



Internet of Things (IoT) – Scenarios on Today and Tomorrow

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Abstract — This paper presents the current trends in IoT research propelled by applications and the need for convergence in several interdisciplinary technologies and Cloud centric vision for worldwide implementation of Internet of Things. The terms ‘Internet of Things’ and ‘IoT’ refers broadly to the extension of network connectivity and computing capability to objects, devices sensors, and items not ordinarily considered to be computers. The Internet of Things (IoT) is the network of physical objects or things embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure. The IoT is enabled by the latest developments in RFID, smart sensors, communication technologies, and Internet protocols. These smart objects require minimal human intervention to generate, exchange, and consume data. They often feature connectivity to remote data collection, analysis and management capabilities

Keywords- Internet of Things; wireless networks; RFID; cloud computing; IoT Technology

I. INTRODUCTION

The Internet of Things is often referred to by other names- the internet of ‘everything’ or the Internet of Intelligent Objects. It is a network of objects that can communicate with each other. They could be in sensors, electronics or the software that is used to gather exchange or analyze the data between various devices which is further used for management, planning, and decision making. The IoT enables direct connection between physical devices and computer based system. So this has led to an era in which the connection between devices or objects will be more than the one between human beings. The IoT concept is such that anything with intelligence fed into it, can be connected.

With the continuous evolution in technology, today, the communication between people is reducing while human beings are getting more connected to their devices. The importance of the IoT is continuously increasing due the growth of cloud computing, mobile technology and data analytics.

IoT includes various technologies that cover wireless sensor networks, RFID enabled tracking, embedded systems, Internet connected wearable, Bluetooth-enabled devices that connect to the internet, etc.

II. IoT IS GOING TO IMPACT US

IoT will greatly impact human life. Consider a world in which, based on the time you set for your alarm to ring, the coffee maker will start preparing coffee and the geyser will being to heat the water for your bath. Outside the home, the car will automatically track how heavy traffic is and will apprise you of the situation. When the vegetables in the refrigerator run low, the fridge will re-order more, automatically, from the nearest store. This is what IoT technology is all about.

Several connected appliances are already available in the market. Case in example is air purifiers which allows user to monitor and control air quality levels in their homes using their smart phones. In healthcare for instance, IoT devices can enable remote health monitoring measuring blood pressure, heart rate and also management of advanced devices such as pacemakers and hearing devices.

Internet of Things represents the next boundless wave of technology enabled by mobiles and the endless possibilities it holds in improving our lives. A key prerequisite for this progress will be policies that allow mobile internet to expand in the country to match pace with connectivity should focus on making more spectrum capacity available for mobile and other IoT tools, and also increasing investment and infrastructure in targeted research to encourage innovation in this sector.

However, there is no doubt that mobiles and IoT are inseparable partners in the future of technology. As part of IoT ecosystems, Mobiles will play a critical role in the collection, management and use of data generated.

USING IoT TECHNOLOGY

IoT all around us that capture data about how we live and what we do when they being to talk to one another and our ability to choreograph them to respond to our needs, solve our problems even save our lives. It can be useful in various day-to-day scenarios as shown in Figure 1.

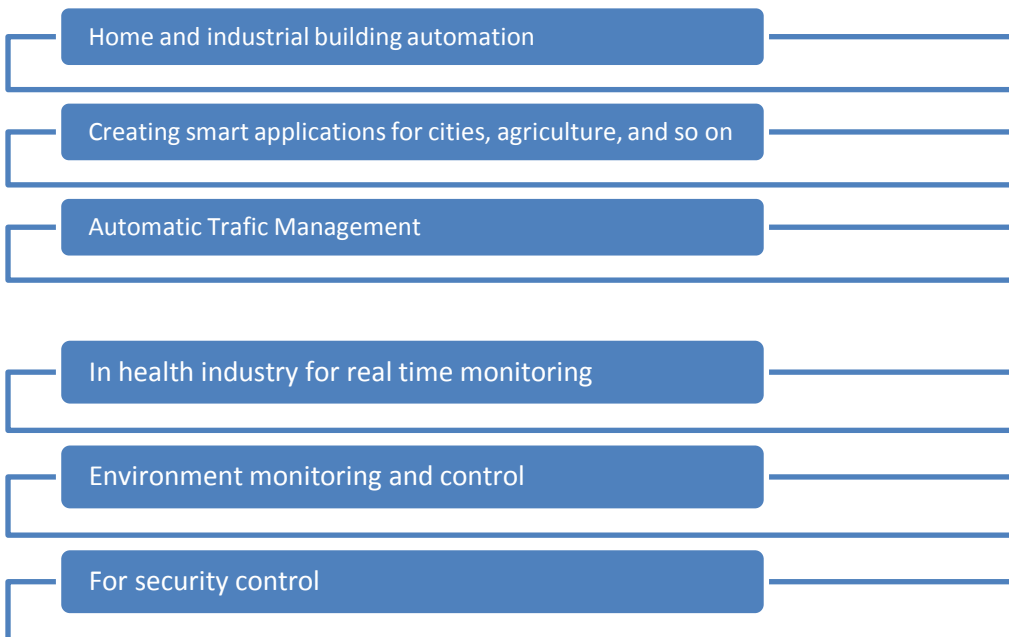


Figure 1.Using IoT Technology

III. HOME AUTOMATION WITH IoT

Lights, cameras, air conditioning systems, digital audio and media systems, energy meters, special sensors to detect motions, intrusion and actuators can all be connected to the internet via wireless communication technologies such as Wi-Fi & Bluetooth. These devices are capable of sharing the data they sense with applications that make intelligent decisions to take actions on our behalf.

