

Internet of Things: A World of Need and Opportunity

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Abstract—With increasing popularity of the IoT (Internet of Things) and devices getting smarter day by day, this paper presents an idea to reform the Internet of things a world of opportunity. The IoT is opening fantastic opportunities for entrepreneurs and large established enterprises alike. Whether you prefer to think of it as the “Internet of Everything” or the “Internet of New Services for Me,” your life will be changed in ways not yet imaginable. The Internet of Things (IoT) refers to the use of intelligently connected devices and systems to pull data gathered by embedded sensors and actuators in machines and other physical objects. IoT is expected to spread rapidly over the coming years and this convergence will unleash a new dimension of services that improve the quality of life of consumers and productivity of enterprises shows internet of things as world of opportunity. In many different ways, and it encompasses many aspects of life from connected homes and cities to connected cars and roads, roads to devices that track an individual s behavior and use the data collected for push services. Some mention one trillion Internet-connected devices by 2020 and define mobile phones as the eyes and ears of the applications connecting all of those connected things.

Keywords—component; IOT, M2M, Agricultural IOT, GSMA, IOT Ecosystem, Smart Cities, Wireless Sensor

I. INTRODUCTION

The term IOT was first coined by Peter T. Lewis in the year 1985 in a speech given at the Federal Communication Commission (FCC). At that time the concept didn't gain popularity back then, it has been gaining a lot of traction since last five years or so. IoT has now entered into a lot of industries and made our daily lives much easier than never before. These industries include automotive, healthcare, retail, transportation etc. Media and entertainment industry One of the industries, which came a little late to the party. But, they have now realized that IoT is both disruptive and inevitable and in order to survive in this competitive world and retain viewers/customers, they will have to embrace the technology.^[1]

The Internet of Things is a rising topic of technical, social, and economic implication. Consumer products like cars and trucks, industrial and utility components, sensors, and other everyday objects which are being combined with Internet connectivity and have powerful data analytic capabilities that guarantee to transform the way we work, live, and play. The Internet of Things presents a whole new class of smart objects and applications ushering in novel forms of automation for nearly all fields of human endeavor.

Industry analysts project a steep growth trajectory for connected IoT devices, with a range of numbers that underscores the newness of this phenomenon: Gartner forecasts 26 billion IoT devices by 2020, meanwhile ABI Research projects more than 40 billion and IDC has estimated the figure to exceed 50 billion.

The Projections for the impact of IoT on the Internet and economy are impressive, with some anxiety as many as 100 billion connected IoT devices and a global economic impact of more than \$11 trillion by 2025. Now consider that IoT represents the next evolution of the Internet, taking a huge leap in its ability to gather, analyze, and distribute data that we can

turn into information, knowledge, and, ultimately, wisdom. In this context, IoT becomes vastly important.^[1] Already, IoT projects are under way that promise to close the gap between poor and rich, improve distribution of the world's resources to those who need them most, and help us understand our planet, so we can be more proactive and less reactive. Even so, several barriers exist in the way of IoT development, including the transition to IPv6, having a common set of standards, and developing energy sources for millions—even billions—of minute sensors. However, as businesses, governments, standards bodies, and academia work together to solve these challenges, IoT will continue to progress. The goal of this paper, therefore, is to educate you in plain and simple terms so you can be well versed in IoT and understand its potential to change everything we know to be true today.^[2] Let's talk about some other related terms to IoT like M2M.

Machine to Machine (M2M) solutions ia a subset of the IoT which already use wireless networks to connect devices to each other and the Internet, with minimal direct human interference, for deliver services which confirmed the needs of a wide range of industries. In 2013, M2M connections accounted for 2.8% of global mobile connections which were about 195 million; it shows that this sector is still at a comparatively early stage in its development. An evolution of M2M, the IoT indicate the assortment of multiple vendors' machines, devices and appliances connected to the Internet through multiple networks. While the hidden impact of the IoT is considerable, a cooperative effort is required to move beyond this early stage. In order to optimize the development of the market, a common understanding of the discrete nature of the opportunity is required. To achieve this, mobile operators have identified the following classifiable features:

- The Internet of Things can enable the next wave of life-enhancing services across several fundamental sectors of the economy.
- Meeting the needs of customers may require global distribution models and consistent global services.

