Internet of Things (IOT): to Deliver Smart Living Services

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Abstract

Smart living emphasizes the integration of IoT-components in applications for houses, offices, industries, payments, security and so on. In 2014, 25% of the total investments made, went to the 'connected home' and 'connected car' industry. The sessions given in this track underscore the importance of the future of connectivity and interactions, of the current investment-landscape, of development opportunities, and these both for the consumer and the producer. "smart" living or the Internet of Things, many of the physical objects around us are connected to the web in one way or another, a development that is radically transforming how we live.

KEYWORDS-Internet of things, RFID, IPv6,Wireless Sensor Network, Smart home, smart living.

I. Introduction

IoT is a concept and a paradigm that considers pervasive presence in the environment of a variety of things/objects that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications/services and reach common goals.The IoT is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment. The confluence of efficient wireless protocols, improved sensors, cheaper processors, and a bevy of start-ups and established companies developing the necessary management and application software, has finally made the concept of the IoT mainstream. Some applications include architecture field, construction materials, home automation, automotive (construction), payments, online marketing, and so on.

The research and development challenges in IoT to create a smart world a reenormous. A world where the real,digital and the virtual are converging to create smart environments that make energy, transport ,cities and man are as more intelligent. The goal of the Internet of Things is to enable things to be connected anytime , anyplace, with anything and any on using any path/network and any service. IoT is an revolution of the Internet. Objects make themelves recognizable and they obtain intelligence by making or enabling context related decisions thanks to the fact that they can communicate information about themselves and they can access information that has been aggregated by other things, or they can be components of complex services.

The number of Internet-connected devices surpassed the number of human beings on the planet in 2011, and by 2020, Internet connected devices are expected to number

between 26 billion and 50 billion. For every Internet-connected PC or handset there will be 5–10 other types of devices old with native Internet connectivity. Applications can involve the electric vehicle and the smart house, in which appliances and services that provide notifications; security, energy-saving, automation, telecommunication, computers and entertainment will be integrated into a single ecosystem with a shared user interface. IoT is providing access to information, media and services, through wired and wireless broad band connections.

II. Functionality of Smart Living

Internet of Things affects our daily life at home. In the near future we will be able to communicate with all sorts of devices as long as they are connected to the internet. The home is one of the places that will be radically transformed and become "smarter" – all thanks to Internet of Things. IoT is sometimes understood as being synonymous with ―smart systems: Intelligent Shopping Applications, Energy and Water Use, Remote Control Appliances, Weather Station, smart environment, smart enterprises, smart home appliances and so on. This Section discusses the functionality review of IoT solution available in different sectors.

Wi-Fi network adapters, motion sensors, cameras, microphones and other instrumentation can be embedded in these devices to enable them for work following applications of the Internet of Things.

1. Intelligent Shopping Applications: Getting advice at the point of sale according to customer habits, preferences, presence of all energy components for them, or expiring dates.

1. Energy and Water Use: Energy and water supply consumption monitoring to obtained vice on how to save cost and resources. Maximizing energy efficiency by introducing lighting and heating products, such as bulbs, thermostats and air conditioners.
2. RemoteControlAppliances:Switchingonandoffermotelyappliancestoavoidaccidentsandsaveenergy.

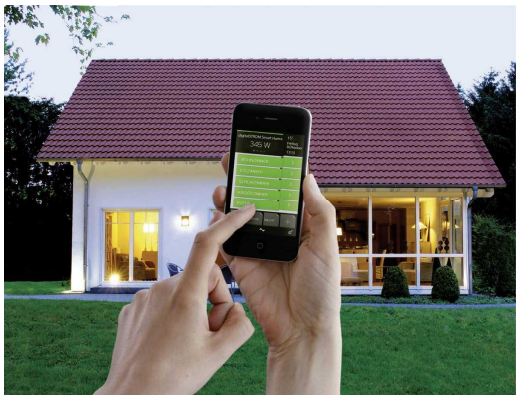

Fig.1: Remote control appliance for switching on/off light.

3. Weather Station: Displays out door weather conditions such as umidity ,temperature,

barometric pressure, wind speed and rainlevel susingmeter switchability to transmit data overlong distances.

4. Smart Home Appliances: Refrigerator switch LCD screen telling That's inside, food that's about to expire, ingredients you need to buy and with all the information available ona Smartphone app. Washing machines allowing to monitor the laundry remotely, and run automatically when electricity rates are lowest. Kitchen ranges with interface to a Smartphone app allowing remotely adjustable temperature control and monitoring the oven'sself-cleaning feature. Home automation systems already implement primitive versions of this concept for things like light bulbs, plus other devices like wireless scales and wireless blood pressure monitors that each represent early examples of IoT gadgets. Wearable computing devices like watches and glasses are also envisioned to be key components in future IoT systems.

I.TECHNICAL BACKBONE:

There are three IoT components which enables seamless pervasive computing: a) Hardware - made up of sensors, actuators and embedded communication hardware b) Middleware - on demand storage and computing tools for data analytics and c) Presentation - novel easy to understand visualization and interpretation tools which can be widely accessed on different platforms and which can be designed for different applications.

This Section focuses on some of the technologies that are driving the IoT, from popular communication options to the different software and data brokerage platforms managing the data exhaust from these systems

1. Radio Frequency Identification (RFID):

A radio-frequency identification system uses tags, or labels attached to the objects to be identified. Two-way radio transmitter-receivers called interrogators or readers send a signal to the tag and read its response. The readers generally transmit their observations to a computer system running RFID software and RFID hardware. RFID tags can be either passive, active or battery assisted passive. An active tag has an on-board battery and periodically transmits its ID signal. A battery assisted passive (BAP) has a small battery on board and is activated when in the presence of a RFID reader."

