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Electronic fee collection — — Pre-study on the use of vehicle licence plate information and automatic number plate recognition (ANPR) technologies

~~Elektronische Gebührenerhebung Vorstudie zur Nutzung von Kennzeicheninformationen und automatischer Kennzeichenerkennung (ANPR) Technologie~~

~~Perception du télépéage — Pré-étude sur l'utilisation des informations de la plaque d'immatriculation du véhicule et la technologie de la lecture automatique des plaques minéralogiques (LAPI)~~

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European foreword

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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 (~~For~~ CEN ISO/DTR 6026:2021) has ~~been~~ was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 CEN ISO/TC 278 204, Intelligent transport systems, the secretariat of which is held by NEN. It has been prepared in-in collaboration with the International Organization for Standardization (ISO) Technical European Committee TC 204 for Standardization (CEN) Technical Committee CEN/TC 278, Intelligent transport systems, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Introduction

[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 \[www.iso.org/members.html\]\(http://www.iso.org/members.html\).](#)

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Introduction

This document endeavours to foster a common understanding in the context of electronic fee collection (EFC) systems ~~of~~ the use of vehicle licence plate information, and ~~of~~ automatic number plate recognition (ANPR) technologies.

This document notably seeks to advance the common understanding and definitions in the following areas:

- information associated with licence plate number (LPN);
- information exchanges over open interfaces;
- outline of specification of exchanges between actors, notably the toll service provider, (TSP), the toll charger, (TC), vehicle ~~registrations~~registration authorities, etc;
- technologies regarding the ANPR.

The outcome is intended to contribute to more effective and efficient EFC schemes using vehicle LPN, obtained by means of ANPR technology, and any associated information (including make and model) as a primary means to identify the user via the LPN, or a complementary means to augment the reliability and the robustness of their dedicated short-range communication (DSRC)- or global navigation satellite system ~~+/~~cellular network) (GNSS/CN)-based systems (including degraded mode, trip reconstitution, etc).

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Electronic fee collection — Pre-study on the use of vehicle licence plate information and automatic number plate recognition (ANPR) technologies

1 Scope

This document provides an analysis of the use of licence plate number (LPN) information and automatic number plate recognition (ANPR) technologies in electronic fee collection (EFC), through the description of the legal, technical, and functional contexts of LPN-based EFC. It also provides an associated gap analysis of the EFC standards to identify actions to support ~~standardised~~standardized use of the identified technologies, and a roadmap to address the identified gaps.

The gap analysis in this document is based on use cases, relevant regulations, standards, and best practices in the field of EFC, based on the European electronic toll service (EETS)-~~f~~^[27] model.

Examples of licence plate number (LPN)-based tolling schemes are given in the informative Annex ~~A~~.

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 ~~terminological~~terminology databases for use in standardization at the following addresses:

— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <http://www.iso.org/obp>~~https://www.iso.org/obp~~

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

3.1

3 dimensional

3D

computer graphics that define an object by its width, length and depth

[SOURCE: ISO/TS 23541-1:2021, 3.1.1], ~~modified~~ — ~~Note 1 to entry removed.~~

3.2

automatic number plate recognition

ANPR

~~automated process of determining the licence plate number and the country code from a digital image of a licence plate~~

technology to automatically read vehicle registration plates

Note-1 to entry: A vehicle registration plate typically contains the indicator or the code of the country that issued the vehicle registration plate.

Note-2 to entry: Optical character recognition techniques are typically part of the technology associated with ~~automated~~automatic number plate recognition.

Note-3 to entry: Automatic licence plate recognition (ALPR) is a synonym to ANPR.

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[SOURCE: ISO/TS 17573-2:2020, 3.18, modified — Note 3 to entry has been added.]

3.3 artificial intelligence

AI

<engineered system> set of methods or automated entities that together build, optimize and apply a model so that the system can, for a given set of predefined tasks, compute predictions, recommendations, or decisions

Note-1 to entry: AI systems are designed to operate with varying levels of automation.

Note-2 to entry: "Predictions" can refer to various kinds of data analysis or production (including translating text, creating synthetic images, or diagnosing a previous power failure). ~~#The term~~ does not imply anteriority.

[SOURCE: ISO/IEC DIS 22989:2021, 3.1.2]

3.4 country code

CC

~~Identification~~identification of the issuing country of a licence plate, formatted in accordance with the United Nations Distinguishing Signs of vehicles in International traffic. ~~In accordance with this regulation, the CC contains 1, 2 or 3 alphabetical characters~~ regulation

Note 1 to entry: In accordance with the United Nations Distinguishing Signs of vehicles in International traffic regulation,^[33] the CC contains 1, 2 or 3 alphabetical characters.

Note 2 to entry: A "human-readable country code" is defined as a licence plate number where human inspection can determine the issuing country from syntax, font and other characteristics of licence plates.

3.5 error rate

ratio between the absolute error and the reference value of all transactions

3.6 false negative

incorrect reporting of a failure when in reality it is a pass

[SOURCE: ISO/IEC TR 29119-11:2020, 3.1.34], modified — Note 1 to entry and Example removed.

3.7 false positive

incorrect reporting of a pass when in reality it is a failure

[SOURCE: ISO/IEC TR 29119-11:2020, 3.1.34, modified — Note 1 to entry and Example removed.]

3.8 false negative error rate

ratio between the false negatives and the reference value of all transactions

3.9 false positive error rate

ratio between the false positives and the reference value of all transactions

3.10

false ~~recognisable~~recognizable error rate

ratio between the false ~~recognisable~~recognizable transactions and the reference value of all processed transactions

3.11

human-readable licence plate image

~~a licence plate image with a human-readable LPN and country code~~

3.12

human-readable country code

~~LPN where a human inspection can determine the issuing country from syntax, font and other characteristics of licence plates~~

3.13

infrared

IR

optical radiation for which the wavelengths are longer than those for visible radiation

Note 1 to entry: For infrared radiation, the range between 780 nm and 1 mm is commonly subdivided

[SOURCE: IEC 60050-845:1987]

3.1412

intelligent transport ~~system~~system

ITS

transport ~~system~~system in which advanced information, communication, sensor and control technologies, including the Internet, are applied to increase safety, sustainability, efficiency, and comfort

[SOURCE: ISO/TR 17465-2:2015, 2.2] [ISO/PRF TR 6026](#)

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3.1513

licence plate image

digital image on which a vehicle licence plate is visible

Note 1 to entry: A "human-readable licence plate image" is defined as a licence plate image with a human-readable LPN and country code.

3.1614

licence plate number

LPN

number of the registration plate of a vehicle

3.1715

manual number plate recognition

MNPR

process of determining the licence plate number and country code by human inspection of a digital image

3.1816

on-board unit

OBU

electronic unit on-board a vehicle for performing specific electronic fee collection (EFC) functions and for communication with external systems

[SOURCE: ISO/TS 17573-2:2020, 3.127]