- The Internet of Things presents an opportunity for new commercial models to support mass global deployments.
- The majority of revenue will arise from the provision of value-added services and mobile operators are building new capabilities to enable these new service areas.

Device and application behavior will place new and varying demands on mobile networks.

II. OPPORTUNITY IN AGRICULTURE

Due to the development of society, traditional forms of agriculture can't satisfy people's needs, so agriculture must be change to satisfy people's needs. The development of Internet technology has brought great opportunity for the development of agricultural modernization, agricultural Internet of things has become the inevitable trend of agricultural informatization. With the help of remote monitoring and control of greenhouse, the greenhouse monitoring system realized the precise measurement and real time control of the greenhouse.

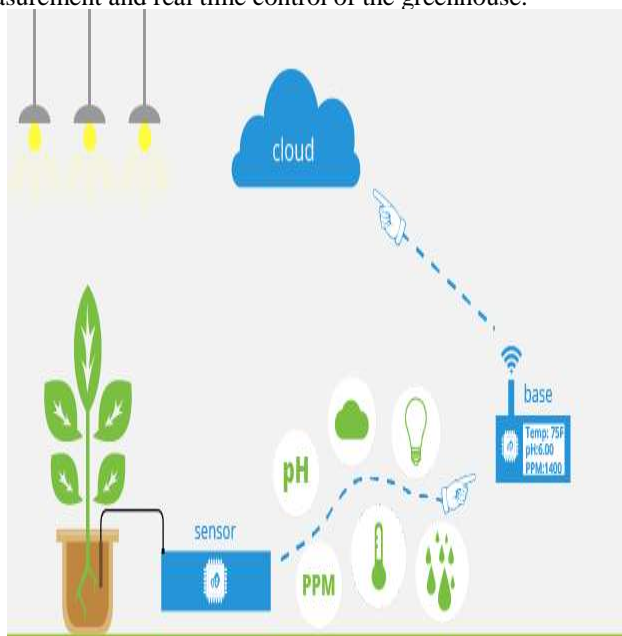


Figure 1. IOT in Agriculture^[8]

Also the greenhouse monitoring system can implement the scientific management methods, improve the situation of crop disaster prevention ability and increase production. The greenhouse monitoring system is designed for satisfy the need of the remote monitoring and control of greenhouse. The IOT gateway is a join point of public network and wireless sensor network in greenhouse monitoring and control system. And the function of the gateway is to gathering data, upload and processing remote user control information. The gateway is based on modularization method and the using of the method to improve the compatibility and better meets the needs of complex agricultural environment.

In agricultural Internet of things Because of the electric and network is instability, the design can realize the cable and wireless communication between the gateway and the upper computer, if all the network lose connection, then the data will

be stored in the SD card, and send to the upper computer when established network connection.^[3]

III. OPPORTUNITY ENTERTAINMENT AND SOCIAL NETWORKING

The IoT is breaking down barriers between professional and user-generated content as never before, with higher quality data-capture and display capabilities. Accordingly, media entertainment and social networking are becoming a seamless continuum.

For example, if you are a fan of the Food Network, watching a cooking show, you could connect your TV to a smart refrigerator integrated with a supermarket that delivers, enabling timely access to needed ingredients. From there, you could also activate a smart oven, or social network of fellow food-preparers to share in recipe preparation. ^[4]



Figure 2. IOT in Entertainment And Social Networking^[9]

The term IOT was first given by Peter T. Lewis in the year 1985 in a speech which is given at the Federal Communication Commission (FCC). At that time this concept didn't gain popularity till then, it has been gaining a lot of traction since last five years or so. IoT has now entered into a lot of industries and made our daily lives much easier than never before. These industries are automotive, healthcare, retail, transportation etc. The Media and entertainment industry was that industries which came a little late to the party. But, they have now realized that IoT is both troublesome and inexorable and in order to survive in this competitive world and retain viewers/customers, they will have to clinch the technology.