2. Wireless SoC (system on chip):

System on a chip SoIntegrated circuit (IC) that integrates all components of a computer or other electronic system into a single chip.

3. External Accessory Framework:

In order to connect mobile devices to IoT devices, app developers have to several programming protocols while developing apps for them. A bunch of common code, known as the External Accessory Framework, can be used to let the mobile device know the type of IoT device that is trying to communicate with it. This framework also enables

developers to determine the type of apps that each IoT device can access via its connected mobile devices.

Manufactures like Gainspan, Wiznet, Nordic Semiconductor and others are creating self-contained, RF-certified module solutions that have TCP, UDP and IP on chip. These solutions include built-in security features, can reduce certification times and allow companies to add communication to any microcontroller-based (MCU-based) product with little RF expertise.

Fig.2. Different technologies that drive the IoT.

4. RIOT: An Operating System for the IoT:

RIOT is a friendly Operating System for the Internet of Things.There are only a few operating systems that are suitable for Internet of Things (IoT) applications. RIOT OS, which is free and open source, is specially designed to meet the particular needs of the IoT, with features like a low memory footprint, high energy efficiency, real-time capabilities, a modular and configurable communication stack, and support for a wide range of low-power devices. The Internet of Things (IoT) is used with heterogeneous devices, based on a microkernel and designed for energy efficiency, hardware independent development, a high degree of modularity, which ranges from 8-bit to 32-bit microcontrollers from different manufacturers.

5. A wireless sensor network (WSN):

A wireless sensor network (WSN) is a network formed by a large number of sensor nodes where each node is equipped with a sensor to detect physical phenomena such as light, heat, pressure, etc. WSNs are regarded as a revolutionary information gathering method to build the information and communication system which will greatly improve the reliability and efficiency of infrastructure systems. Compared with the wired solution, WSNs feature easier deployment and better flexibility of devices. With the rapid technological development of sensors, WSNs will become the key technology for IoT.

6. Addressing scheme- IPV6 adoption:

The ability to uniquely identify Things is critical for the success of IoT. This will not only allow us to uniquely identify billions of devices but also to control remote devices through the Internet. The few most critical features of creating a unique address are:

uniqueness, reliability, persistence and scalability.IPv6 is an essential element and a key enabler for the Internet of Things. IPv6 offers sufficient IP addresses for the needs of any present and future communicating devices.

The lack of IPV4 addresses has promoted the adoption of an intermediate solution called the Network Address Translation (NAT). It enables several users and devices to share the same public IP address. This solution is working as NAT users are sharing IP addresses with others, but this technique becomes completely unmanageable if the same end-points are to be used by many different services, which may occur in an IoT deployment where the same sensors are to be used by multiple, independent, applications.IPv6 provides for end devices to have multiple addresses and allows different services to assign IoT end-device addresses that are consistent with their own applications. Different services can deploy their own applications, sharing a common sensor/actuation infrastructure, without impacting the technical operation.

IPv6 provides a large number of addresses that enables the extension of the Internet to any device and service. As indicated by the IOT6 project in the European Union, experiments have demonstrated the successful use of IPv6 addresses to large-scale deployments of sensors in smart buildings, smart cities and even with cattle. The industry and the experts agree about the relevance of IPV6 for Internet of things, however applicability by new entities would require even more dissemination of IPV6 enabled infrastructure and general adoption.With IPv6, it is much simpler for an IoT device to obtain a global IP address, which enables efficient peer to peer communication.

I.CHALLENGES FACED BY IoT:

As IoTs are emerging and a very huge number of devices and applications are embracing it to open the ample number of opportunities in the IoTs making it as the next big thing in Information Technology sector. However it poses some serious challenges and thus gives rise to new areas of research pertaining to IoTs. Some of the challenges and problems faced by IoTsare :-

1. Organization and Standardization of nomenclature of the devices.
2. The communication model for the devices to communicate with each other which all the devices may agree upon. This may result in invention of newer lightweight protocols specifically designed for IoTs.
3. Monitoring and tracking of large number of devices.
4. The performance measurement of the devices which may become a research area to develop newer benchmarks specifically for IoTs and optimization of performance of the devices.
5. Overcoming the security threats in these billions of devices and safeguarding the privacy issues of the devices and customers.
    1. Maintenance of these devices.

I.CONCLUSION AND FUTURE WORK:

As we start to “smarten up” our homes, we quickly learn that it gets difficult to orchestrate all the smart devices in a meaningful way, often trapped in the mode of

"making it work" instead of "making it work for you..". It seems there is no truly convenient way to access and control each one individually or collectively until now. Through the product's Artificial Intelligence interactive smart home hub with facial recognition and voice control, smart living is now both easy and affordable. Smart Beings is crafted from a team with an extensive background in software and hardware development. The organization is built upon a passion for combining device intelligence, cloud connectivity and content-rich applications to helpsolve real-world problems in the "smart monitoring" domain.

Although IoTs is still in the budding stage with lots of promises to deliver things at fingertips to ease most of the tasks carried out by the human beings or to aid the human beings. But as with any new technology a standardization of the IoTs are also very much necessary and it should be able to address most of the challenges, so that newer research areas will be evolved around these issues.

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