Big Data Handling Over Cloud for Internet of Things

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ABSTRACT

In this article, the authors have discussed about the connection between Internet of Things and growth of big data. They have also discussed short reference on the evolution, features, lifecycle, and implementation of Big Data from IoT over the cloud. Internet of Things represents a platform or environment that consists of enormous number of sensors and mediators interconnecting heterogeneous physical devices over the internet. IoT applications are available in many real-world areas such as smart city, smart workplace, smart home, smart transportation and various other ubiquitous computing areas. Using IoT applications generates tremendous amount of data for storage and management in the internet. With the time and research evolution integration of the IoT platforms and cloud comes in the market and IoT platforms data storage and management started shifting to the cloud from the internet connected physical systems for many real-world application areas. Meanwhile when this data becomes huge termed as Big Data. Handling of Big Data over the cloud develops many new areas of research and attention.

KEYWORDS

Big Data, Cloud Computing, Data Storage, Internet of Things(Iot), Sensors

1. INTRODUCTION

Internet of Things is an emerging paradigm in the field of research. Internet of Things allows people and things to be connected anytime, anyplace, with anything and anyone, using any network and any service.

Internet of things has a huge impact on the society. Smart cities using sensors monitors air pollution, drainage system, and traffic of the city. Smart workplace uses sensors and RFIDs to monitor the work timing of the employees/workers in the organization. Smart home application uses sensors to manage and control all the home appliances. As similar smart transportation manages and control the location, speed, and condition of the vehicle by installing sensors and trackers in the

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vehicle. There are many other applications also available in the market, which use IoT platform for managing things smartly.

Today there are more connected things available in the market than the work population. Cisco predicts there will be over 50 billion connected things by the year 2020 and also believes that the market capture will be over 19 trillion dollars by 2025. According to a report from International Data Corporation (IDC) the overall created and copied data volume of the world was 1.8 zettabytes in 2011 and which increased approx. 9 times within last five to six years. Internet based companies handle enormous amount of data on the daily basis, e.g. Google processes hundreds of petabyte data daily.

Huge amount of data processed is termed as Big Data and its capturing, storage and analysis is a challenge to the researchers and industry people. Big Data facilitates organizations to customize products and services precisely to meet the need of the clients. Managing data helps organizations in extracting conclusion through decision making.

Big Data from the IoT devices (e.g. sensors, RFIDs, trackers, and other sensing devices) get storage over the cloud, when IoT integrates with the cloud for the storage of the data. Researchers and organizations have to manage that data over the cloud for taking conclusion on decision making.

In this paper, we focus on the huge amount of data moved by IoT devices over the cloud. Section 2 contains details about the background and work done in the Internet of Things, Cloud, and Big Data field research area. In section 3 cloud based Internet of Things is discussed. In section 4, discussed about the Big Data and Internet of Things. Section 5 discussed about the implementation of Big Data tools and software for managing IoT data. In section 6, we covered the Big Data storage over the cloud from the IoT devices. Section 7 covers the challenges to be present in IoT, Cloud, and Big Data.

2. BACKGROUND

Internet of Things (IoT) represents a platform that consists of an enormous number of sensors and mediators that interconnect heterogeneous physical objects to the internet. Traditionally, the content available on the internet was generated by the people for the people, which was known as web 1.0. With the time and advancement in networking applications most of the data content available nowadays is dynamically generated by the participants and is being termed as Web 2.0. Semantic web is termed as Web 3.0 (Aghaei, Nematbakhsh, & Farsani, 2012). IoT evolved as the next advancement in this domain, where the things/devices are communicating among themselves in generating valuable results for the people. IoT can be termed as Web 4.0 and beyond, with its support for intelligent connections (Evans, 2011). When smart home appliances communicate together, in making life of the people better and easy, then it is known as IoT. Figure 1 shows the communication paradigm of the IoT devices for communicating data in the internet and also communicating with each other.

Figure 1. Basic structure of IoT devices communication
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