Here are a few key areas where IoT is expected to make a huge difference for the media and entertainment industry:

▪ Advertisement

A recent report of global survey and accounting firm, Ernst & Young tells that the usage of sensors within the Internet of Things devices such as phones, or wearable will be contributing mankind with probably the biggest data unlocking potential. This huge data can be utilized by the advertisers to target their ads to specifically to their target audience. The report also mentions that this data can provide help the advertisers to understand when and where did one will see their ad, and how many times the ad watched, and at what context all this made the ad successful.

Google's much famous Ad Words advertising platform works exactly towards matching with the media as more and more consumers now want to consume their content in terms of

context, engagement and sometimes even performance. Over the years, the way Mark Zuckerberg's Facebook has utilized its marketing skills and leveraged its social networking site's famous newsfeed to make it a top revenue generator for itself and the media companies is a commendable success story in itself. After that almost all the top newspaper publishing houses in the world have now joined Facebook in order to provide direct content to their readers and decrease the loading time exponentially. ^[5]

■ Big-data Journalism

For the unskilled, data journalism involves a journalist analyzing and filtering a large sea of data to arrive at news stories that are worth being told to the viewers. The core process of data journalism involves gathering, filtering and then visualizing this data into news that will be relevant to the masses.

This type of journalism holds a wide variety of scope as far as story ideas are concerned because the only thing that matters here is news worthiness.

After all, data journalism is considered as the only type of journalism that is capable of moving into any sector. Every company is currently in need of people who have the skills to find relevant information and create valuable, relevant stories from them.

■ IoT Enabled Devices in the Warzone

If all goes according to the plan, we could soon see IoT enables devices becoming important companions of soldiers fighting it out in the warzone. As we have reported earlier, global tech giants Google and Amazon have already been testing their innovative drone technology for product delivery purposes. The defence forces of several countries including India have also recruited drones into their war equipment.

There's a strong possibility that in the future we might see IoT enabled devices being used by journalists and media organisations to provide real-time news coverage from warzones and keep their staff safe at the same time.

● Connected Smartphones

With Internet of Things enabled sensors will soon have the potential of generating news through data and deliver news relevant to individuals based on their previous news consumption habits. A recent research has found that 39 of the top 50 news sites in the US get more traffic from mobile devices than from desktop PCs.

■ Wearable devices

Applications for wearable devices hold a huge potential for the media and entertainment industry. It can attract new subscription and advertising revenue for broadcasters, publishers, and entertainment firms. Hence, devising a suitable wearable media strategy has now become an important task for media organizations.

■ Challenges With Big-data

The biggest challenge for a media organization has to face with big-data is smartly handling the massive amount of data that is available to them. The media companies depend on heavy IoT deployment to track and analyse this massive amount of data. Social media channels, embedded devices and sensors further expand the ability of gathering data from areas that were previously unexplored or considered difficult to explore. This calls for the creation of a sophisticated analytics.

A recent Accenture research has shown that finding top analytics talent to manage massive amounts of data is going to become a difficult task in the coming years. Hence, it is needed that the industry takes a stock of the situation and makes sure that such a situation does not arrive in the future.

IV. SMART FITNESS AND HEALTH CARE

The concept of smart healthcare plays a significant role in healthcare applications through embedding sensors and actuators in patients and their medicine for monitoring and tracking purposes. The IoT is used for clinical care to monitoring physiological situations of patients through sensors and by collecting, analyzing that information. After then sending that analyzed patient's data remotely to processing centers for perform suitable actions. More and more people use connected personal objects—so-called “wearable’s”—to collect information about themselves and positively impact their lives. Currently, wristband monitors and mobile apps track performance metrics. On the other end of the spectrum is an array of implanted medical devices creating new opportunities to serve patients by dispensing medications, providing electronic and motor stimuli and monitoring critical biometrics. ^[6]



Figure3. IOT in Health ^[10]

The Healthcare industry is the fastest then others to adopt the Internet of Things. The reason of this trend is that features of IOT into medical devices which improves the quality and effectiveness of service, bringing especially high value for the elderly, patients with chronic conditions, and those requiring constant supervision. According to some estimates, spending on the Healthcare IoT solutions will reach a staggering \$1 trillion by 2020 and, hopefully, will set the stage for highly personalized, accessible, and on-time Healthcare services for everyone. Smart sensors, which combined with other sensors and also with microcontroller, which make it possible to tackle the power of the IoT for healthcare by accurately measuring, monitoring and analyzing a variety of health status indicators.

