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Going Green with IoT for Smart World - An Overview

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ABSTRACT

Smart world is planned as an epoch in which objects (e.g., watches, mobile phones, computers, cars, buses and trains) can immediately and intelligently serve people in a coefficient manner. Internet of things links up everything in the smart world. Internet of things allows objects to be sensed and controlled remotely across exiting network infrastructure, creating opportunities for more-direct integration between the physical world and computer – based systems, and resulting in improved efficiency, accuracy and economic benefits. Each thing is exclusively different through its embedded computing system but is able to interoperate within the surviving internet infrastructure. Today's earth encloses a smart reminder that the internet of things can be made green- and green technology can be maximized with smart use of IoT. IoT implement the collection of data at finer levels of details, and deeper analysis of that data, business and individuals can drive bigger results from smaller changes to their immediate environment. Internet of things is that things can correspond to each other without human with each other and helps to save energy with user. This permits peoples and things to be connected Anytime, Anyplace, with anything and anyone, ideally using any path/network and any service. Green IoT forecast to familiarize changes in our daily life and would help realizing the vision of "Green ambient intelligence".

Keywords: Internet of Things, Smart World, Smart homes, Smart city, Smart grid, Smart health care, Green IoT, ICT technology, GPS

1. INTRODUCTION

When people talk about "the next big thing," they're never thinking big enough. It's not a lack of imagination; it's a lack of observation. Generally speaking, IoT refers to the network paired of everyday objects, which are prepared with global intelligence. It is opening tremendous opportunities for a large set of novel application that promise the quality of our lives. In recent years, IoT has gained much attention from researchers and practitioners from around the world.

Living in such a smart world people will be collaboratively and immediately served by the smart devices (e.g., mobile phones, laptops), Smart environments (e.g., apartments, malls), Smart transportation (e.g., cars, trains), etc. For e.g., GPS helps a person's locations can continuously transmitted to a server that tells us the best routes for the travelers destination, keeping the person stuck in traffic. As the next significant stage in human history, smart world is receiving various attention from government, academic, industry, etc [1].
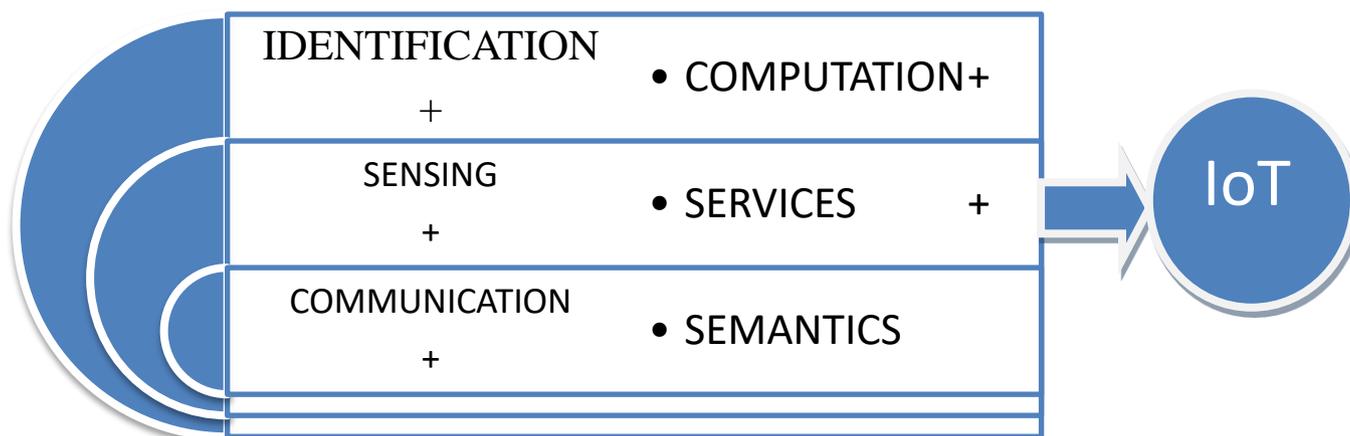

Fig. 1. Elements of IoT.

