

Title	ホームネットワークにおけるメタデータの活用に関する研究
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Abstract

Metadata plays a very important role in the IoT world. By using metadata, it becomes possible to maximize the value of data, and it also helps to promote cooperation and integration of different field data. Previous data has been collected in a closed vertical direction with a single industry single purpose but the purpose such as creating business value by horizontally integrating data collected for different purposes. It is expected that efforts such as using metadata and constructing a data distribution society. This paper utilizes metadata in the Smart Home field which is representative in IoT, cooperates with existing platforms for home network, and proposes a data catalog which can understand mutually. Specifically, it gives concrete examples on metadata description items, description method, and metadata data retrieval system in the home network.

Along with the rapid development of IoT technology, it is utilized in various fields from manufacturing industry, medical care, agriculture to our lives, and the amount and type of generated data is rapidly increasing. Creating new value and solving social problems is required by utilizing technologies such as data mining and deep learning for data collected and accumulated in these fields. However, currently there are differences in meaning of terms of data and protocols to cooperate for each industry, so there is a gap between data that the data user wants and data that the data provider can provide. Therefore, there is a growing need to construct a data catalog which can be understood commonly by various industries across the boundaries of fields.

With the rapid increase in the amount of data, businesses that want to distribute data have appeared. Grant metadata for the purpose of providing data shipping businesses with appropriate and safe data and for establishing technical and institutional environments where data users can easily judge and collect and utilize data they want. The movement to use it is increasing.

Even in the typical smart home field of IoT, data format and cooperation method differ for each equipment and industry. In order to improve the environment sufficient for service providers to use, efforts are being made to build data catalogs that various device manufacturers and service providers can understand in common.

Also, the composition of home network architecture is changing. The main elements that make up the conventional home network architecture are devices, gateways, IoT platforms, and service providers. Among them, called a four hierarchy, devices in the home were generally connected to the IoT platform via the IoT gateway and communicated with the service provider. In recent years, however, due to the evolution

of IoT devices, the device does not go through the IoT gateway, connects to the IoT platform via the Internet, and communicates with the service provider, and it passes through from the device to the manufacturer / user cloud. In addition, a two-tiered approach to communicate with service providers also appeared.

In the current state of the home network, several kinds of home network architectures are mixed, and in one house, there are a plurality of different technologies and different purpose installed networks. Both are independent networks. Third parties can not use data of sensors and equipment in the network.

Also, the number of devices that can be used as a sensor, including those built into home appliances due to miniaturization of the sensor itself, lower price, and lower power consumption, is explosively increasing. For that reason, it is required to utilize metadata to select data of sensors most suitable for the purpose of use from among many sensors.

Therefore, this research proposes a metadata model called BCADFL with reference to the standardized data model such as ECHONET standard and SSN. We proposed a method to assign vocabulary to data using ontology and map it to the same form.

Also, with reference to OneM2M general purpose semantic model, we proposed a system that can search metadata using SPARQL query language. We believe that the service provider can use the system to retrieve the metadata most suitable for the purpose of use.

The purpose of this research is to collaborate existing networks for home network, create data catalog which can mutually understand beyond closed data for each network. Specifically, it gives concrete examples on metadata description items, description method, metadata generation / provision method, and metadata data retrieval system in the home network.

By using the proposed metadata utilization method, we will transfer the appropriate data gathered from the house over the industry and platform barriers smoothly to the service provider so that better service can be realized for the user. Information from various devices in the home can also be used as sensing data. Also, for data distribution operators operating the service platform, these data can be used secondarily, and it can be expected that the data distribution market will be revitalized.