These can include basic vital signs such as heart rate and blood pressure, as well as levels of glucose or oxygen saturation in the blood. Smart sensors can even be incorporated into pill bottles and connected to the network to indicate whether a patient has taken a scheduled dose of medication.

V. PROGRAMMABLE HOMES

After IoT is also making aggression in this sector, with solutions ranging from smart thermostats and security systems

to many different types of appliances and energy management products controlled from remote locations.

In the Programmable World, All Our Objects Will Act as One. In our houses, cars, and factories, we're surrounded by intelligent devices which capture data. And with the help of that data it can be decide about how we live and what we do. Now they are beginning to talk to one another. Soon we'll be able to choreograph them to respond to our needs, solve our problems, even save our lives.

This is the future: tiny, intelligent things all around us, coordinating their activities: Coffee pots that talk to alarm clocks, Thermostats that talks to motion sensors, Factory machines that talk to the power grid and to boxes of raw material. A decade after Wi-Fi put all our computers on a wireless network—and half a decade after the Smartphone revolution put a series of pocket-size devices on that network—we are seeing the dawn of an era when the most mundane items in our lives can talk wirelessly among themselves, performing tasks on command, giving us data which we've never had before.^[7]



Figure 4. IOT in Programmable Homes^[11]

Technology developers are seriously aware of the need for simplicity and convenience in smart-home applications. The NFC Forum in particular, has formed an IoT Special Interest Group (SIG) to investigate how NFC makes it easier to connect, commission, and control IoT devices in the home. The figure below gives an overview of what that means.

- **Connecting**

NFC lets us pair devices with each other that use different communications technologies, so we can initiate a Bluetooth or Wi-Fi transaction. In this we Join a Wi-Fi network without having to enter settings or complex pass codes, or add a new light equipment to your network without keying in a product ID or serial number. NFC is especially helpful when working with IoT devices that don't have a user interface, such as light bulbs, sensors, small appliances, electrical outlets, and so on.

- **Commissioning**

NFC helps to install our setup easily, log data, and maintain our network. In most cases, our Smartphone becomes the user interface for the smart-home network, making it possible to interact with IoT

devices. we can Tap your phone to our water meter, to monitor usage or view our account, or run diagnostics on your Internet-connected TV, so we can resolve a problem, access warranty information, or request a service call. We can even use our phone or tablet to program appliances that aren't connected to Wi-Fi, like your microwave, for a new level of programmability.

- **Controlling**

NFC gives us greater control over settings and access advantage, so NFC gives a higher degree of flexibility with a higher degree of security. we can set our washing machine to start early in the morning, or program our preferred settings for lighting, temperature, and entertainment, so your living room is just the way we like it, or temporarily disable our alarm to let guests in.

Imagine a factory where every machine, every room, feeds back information to solve problems on the production line. Imagine a hotel room (like the ones at the Aria in Las Vegas) where the lights, the stereo, and the window shade are not just controlled from a central station but adjust to your preferences before you even walk in. Think of a gym where the machines know your workout as soon as you arrive, or a medical device that can point toward the closest defibrillator when you have a heart attack. Consider a hybrid car—like the new Ford Fusion—that can maximize energy efficiency by drawing down the battery as it nears a charging station.

VI. CONCLSION

The Internet of Things is a world of opportunities to deliver a step change in individuals' quality of life and enterprises' productivity. With help of widely distributed, locally intelligent network of smart devices, the IoT has the power to enable extensions and enhancements to fundamental services in transportation, logistics, security, utilities, education, healthcare and other areas also, while providing a new ecosystem for application development. There is need of concerted effort to move the industry beyond the early stages of market development towards maturity, driven by common understanding of the distinct nature of the opportunity. This market has distinct characteristics in the areas of service distribution, business and charging models also, capabilities required to deliver IoT services, and the differing demands these services will place on mobile networks. GSMA's Connected Living Programme is an industry initiative which seeks to hasten of the development of mobile-enabled IoT services. It is hoped that a common understanding of the characteristics of IoT will enable industry stakeholders to collaborate more effectively in order to propel the market forward for the benefit of consumers and society.

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