2. OVERVIEW OF IoT AND GREEN IoT

A. IoT

The Internet of Things is the network of physical objects, devices, vehicles, buildings and other items which are embedded with electronics, software, sensors and network connectivity, which enables these objects to gather and replace data [2]. It allows objects to identify and organize remotely across existing network infrastructure, creating chances for mode-direct incorporation between the physical world and computer-based systems, and resulting in improved efficiency, accuracy, and economic benefits; when IOT is accelerated with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also includes technologies such as smart grids, smart homes, intelligent transportation and smart cities.
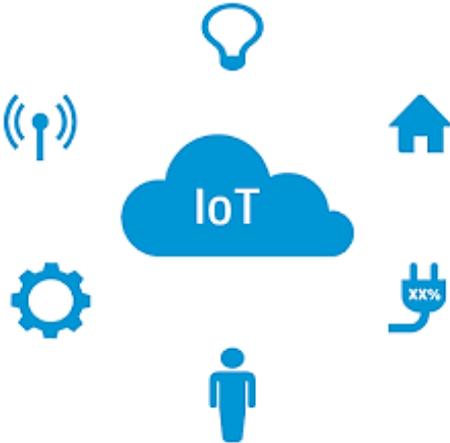
Fig. 2. Examole for IoT.
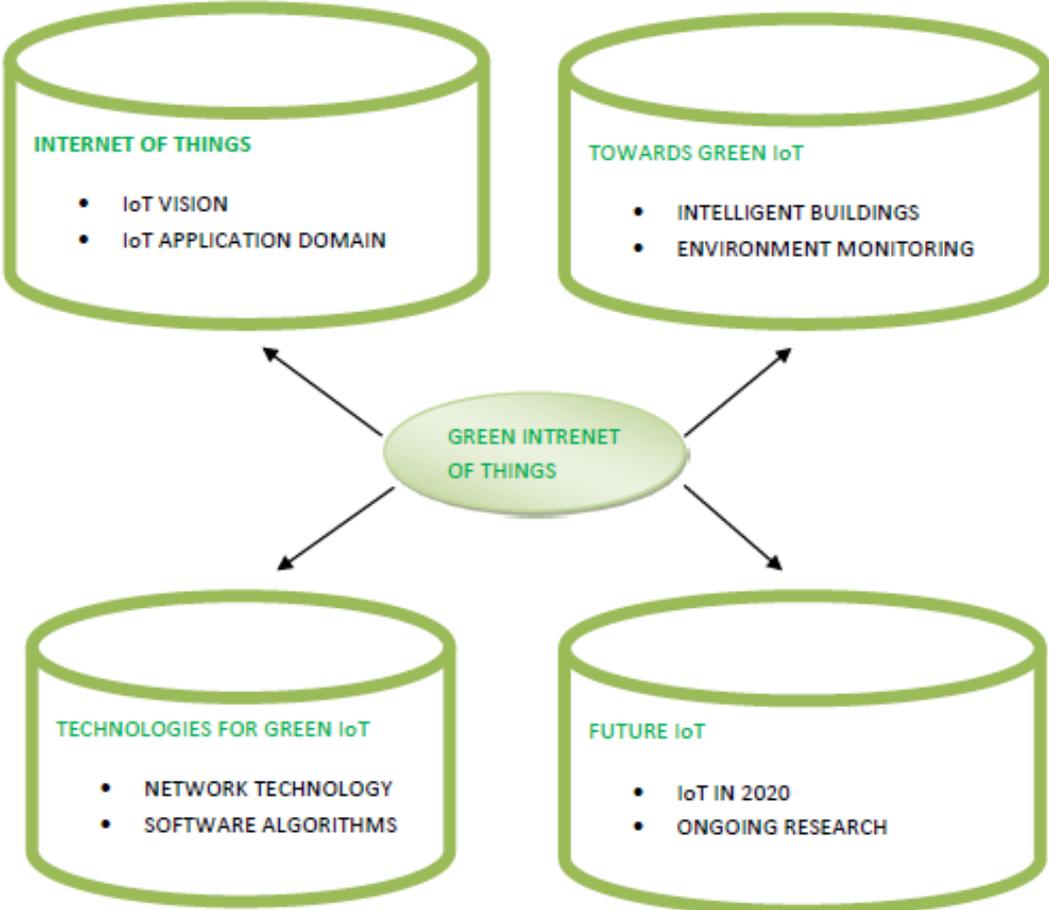
B. GREEN IoT

