



## Internet of things applications, challenges and innovations in future technologies: A survey

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### Abstract

Machine-to-Machine interactions facilitate networked devices and services to substitute information and perform actions seamlessly without the need for human intervention. IOT is going to be a market-changing force for a wide variety of real-time monitoring applications, such as E-healthcare, homes automation system, environmental monitoring and industrial automation as it is supporting to a large number of characteristics and achieving better cost efficiency. IOT is going to be a market-changing force for a wide variety of real-time monitoring applications, such as E-healthcare, homes automation system, environmental monitoring and industrial automation as it is supporting to a large number of characteristics and achieving better cost efficiency. Moreover, end-users in the private and business domain have nowadays acquired a significant competence in dealing with smart devices and networked applications. In this paper we have discussed how the Internet of Things continues to develop, further potential is estimated by a combination with related technology approaches and concepts such as Cloud computing, Future Internet, Big Data, robotics and Semantic technology.

**Keywords:** IOT Applications, Future Technologies, Smart Cities, Smart Environment, RFID, Challenges in Developing in IOT

### Introduction

**Internet of Things:** The Internet of Things is not a hard sell any more. It's a technology that has slowly gained momentum and is now silently shaping our future. IoT is the result of mankind's curiosity and intention to lead a convenient and connected lifestyle, reducing labor and eliminating the chances of human errors. That's why we decided to make devices smart and take care of things that will bring in efficiency. We've figured out that data is the new currency and tons of crucial concerns can be addressed and resolved through data and this is what drives the concept of the Internet of Things. We have all had our experiences with IOT through smart phones, direct-to-home television services, smart televisions, and more and we know to an extent how the technology works.



Fig 1

### IOT Applications

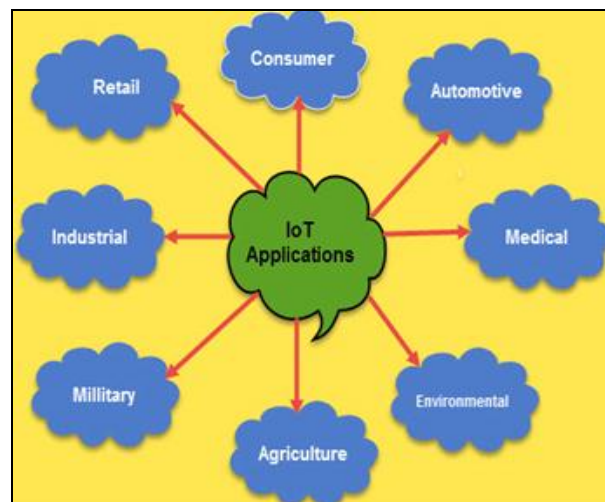


Fig 2

- 1. Wearable's:** Wearable's remains a hot topic in consumers. As consumers await the release of Apple's new smart watch in April 2015, there are many more other wearable's those innovations is to be excited about as like the Fit bit smart watch, Adidas Chameleon, Levi's Commuter Trucker Jacket, Windows Mixed Reality or Microsoft HoloLens etc. As there is mentioned that All of the IOT the wearable's startups and maker Jawbone is probably the one with the biggest funding to date.
- 2. Smart agriculture:** Smart agriculture is an frequently unnoticed business-case for the Internet of Things because it does not really fit into the well-known categories such as health, mobility or industrial. However, due to the

isolation of farming operations and the large number of livestock that could be monitored by the Internet of Things could revolutionize the way farmers work. But this idea has not yet reached large-scale attention. The Internet of Things applications that should not be underestimated. Smart farming will turn into the considerable application field in the predominantly agricultural-product exporting countries.

3. **Connected healthcare:** There are obvious concerns of vulnerability involved with connected healthcare, which along with the rigor of drug development may be slowing the development of new digital medicines. In particular, life logging which seems still to be a powerful idea, changing how patients interact with their clinic. This is particularly the case for measuring subjective data for those suffering from depression. Ultimately, one can see why Apple is getting into this space with HealthKit, and Google with GoogleFit. It's not hard to imagine a future in which iOS or Android apps interact with much of our medicine.
4. **Smart/Connected City:** Smart city is able to cover a broad variety of use cases, from traffic management to water distribution, to waste management, water distribution, urban security and environmental monitoring management and many more. Not just internet access to people in a city but to the devices in it as well – that's what smart cities are supposed to be made of. And again we can pompously say that we're going towards realizing this dream. Efforts are being made to incorporate connected technology into infrastructural requirements. All these work towards eliminating some day to day concerns faced by people and bring in added convenience.
5. **Smart Environment:** The Smart Environment in a city comprises of Smart Governance, Smart Mobility, Smart Utilities, Smart Buildings. Services enabled by the IoT paradigm in smart city environment might ranges from Monitoring health building, Management of waste, Monitoring air quality, Monitoring noise, Traffic congestion, smart parking, smart lightning, water quality monitoring, natural disaster monitoring, smart farming and many more. For instance, Air quality egg is a community led sensor system that helps the community to have better air quality. Amrita WNA is a wireless landslide detection system that is capable of releasing alerts about possible landslides caused by torrential rain in the season. There are many more solutions available providing diverse solutions in different areas mentioned above.

