

Recommendation

ITU-T Y.4487 (07/2024)

SERIES Y: Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

Internet of things and smart cities and communities –
Identification and security

A functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles

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Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

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Recommendation ITU-T Y.4487

A functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles

Summary

With the development of autonomous driving, perception methods relying solely on the vehicle's own sensors or on traditional roadside sensing systems that lack sufficient collaboration between devices are no longer sufficient to support higher-level autonomous driving applications. A higher requirement for roadside perception capabilities is therefore proposed. The roadside multi-sensor data fusion system (RMDFS) can provide new functionalities which will contribute to enhancing roadside perception capabilities by combining different types of roadside sensing devices such as cameras, lidars, millimetre wave radars, etc. according to their characteristics, and perform unified management and coordination so as to achieve accurate perception of road information, and support for autonomous driving applications.

Recommendation ITU-T Y.4487 defines a reference functional architecture of roadside multi-sensor data fusion systems. It clarifies the concept and components of the systems, and specifies the key functional entities of the systems and the reference points between the functional entities. Use cases based on roadside multi-sensor data fusion systems are also provided in the appendix.

History*

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Autonomous vehicles, functional architecture, functional entities, reference points, roadside multi-sensor data fusion systems, roadside sensing devices.

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Recommendation ITU-T Y.4487

A functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles

1 Scope

This Recommendation specifies functional architecture of roadside multi-sensor data fusion systems (RMDFS) for autonomous vehicles.

The functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles builds on the Internet of things (IoT) reference model from the ITU-T Recommendation *Overview of the Internet of things* [ITU-T Y.4000].

The scope of this Recommendation includes:

- Introduction of roadside multi-sensor data fusion systems for autonomous vehicles.
- Functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles.
- The functional entities of the functional architecture.
- The reference points between the functional entities of the functional architecture.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T Y.4000] Recommendation ITU-T Y.4000/Y.2060 (2012), *Overview of the Internet of things*.
- [ITU-T Y.4401] Recommendation ITU-T Y.4401/Y.2068 (2015), *Functional framework and capabilities of the Internet of things*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 Internet of things (IoT) [ITU-T Y.4000]: A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies.

3.1.2 functional architecture [b-ITU-T Y.2012]: A set of functional entities and the reference points between them used to describe the structure of an NGN. These functional entities are separated by reference points, and thus, they define the distribution of functions.

NOTE – The functional entities can be used to describe a set of reference configurations. These reference configurations identify which reference points are visible at the boundaries of equipment implementations and between administrative domains.