Fig. 3. Green Internets of Things

Green IoT is predictable that any object will have a unique way of identification in the upcoming years. That is commonly known in the networking field of computer science as "Unique address", creating an addressable continuum of computers, sensors, actuators, mobile phone. In future we will be surrounded by a huge amount of sensors, devices and "things", which will be able to be in contact via IP, act "intelligently", and provide green support for users in managing and maintenance of everyone's tasks. These new smart objects will be able to perform certain functions autonomously such as calling for new forms of green communication between people and things and between things themselves, where power consumption is optimized and bandwidth utilization is maximized. These developments would not only be relevant to researchers, but also to corporations and individuals alike.

3. APPLICATION OF IoT AND GREEN IoT

With honor to IoT and green IoT, there are a lot of applications. We list some application scenarios as follows [5],

SMART HOMES: Personal life-style of every people is going on improvers, at homes by making it more time-saving and simpler to monitor and operate home appliances and systems (e.g., microwave, oven, air-conditioned etc.) remotely.

INDUSTRIAL AUTOMATION: This IoT and Green IoT technology plays a vital role in the industrial automation. Human participation, robotic devices are computerized to finish completion tasks sooner. The machines operations, functionalities and productivity rates are spontaneously coordinated and monitored.

SMART HEALTHCARE: Healthcare applications are improved in many countries and paying more attention for every citizens, by embedding sensors and actuators in patients and their medicine for monitoring and tracking the patient's details.

SMART GRID: Smart grid mainly help in Power suppliers which are assisted to control and manage resources so that power can be offered proportionally to the population growth.

SMART CITY: Smart city gives the Quality of life in the city improvement by making it more convenient and easier for the residents to obtain details of interest.
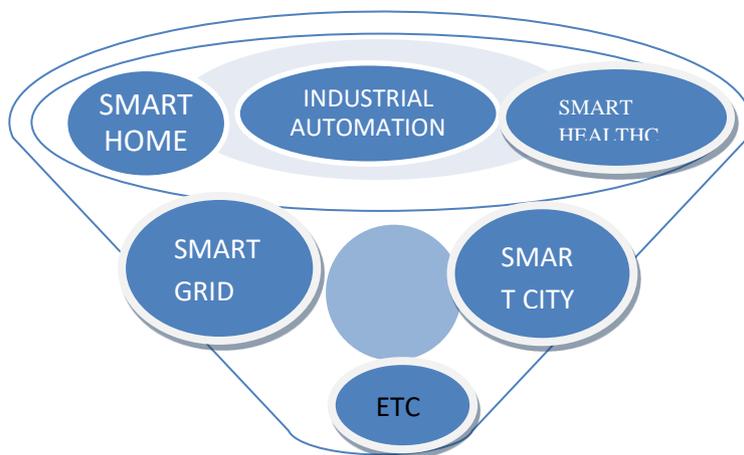

Fig. 4. Applications of IoT and Green IoT.

