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Road vehicles — Ergonomic aspects of human vehicle interactions — Taxonomy for the classification of adaptive interactive vehicle systems

Véhicules routiers — Aspects ergonomiques des interactions homme-véhicule — Taxonomie pour la classification des systèmes interactifs adaptatifs pour véhicules

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 39, *Ergonomics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

With increasing technical feasibility of artificial intelligence (AI), more companies are integrating AI-based adaptivity and personalization into vehicle systems to adapt their behavior and/or content to the needs or expectations of individual users or groups of users. This enables vehicle systems to match individual user preferences and assist and ease execution of non-driving related functions. For the driving context, this offers the potential to reduce workload and distraction by helping users to handle large amounts of information within road vehicles. Nevertheless, there is no uniform classification for the capacities and characteristics of the type of adaptivity for vehicle systems.

This may lead to several risks of misunderstandings and unmatched expectations for different stakeholders as well as for the end user. If the type of the adaptivity is not clear to the end user, it can lead to uncertainty and a lack of transparency, predictability, algorithmic awareness, and understanding of the vehicle system's capacities and limits. Developers as well as the manufacturers as stakeholders also bear the risks of misunderstandings or unmatched expectations within all phases of the development process (ISO/IEC/IEEE 29148).

The ISO 8235 was developed to classify vehicle functions regarding their type of adaptivity and parameters used to achieve the adaptations.

Standardizing the types of adaptation of vehicle systems serves the following purposes:

a) enables end users to assess the extent and limitations of adaptation specified by the manufacturers, suppliers and researchers,

b) provides an unambiguous framework for the specification of adaptive vehicle systems and the technical differentiation of the respective types of adaptivity in the requirement phase,

c) provides clarity and transparency in communication on the topic of adaptive vehicle systems for manufacturers, suppliers as well as researchers,

d) reduces uncertainty about the capacity and limitations associated with non-transparent black box technology solutions for the manufacturers,

e) prevents misunderstandings and deviating expectations between development partners of adaptive vehicle systems and therefore,

f) prevents unnecessary effort, duplicate work and costs in the development and evaluation of adaptive vehicle systems.

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Road vehicles — Ergonomic aspects of human vehicle interactions — Taxonomy for the classification of adaptive interactive vehicle systems

1 Scope

This document provides a taxonomy to classify the type of adaptivity within vehicle systems. The taxonomy includes five types ranging from no adaptation (type 0) to adaptations based on interpreted user characteristics and context data (type 4). This document provides definitions of the five types of adaptation and explains adaptation in a consistent and coherent manner. By offering definitions and descriptions of the five types, this document can be used to classify the adaptivity within vehicle systems according to the types.

This document is intended to be applied to all components of vehicle systems that the driver and/or other occupants interact with either while driving or while parked. This includes vehicle information systems, communication systems, for example, navigation systems or mobile devices connected to the vehicle infrastructure, traffic and travel information (TTI) systems, as well as vehicle comfort systems, for example, climate control, massage, or ambient lighting. The taxonomy is also applicable to third-party software provided by third-party suppliers that is displayed and/or operated in the vehicle.

The taxonomy can also be applied to interactive exterior elements, like windscreen wipers or pedestrian communication devices and non-driving-related functions that are novel to future vehicles in the context of automated driving, such as playing a video.

The information and communication vehicle systems described in this document exclude driving-operation or driving-assistance systems. Consequently, safety-related functions governed by Automotive Safety Integrity Level (ASIL) specifications (ISO 26262) are not addressed. Implementation and validation of data collection/detection are also beyond the scope. Additionally, priority handling, as well as varying legal regulations across countries, are not covered in the taxonomy.

2 Normative references

There are no normative references in this document.

3 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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
adaptable vehicle system
interactive system within a vehicle that can change its behaviour and/or content triggered by configurations from the user

[SOURCE: Reference [8]]

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