSP and can handle lightweight AI tasks such as keyword wake-up and simple voice command recognition, relying on cloud-side collaboration for complex tasks (Note 2: they generally run AI tasks while connected to the network).

6.3 Scenario of use. Terminals are divided into: a) personal terminals, highly portable, highly personalized (such as personalized product recommendation), multifunctional and attentive to privacy protection; b) office terminals, which raise the efficiency of collaboration (such as AI-assisted programming), process information (such as intelligent meeting minutes) and serve professional applications; c) home terminals, shared by several users, for control of the home environment, content services, far-field speech interaction, multi-user recognition, linkage of home devices and content recommendation; d) transport terminals, which provide travel services, navigation optimization, perception of the in-vehicle environment,