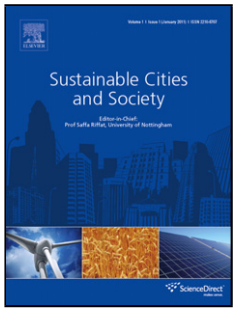
Accepted Manuscript



Title: A Generic Internet of Things Architecture for Controlling Electrical Energy Consumption in Smart Homes

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PII: S2210-6707(18)30048-9
DOI: https://doi.org/10.1016/j.scs.2018.09.020
Reference: SCS 1258

To appear in:

Received date: 8-1-2018
Revised date: 25-8-2018
Accepted date: 14-9-2018

Please cite this article as: Iqbal J, Khan M, Talha M, Farman H, Jan B, Muhammad A, Khattak HA, A Generic Internet of Things Architecture for Controlling Electrical Energy Consumption in Smart Homes, *Sustainable Cities and Society* (2018), https://doi.org/10.1016/j.scs.2018.09.020

A Generic Internet of Things Architecture for Controlling Electrical Energy Consumption in Smart Homes

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Highlights

- The IoT becomes more prominent due to the enormous data generated by the IoT devices called the Big Data
- A generic IoT architecture is designed to push the current IoT paradigm a step further to standardization
- The proposed system helps in minimizing the unnecessary electrical energy usage in smart homes
- In addition, the proposed scheme also address the communication failure occur due to the co-existence of heterogeneous technologies

ABSTRACT

The Internet of Things (IoT) is progressively developing since it was first introduced at the beginning of the 21st century. The IoT becomes more prominent due to the enormous data generated by the IoT devices called the Big Data. Further, the application of Big Data is widely adopted in many areas such as smart home and city planning, efficient system design, etc. However, during the developing stages of IoT, the researchers have many challenges that need to be addressed before standardizing IoT for general use. These challenges include co-existences of many communication technologies such as Bluetooth, ZigBee, WIFI, and so on. The effect of such technologies on the communication becomes more when these technologies exist in shot communication range. Similarly, other challenges include processing of huge amount of data generated by the IoT devices in real-time. Therefore, in order to address these challenges, we come up with a proposed scheme that enable a generic communication architecture among the IoT devices with less interference. Further, the proposed architecture consists of four main steps i.e. 1) a system to discover and identify electrical appliances in a smart home or smart building, 2) deployment of sensors, 3) applying proposed load balancing on appliances and sensors, and 4) processing the data obtained from these sensors for better usage of home and electrical appliances. The proposed scheme is tested on real electronic appliances and the energy consumption is recorded using the proposed Electronic Device Sleep Scheduling Algorithm (EDSA). Furthermore, the EDSA is responsible for controlling the activities of the sensors while it is active, sleep, and idle modes. The results show that the proposed architecture perform better in a heterogeneous environment compare to simple Wireless Sensor Network (WSN) based technologies. The data is also processed using Hadoop Ecosystem is to maximize the efficiency and minimize the time required to process the data in real-time.

Keywords: Wireless Sensor Networks; Hadoop Ecosystem; Internet of Things; Scheduling; Load Balancing

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ABSTRACT

1. INTRODUCTION

Internet of Things (IoT) notion has been revolutionized with the unceasing development of heterogeneous communication technologies. In late 2000, IoT term was initially coined by two students who worked on Radio Frequency Identifiers (RFID) at MIT. Thereafter, IoT concept has been widely used to connect various embedded devices. IoT environments incorporate both short and long-range communication technologies along with advanced protocols and algorithms. Real-time data processing facilitates data transmission between an end user and a sensor