This provides home security, monitoring from anywhere, automatically taking actions such as turning on/off of lights, air-conditioners, heaters based on usage. In the near future, high energy consuming devices such as washing machines and water heaters will be capable of integrating with the electricity grids and will automatically tune them to load balance the energy consumption of cities.

IV. IoT MAKE THE CITIES SMARTER

The need for new, sustainable cities is rising as the world's population continuous to grow. IoT is transforming education, transportation, energy management, water redefining, urban-living and creating sustainable cities. A connected city will have greater intelligence fees for road use, and communicate transportation related information in real time. IoT solutions will regulate electricity and water use in the entire city's building, cub rings waste and cutting operating costs.

The system will give residents the power to control their own energy use. All this is made possible with sensor on everything interlinked with information systems all connected to the internet making it easy to share and harness knowledge for anyone from anywhere. A coordinated response can be rolled out in the event of a crisis, such as collapsing building or upon occurrence of natural disaster. Transport systems can be shut down, emergency services mobilized and gas supplies can be cut off, while citizens can be informed of alternative routes.

V. TYPICAL IoT AGRICULTURE

Agriculture has been evolving with new technology such as the Internet of Things (IoT). For example, greenhouses are connected to each other, and their environments are controlled automatically and optimized for the best quality of agricultural products. In addition, the advanced cattle sheds are built based on the IoT technologies. These efforts enhance the quality and safety of agricultural products and mitigate information asymmetry between producers and consumers.

However, some technical and business issues need to be addressed in the agriculture domain to accomplish the higher level of the IoT-based productions and services for producers, distributors, retailers, and consumers. This workshop addresses the current issues of agriculture related to IoT, and finds the future directions of technical and business development of smart agriculture.

One of the points to note the end-to end flow of the data from the devices to the customer experience is that the entire process of transmitting data from a device or sensor includes a lot of data that does not add value. Hence, it becomes important to identify this upfront and build the right pre-processing layer and also put in the right filters early on to ensure only relevant data is transmitted. As the data flows through the system, it is of high user quality and more mature with a lot of technologies in play including data visualization tools and also mobile apps for a connected customer experience.

Food security will be a major concern in India in the coming decades due to degradation of agriculture lands, loss of cultivable land to urbanization, population pressure and poor efficiency is one era that calls for immediate attention. Precision farming and agricultural automation is the need of the hour. There are several projects underway at Indian institute of science to make this reality.

The entire supply chain- from the farm, logistic and retail- is set to become even more connected with information. Food products and ingredients can be tagged via RFID for tracking and tracing, and help raise the level of transparency and consumer confidence. There are research projects underway to develop every single stalk in field. These robots can be configured to communicate to one another over a network. The data can be collectively used to build information sets such as crop yield maps, and further linked to information such as current crops prices.

VI. IoT IN HEALTHCARE

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 by clinical care to monitor physiological statuses of patients through sensors by collecting and analyzing their information and then sending analyzed patient's data remotely to processing centers to make suitable actions. For example, Massimo Radical-7 monitors the patient's status remotely and reports that to a clinical staff. Recently, IBM utilized RFID technology at one of OhioHealth's hospitals to track hand washing after checking each patient. Generally in the case of accidents someone has must intimate to the hospital for getting ambulance, but in the case of IoT whenever accidents are takes place, the wearable devices automatically gives signal to nearest Wi-Fi router and then hospitals to get the ambulance, based upon her health conditions like heartbeats. IoT can be used to supplement patient treatment through remote monitoring and communication, and to keep track of patients as they move through a healthcare facility. Read on to discover the specifics of these IoT deployments.

Hospitalized patients whose physiological status requires close attention can be constantly monitored using IoT-driven, non-invasive monitoring. This type of solution Employs sensors to collect comprehensive physiological information and uses gateways and the cloud to analyze and store the information and then send the analyzed data wirelessly to caregivers for further analysis and review. It replaces the process of having a health professional come by at regular intervals to check the patient's vital signs, instead providing a continuous automated flow of information. In this way, it simultaneously improves the quality of care through constant attention and lowers the cost of care by eliminating the need for a caregiver to actively engage in data collection and analysis. There are people all over the world whose health may suffer because they don't have ready access to effective health monitoring. But small, powerful wireless solutions connected through the IoT are now making it possible for monitoring to come to these patients instead of vice-versa. These solutions can be used to securely capture patient health data from a variety of sensors, apply complex algorithms to analyze the data and then share it through wireless connectivity with medical professionals who can make appropriate health recommendations.

VII. THE FINAL WORD

The idea of devices connecting directly with each other is, as the man who coined the term Internet of Things puts it, 'a big deal'. The Internet of Things (IoT) is the network of physical objects—devices, vehicles, buildings and other items—embedded with electronics, software, sensors, and network connectivity that enables these objects to collect and exchange data. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit; when IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020.

Technological limitations to making all this possible are receding exponentially. When billions of things are connected, talking, and learning, the only limitations left will be our own imagination. As aptly put forward by China's then premier the following equation: "Internet + Internet of Thing= Wisdom of the Earth"

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