

A Brief Survey on Internet of Things and Communicational Technologies

(Internet of Things)

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Abstract:The main purpose of this survey paper is to familiarize themselves with IoT (Internet of Things) from a broad perspective of protocols, technologies and applications and related issues. The concept of IoT is a combination of multiple technologies. IoT includes the latest versions of RFID, smart objects, namely communication technologies, smart sensors and internet protocols. The main theory is that without external working factors, smart sensors provide applications directly. The future aspect of IoT promises to be the prime center of different technologies that connect sensors to each other and enable smart outputs. In this article, we will discuss the architecture and related technical aspects of the IoT. It also comprises an overview of the IoT technologies, protocols and applications, and related topics. The goal is to create a structure for researchers and application developers to understand how different protocols work, outline some of the key issues related to the IoT, and the relationship between IoT and other technologies.

IndexTerms - internet of things (IoT)

I. INTRODUCTION

The expression Internet of Things (IoT) has existed for many years. In this case, it is an advanced automation and analysis system that uses a large amount of data, sensors, networks, and artificial intelligence technologies to provide a complete system for the product or services. These systems can provide higher transparency, control, and performance when applied to any computer company or general system. This is about the existence of various objects - the most important of which is the use of Sensors, actuators, RFID, NFC, cell phones and so on. The Internet of Things RFID is the most important concept and the basic requirement of the Internet of Things. Entry and exit systems are suitable for all industries because of their unique flexibility and ability to adapt to all situations. Improve data collection, operation, automation, and much more through smart devices and advanced technologies. IOT is used for the implementation of various technologies in the market such as RFID, machine-to-machine communication, vehicle-to-vehicle communication etc. The main threat using the Internet of Things is security because potential hackers are always ready to attack. The possibilities of coding and tracking objects provide companies with more proficient, faster processes minimize errors, impede theft, and the inclusion of complex and flexible organizational systems through the IoT." Internet of Things" refers to the networks and codes of day-to-day objects and items that provide a separate computer- readable and identifiable Internet. Most of the existing content on the Internet was created by encrypted tags.

II. METICULOUS TECHNOLOGIES

There are various technologies that are involved in the implementation of the IoT. In this Study we have emphasis on the following Technologies:

- Radio Frequency Identification (RFID)
- Near Field Communication (NFC)
- Machine-to-Machine Communication (M2M)
- Vehicle-to-Vehicle Communication (V2V)
- Internet Protocol (IP)
- RFID Reader

A. Radio Frequency Identification (RFID)

RFID is a digital identity in the form of a number of wireless objects using radio waves. In the IoT, the RFID Technologies solves the important task of identifying problems. RFID system is a collection of many readers and several RFID tags. To move attachments to objects, tags use the radio-frequency electromagnetic field. There are electronically stored information in this tags. The passive tags combine energy from nearby RFID reader who asks for radio waves. Just like a barcode or magnetic stripe on the back of the credit card or bank card, RFID devices have the same goal; prescribes the ID of the object. Just like a barcode must be scanned for gathering information, the RFID device must be scanned to regain the identifying information.^[1]

B. Near Field Communication (NFC)

Near Field Communication (NFC) solves the challenges regarding unpowered substance lacking network access. Embedded NFC tags in these unpowered substances allow intelligence to be combined anywhere. NFC makes connecting devices easy and perceptive. No prolonged hand shaking or data entry required. Hackers can compact an open network. NFC solves the hitch for IoT users with features that limit intruding and easy-to-deploy options for the auxiliary protections to match each use case.

C. Machine-to-Machine Communication (M2M)

M2M communication is very useful and helpful aspect of this system. The IoT is interconnecting certain computer equipment into the Internet Infrastructure. In general Internet of things mainly includes a machine that communicates with each other on a computer connected while people observe, analyze and act the explosion caused by "BIG DATA". This is next Internet Revolution developing.

D. Vehicle-to-Vehicle Communication (V2V)

V2V communication is remote information transmission between engine vehicles. The fundamental reason for V2V is to counteract accidents by allowing vehicles in the motion to send location and speed information to each other over a mesh network. So as to exploit mechanical improvements, vehicle's driver may essentially restore a notice on the danger of an accident or the vehicle itself may take diversionary activities, for example, braking to back off.

E. RFID Reader

The Radio frequency identification reader (RFID reader) is accumulation of data from an RFID tag, which is utilized to track particular objects. To exchange information from the tag to a reader, Radio waves are utilized. RFID tags must be inside RFID readers extend from 3 to 300 feet.



figure 1. rfid reader^[2]

III. PROTOCOLS IN IOT

We have crumbled the protocols into following layers to provide a specific level of association:

- Connectivity layer (ex: PLC, ModBus, USB)
- Link Protocol (ex: GSM, WiFi, Bluetooth)
- Transport (ex: 6LoWPAN, IPv4, IPv6)
- Session/Communication (ex: MQTT, CoAP, AMQP)
- Data Aggregation/Processing (ex: JSON-LD)
- Data Storage (ex: Hadoop, MongoDB)

