

# Review on Semantic Open IoT Service Platform

Mrs.Monali Rohit Korde

Lecturer, VPM's Polytechnic Thane Maharashtra, India

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**Abstract** - The Internet of Things (IoT) permits machines and devices in the world to connect with each other and collects a huge amount of data, which has a great potential to provide useful knowledge through the service domains. The main aim of platform technology provides semantic-based IoT information services, and semantic interoperability of IoT devices. This service platform can be applicable to a lot of semantic IoT services like collecting information from real environment by smart devices, gives smart life services by sharing, participating, distributing open sensing information.

**Key Words:** Internet of Things, semantic technology, semantic interoperability

## 1. INTRODUCTION

Due to the on the rapid growth of wearable computing devices such like smart watch, smart glasses we become able to enjoy a 'IoT(Internet of Things) based smart life' that can be connecting internet anywhere, anytime and any-device. Most smart phones have built in a variety of sensors such as ambient light sensor, proximity sensor, global positioning system, accelerometer, compass, and gyroscopic sensor. Especially, recent produced smart phones have contained more environmental sensors such as temperature, humidity and barometer. These sensors make things smarter and can help to make smarter apps such as healthcare apps, educational contents and augmented reality applications. Sensor is one of the most important technology elements to make "internet of things", because of it monitor the state of things and can extend its functionality. More than nine billion devices around the world are currently connected to the Internet, including computers and smart phones. internet of Things can connect devices surrounded in different systems to the internet. When devices/objects can represent themselves digitally, they can be controlled from anywhere. The connectivity then helps us capture more data from more places, ensuring more ways of increasing efficiency and improving safety and IoT security. Sensor network and IoT(Internet of Things) are center technologies in environmental monitoring such as air/water quality, radiation and traffic noise. Useful information gathered from sensor network became an information silo because of sensor networks were so tightly coupled with sensor application until now. Sensor data representation formats used in these sensor networks is various, and cannot understand the sensing value's meaning in other applications except their private application. Therefore, sensing values and information must be shared and provided additional information for other applications. To meet these requirements, this paper shows the open semantic IoT service platform technology that guarantees the semantic interoperability of sensors or things' information and share

of these resources. This technology allows sensor information portal service providers and general developers to develop more useful IoT based applications and services easily.

## 3. RELATED WORK

The term semantic, started by Berners-Lee in 1998, is a framework technology for automated processing between humans and machines through interpretation of meanings to resources[1]. Actually, the goal of the Semantic Web is to allow both humans and machines to understand through semantic interoperability based on well-defined meanings in the current web. The Semantic Web is composed of explicit metadata, ontologies and logical reasoning. The explicit metadata is expressed by linguistic techniques, such as extensible markup language (XML), resource description framework (RDF) and web ontology language (OWL). Additionally, the ontologies express meanings of data and relationships using knowledge representation (KR). Finally, the logical reasoning is used to infer new information based on meanings of data and relationships in ontologies. The Semantic Web has been growing and applied in various research fields. Skillen et al. proposed help-on-demand services in pervasive environments. In this article, the ontological user models are created according to user behaviors and needs.[5] Additionally, they implemented a prototype system for help-on-demand services with semantic rule-based reasoning. semantic IoT based uses the different domain and take advantages of sensory devices Each services offer the user with various services such as verifying sleep satisfaction, providing the aggregated sensor observations and analyzed sleep pattern.

## 4. SEMANTIC OPEN IOT SERVICE PLATFORM

IoT services require IoT applications to have knowledge of IoT middleware and sensors or sensor networks for accessing IoT resources. For example, heterogeneous IoT middleware are not easy to be accessed by applications since each IoT middleware has proprietary Application Programming Interface (APIs) and therefore it is not easy to access various IoT resources which directly attached to different IoT middleware. Even when the applications have access to multiple IoT middleware, applications have to search, collect, analyze and process the sensed data by themselves. These limits can be overcome by providing unified access method for IoT resources via heterogeneous IoT middleware. Figure 1 shows current IoT service platform and open IoT service platform.etc. The functional Architecture of Semantic Open IoT Service Platform consists of different domain like user domain, application domain, sensor domain, processing domain. A common way for

semantic interoperability between different domains is to share their service domain knowledge using the well-known semantic technologies. Accordingly, as Barnaghi illustrated with the context of IoT and semantics the collected data within each service domain needs to be represented as semantic data, including their meanings (e.g., service domain knowledge), so that services from different domains could interpret and understand the data for interoperability (perform semantic interoperability).the integrated service system infrastructure, however, due to the characteristics of IoT, such as being highly-distributed, heterogeneous, and resource-constrained, we have to resolve three main problems for providing integrated semantic services via applying the semantic technologies to IoT: (1) integrated semantic discovery in distributed IoT domains; (2) dynamic semantic representation between a myriad of IoT resources in real time; (3) semantic data repository to archive a large amount of data collected from IoT devices. The following figure shows the functional Architecture of Semantic Open IoT Service Platform.

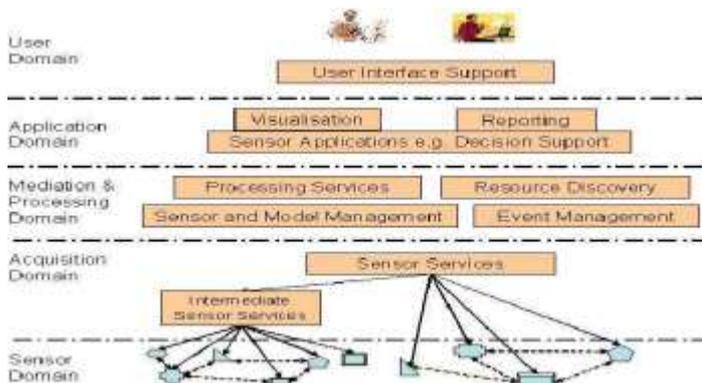


Figure1. Functional Architecture of Semantic Open IoT Service Platform

## 5. CONCLUSION

In this review we studied a semantic open IoT service platform which can support the semantic interoperability between various IoT devices, and The semantic-based management service's user application program was developed on Android Smartphone. the semantic IoT based uses the different domain and take advantages of sensory devices Each services offer the user with various services such as verifying sleep satisfaction, providing the aggregated sensor observations and analyzed sleep pattern

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