4. ICT ENABLING GREEN IoT

The term ICT that relates to any technology, application such as hardware, software, satellite systems, radio, television, cell phones etc., about its details and communication information of users' access, transmit and manipulate various information's.
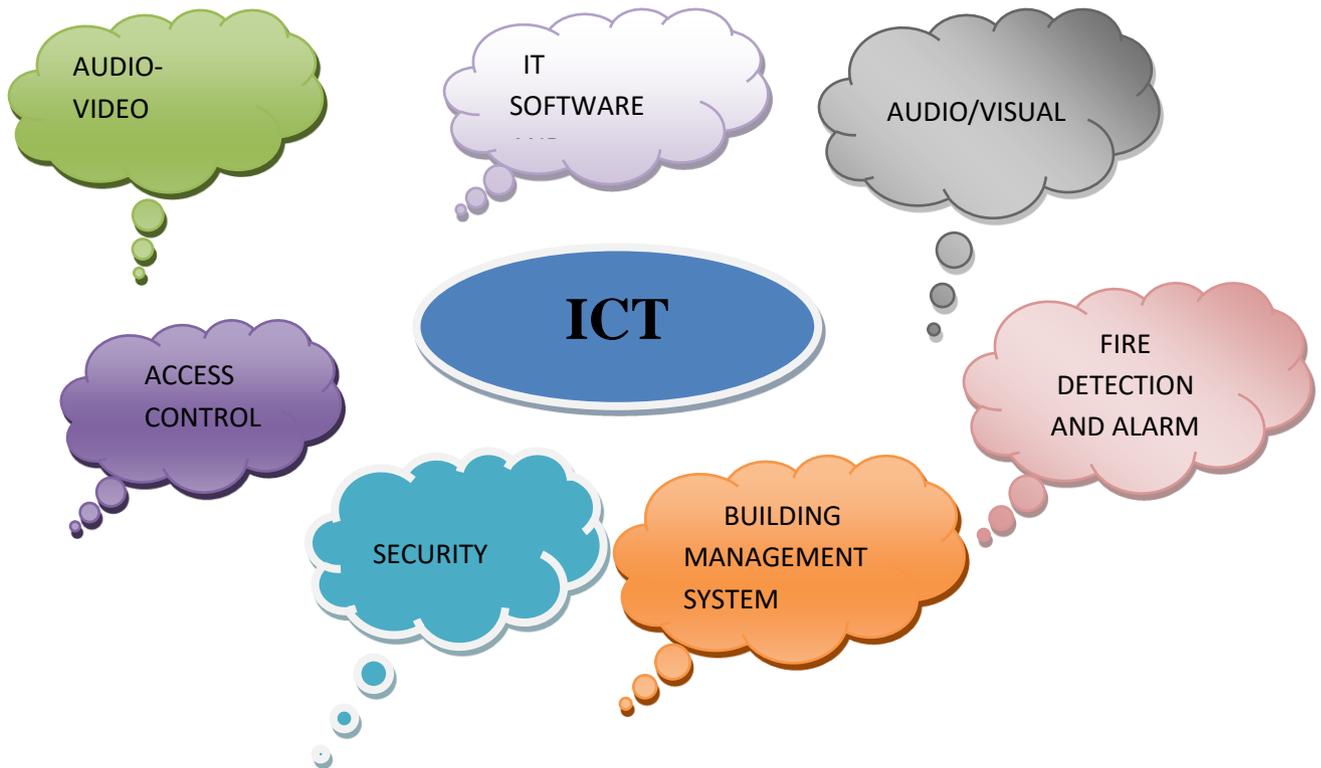

Fig. 5. ICF features

ICT mainly describes about five hot green technologies (i.e., Green dc, green RFID, green M2M, green CC, green WSN.

