INTERNATIONAL STANDARD

ISO 37180

First edition
2021-08

Smart community infrastructures — Guidance on smart transportation with QR code identification and authentification in transportation and its related or additional services

Infrastructures urbaines intelligentes — Lignes directrices relatives au transport intelligent utilisant l'identification et l'authentification par QR code dans le domaine du transport et de ses services connexes ou supplémentaires

Reference number
ISO 37180:2021(E)

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Published in Switzerland

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Foreword

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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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This document was prepared by Technical Committee ISO/TC 268, *Sustainable cities and communities*, Subcommittee SC 1, *Smart community infrastructures*.

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.

Introduction

Quick Response (or QR) codes are widely used worldwide due to their extremely large capacity for data storage and data transfer instead of barcodes. In the transportation field, QR codes have been used for over 20 years. However, their application is limited since the identification and authentication procedure with QR codes in data transfer takes over one second. In cities, a ticket inspection gate should communicate with 60 customers per minute for their ticket validation at rail stations. As the number of people delayed due to ticket processing in a concourse increases, this results in more risk leading to passenger injuries. A typical example is the metro in Bangkok, Thailand. The slow processing rate of ticket inspection machines disturbs passenger flows in the station. The passengers are delayed frequently at the gate due to the processing resulting in missed trains.

In the past, the security of QR codes was very limited, and so it was highly risky to use the QR code for ticket value information retention. If the QR codes were falsely duplicated, the copies would work as a valid ticket. Transportation operators were hesitant to apply QR codes in ticketing and used the code only for specific purposes or particular situations. For example, a bus stop numbered ticket for fare adjustment in bus services and seat reservation sold within one hour of train departure.

However, the lack of security features has been overcome by improving QR code identification and authentication procedures through the use of dynamic encryption keys and their matching fields. These processes aid in achieving fluidity enhancement, controllable anonymity, non-forgery, non-repeatable data transfer and non-repudiation. QR codes are now effective tools to identify data senders and recipients. Further, QR codes can be used to authenticate information contents and authorize personal status, by completing the procedures safely and quickly. This advanced performance and security cultivate improved transportation and its related or additional service fields, such as money transfer services for payment and charging pre-paid cards. Thereby, ensuring that the services are more beneficial for customers and assist service agents with the more highly accurate and functional informational data flow. In geographic information systems where large data are traded, supported with such efforts, QR code applications already started for data provenance indication, metadata linkage, dictionary organization, data integration, qualification and exchange as well as security.

This guidance document describes QR code identification and authentication to be applied in such services.

In the development of this document, ISO Guide 82 has been taken into account in addressing sustainability issues.