### Radio Frequency Identification System

RFID is an automatic technology that uses electromagnetic fields to automatically identify and track tags attached to objects. Connecting RFID reader to the terminal of Internet, the readers can identify, track and monitor the objects attached with tags globally, automatically, and in real time, if needed. This is the so-called Internet of Things. The tags contain electronically stored information. Passive tags gather energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source and may manage hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be

embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture

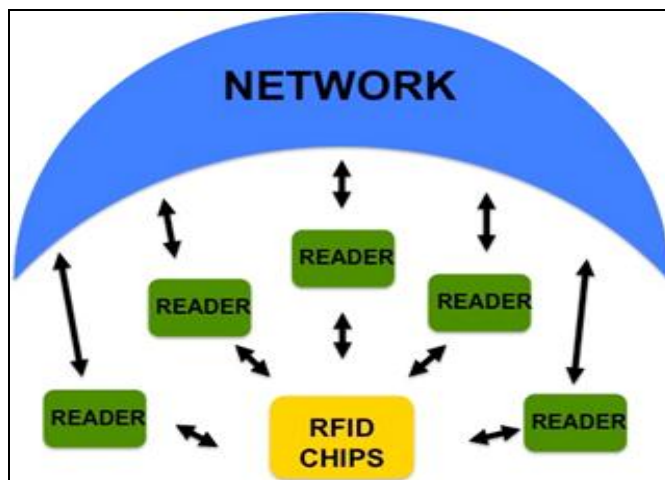


Fig 3

### Challenges in Developing IOT

There is a lot of discussion about the Internet of Things.

#### Security

We all know that in today's the Security is an essential pillar of the Internet and one that ISOC perceives to be similarly essential and 'the' most considerable challenge for the IoT. The number of connected devices that are going to increase rapidly all the opportunity to exploit security vulnerabilities, as do poorly designed devices, which can expose the user data to theft by leaving data streams inadequately protected and in some cases people's health and safety can be put at risk without the security. Many of the IoT deployments will also consist of collections of identical or near identical devices. This uniformity use to magnify the potential impact of any single security vulnerability by the sheer number of devices that all have the same characteristics.

#### Privacy

The IoT creates unique challenges to privacy, that means that many of them can go beyond the data privacy issues that currently exist. Much of this stems from integrating devices into our environments without us consciously using them. This is appropriating in more prevalent in consumer devices, as like in tracking devices for phones and cars as well as smart televisions. In terms of the latter, voice recognition or vision features are being integrated that can continuously listen to conversations or watch for activity and selectively transmit that data to a cloud overhaul for handing out, which every so often incorporate a third party. The collection of this information exposes legal and regulatory challenges facing data protection and privacy law. In addition, many IoT scenarios involve device deployments and data collection activities with multinational or global scope that cross social and cultural boundaries. The opportunities of IOT became conscious about, the ISOC whitepaper suggests that strategies will need to be developed to respect individual privacy choices across a broad spectrum of expectations, while still fostering innovation in new technologies and services.

## Standards

There may be short of standards and documented best practices have a greater impact than just limiting the potential of IoT devices. As we know that Geoff Huston has already pointed out clearly that the absence of standards can enable stupid behavior by IOT devices.

Missing of the standards to direct manufacturers, developers sometimes design products that operate in disruptive ways on the Internet without much regard to their impact. The design if that is inadequately designed and configured, such devices can have negative consequences for the networking resources they connect to and the broader Internet. A lot of this comes down to cost constraints and the need to develop a product for release quicker than competitors. Append to this the difficulties comes with managing and configuring larger numbers of IOT devices, the need for thoughtful design and standardization of configuration tools, methods, and interfaces, coupled with the adoption of IPv6, will be essential in the future.

## Regulation

Like privacy, there are a wide range of regulatory and legal questions surrounding the IoT, which need thoughtful consideration. Legal issues with IoT devices include crossborder data flow; conflict between law enforcement surveillance and civil rights; data retention and destruction policies; and legal liability for unintended uses, security breaches or privacy lapses. Further, the upcoming technology is advancing much more rapidly than the associated policy and regulatory environments. Authoritarian exploration of IOT devices is increasingly being viewed from a general, technology-neutral perspective legal lens, which seeks to prevent unfair or deceptive practices against consumers.

## Development

The expansive span of IOT challenges will not be unique to industrialized countries. In reality, the IOT is gripping a significant pledge for delivering social and economic benefits to emerging and developing economies. as Internet of Things applications are relatively new. If the Internet of Things is to succeed as many people expect, then applications vendors such as On Farm may be required to scale their offerings very rapidly in the coming years.

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