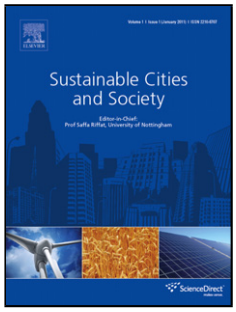

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Smart City Designing and Planning based on Big Data Analytics

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Highlights

- Internet of Things (IoT) provides a global communication network between millions of devices
- Energy-aware communication systems for IoT environments
- Scheduling mechanisms are used to prioritize the home appliances

Abstract

The Internet of Things (IoT) provides a global communication network between millions of devices connected to the internet. Similarly, the emergence of heterogeneous wireless networks provides a medium to the IoT communication paradigm. In order to enable an energy-friendly communication in an IoT environment, such as smart home, office, city, etc. we propose an energy-aware communication systems for IoT environments. The proposed scheme works in several phases such as identification of high energy require appliances, deployment of sensors, scheduling, etc. Moreover, the data from the IoT devices are collected through sensors. The data is tested using the Hadoop ecosystem for future planning and efficient usage of the energy in an IoT environment. The proposed architecture is tested in a different scenario against the Wireless Sensor Network (WSN) based IoT architecture in the context of energy consumption. The proposed architecture performs efficiently than WSN in a number of scenarios. Similarly, the efficiency and processing time of the Hadoop system is computed which shows better results.

Keywords: IoT, RFID, Sensors, Heterogeneous Wireless Network, Smart Home

1. Introduction

In the last decade, the IoT have significantly studied both by the researchers and academia. The term IoT has been introduced in late 2000 by the two researchers working at MIT on Radio Frequency Identifiers (RFID) for different things. Thus, the concept dramatically grows in the world for connecting different things and devices with the internet. Similarly, the IoT covers almost all the existing technologies ranging from the short-range communication to long range communications [1] [2] . It is also stated that everything i.e. humans, devices, machines, etc. will be considered a part of the IoT systems. Moreover, the IoT systems enable both a mobile and static node to connect to anything anytime and anywhere. Thus, the ultimate goal of such systems is to develop an environment which can be used for the betterment of human beings. The betterment can be done in any form for example if a user wants to wash its clothes, but, unfortunately, the user does not have time to perform the job. Thus, the user can connect to the washing machine through the internet and can wash the clothes from anywhere. Similar examples are present in the literature for various purposes and hence the industry wants to enable the same type of communication in the future devices and infrastructure.

The IoT can be defined as a set of interconnected objects, sensors, electronic devices and services which can help a human to perform his tasks and duties from anywhere as shown in Figure 1. The devices are connected with the web using different technologies such as ZigBee, Bluetooth, etc. The communication between the devices and the user is carried out using a web-based infrastructure using the Mesh services. Moreover, the Internet is one of the main technology which can help the humans to perform similar tasks anytime [3] [4]. The communication in IoT systems and environment can be done by both short-range communications i.e. Bluetooth, Infrared, etc. and long-range communication such as 3G/4G, WIFI, and WiMAX technologies. An interesting example of the short-range communication technologies can be stated as if a user is near to the device, it can use short-range communication technology and similarly if the user is away from the device it