Table 1. ICT Scheme and Techniques

ICT scheme	Techniques
Green M2M	a) Adjust the transmission power b) Efficiency communication protocol design c) Mechanism of joint energy-saving d) Advantages of employing energy harvesting
Green RFID	a) Reduce the non degradable material used in manufacturing; b) Adjusting transmission power c) Protocol for optimizing tag estimation

Green CC	a) Decrease energy consumption by adoption of hardware and software b) Green CC scheme based on cloud supporting technologies. c) Virtual machine techniques for power saving
Green DC	a) Green source of energy b) Novel energy-efficiency data center architecture design c) Accurate and effective data center power models construction
Green WSN	a) Data reduction mechanisms b) Radio optimization techniques
General green ICT	a) Data path length minimization b) Needed data are to be sent. c) Green power sources renewable

5. SURVEY OF IoT DEVICES AROUND THE WORLD

The following is a list of countries uses IoT devices around the world:

Korea is the first ranking country around the world for IoT devices online with 37.9. They mainly involves in remote health monitoring of country peoples, helps in the integration of sensing and actuation systems, in the manufacturing of the material and so on. Other countries IoT devices are given in Fig. 6.
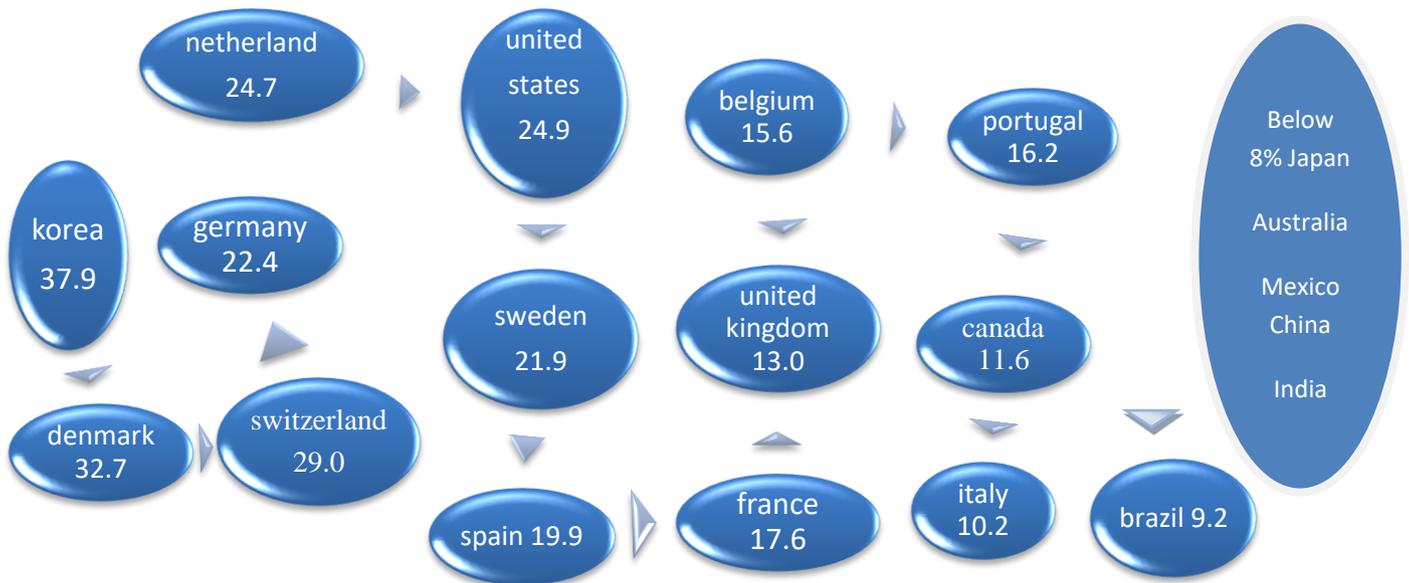

Fig. 6. IoT devices used around the world

6. CONCLUSION

As a motivating and latest guidance for research concerning smart world. Various technologies and issues with respect to green IoT, which plays a significant role in achieving a sustainable world. Green IoT mainly helps for the development of the world, with its smart sensors. The sensors such as unnecessarily turn off facilities that are not needed, it removes the unwanted data and sends only which is needed. The smart sensors help in communication to the world. In coming future years let us wait for the smart world for more betterment of citizens.

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