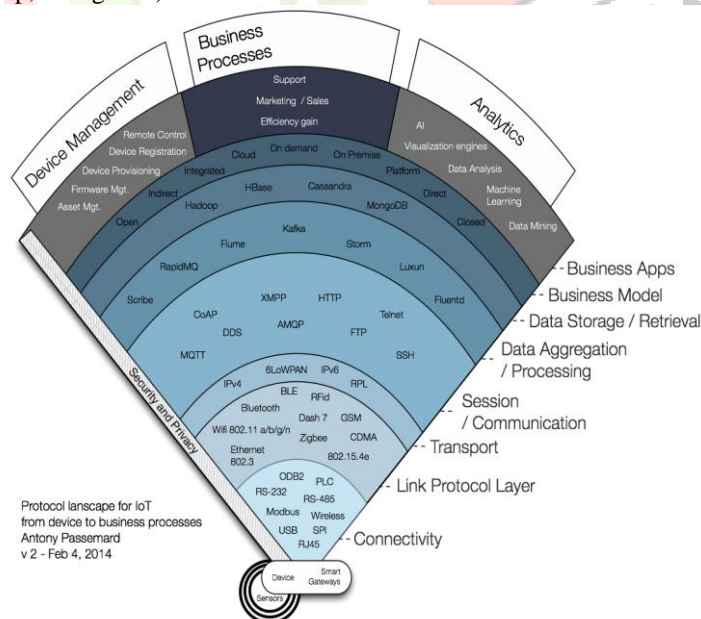


figure 2. protocols of iot^[3]

IV. APPLICATIONS OF IOT

There are varied Applications. In any main sectors Applications of IoT are increasing. Consistently our requirements changes and as accordingly we utilize the Web and consequently IoT. In forthcoming years, IoT will be more changed in view of the RFID, NFC, M2M and V2V communications.

A. Radio frequency Identification (RFID)

1) Smart parking:

To identify arrival and departure of vehicles sensors are attached to parking space. Hence providing well-organized management which assists the driver to save fuel and time. Sensors provide precise information regarding parking space and avoid traffic. It also provides provision to reserve a parking space from the vehicle itself. It's the solution to less pollution and traffic management.^[4]

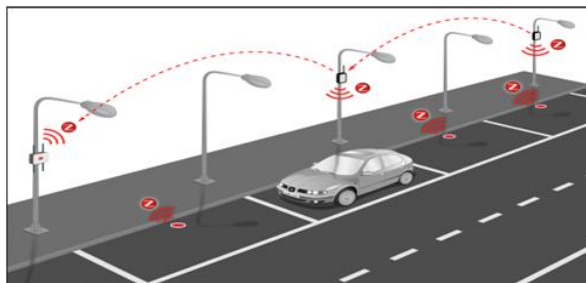


figure 3. smart parking^[5]

2) Augmented maps :

Tourists can search the information about places through a phone with the assistance of maps with tags that authorize NFC tag by linking to web service. This makes easy for a person to seek obligatory data about restaurants, motel, memorial, auditorium and the local attractions.^[6]

3) Logistics:

By the assistance of RFIC and NFIC, a person can screen everything such as item subtle elements, buying of raw materials, production and sales of the product after sale service. With the assistance of IoT, a person can track the stock in the warehouse so that one can have data about the stock, consumer's satisfaction etc. and result in escalating sales.^[6]

4) Smart water supply:

Through remote system framework IoT will able to observe the water supply and will verify that there is sufficient water supply for the inhabitant or business utilize. In case of any water loss it will help to detect it. Hence it will reduce water leakage and wastage problem. The framework can indicate insight about pipe stream estimation information frequently, and also send programmed cautions is water utilize is outside of surmised ordinary range. This decides the site of spilling channels and concerned repairs in view of measure of water misfortune that could be counteracted.^[7]

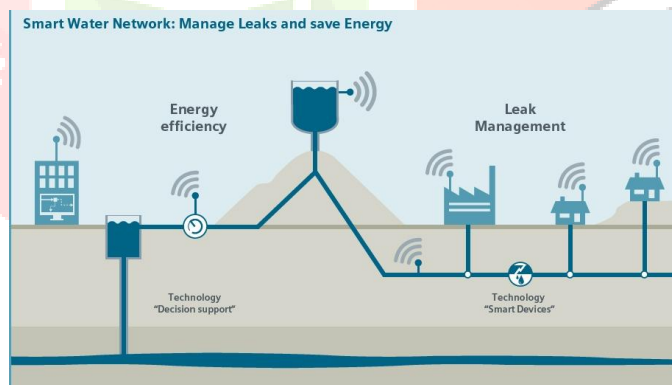


figure 4. smart water management^[8]

5) Smart homes and offices:

For Day-to-Day life, we have numerous electronics machines or appliances like refrigerators, microwave ovens, air conditioners, heaters, fan and lights. By inserting sensors, it will help to use the power adequately and managing comfort in life. These sensors can compute the external temperatures as well as inhabitants' interior the area and as a result command the aggregate of warming, chilling and surge of lights etc. This implementation would eventually save energy and minimize the cost.



figure 5. smart home^[9]

B. M2M and V2V Communication Domain:

1) Industrial maintenance:

To avoid bizarre operation in industries it is essential to detect the temperature and vibrations in mechanical engines. The sensors set on these machines will record industrial safeguarding, by keeping the hardware running profitably in a factory, cleaning, lubrication and repairs. This defensive protection is commonly a significant part of an industrial field. Companies squander lots of cash because of wasteful upkeep administration. This will enable the company spare cash and time.

2) Smart cars:

Smart cars and M2M communication is the most ideal approach to lessen accidents. These cars are driverless and will give activities other than just safety, for example, they can spare significant time, decrease worry of driving etc. A pilot can work remote control car with a specific end goal to prune car crash and decrease human blunder. The Institute of Electrical and Electronics Engineers (IEEE) now expects that by 2040, driverless cars will account for up to 75 % of vehicles across the globe.

3) Smart grid:

Smart grid is a voltaic framework, which is planned to advance the effectiveness of energy usage, and quality support to end-client. All gadgets in the system are associated to sensors that transmit information related with energy utilization to the central server regularly. The central server builds up utilization standard and the total of energy. It will enhance the creation to accomplish temporary power goals.

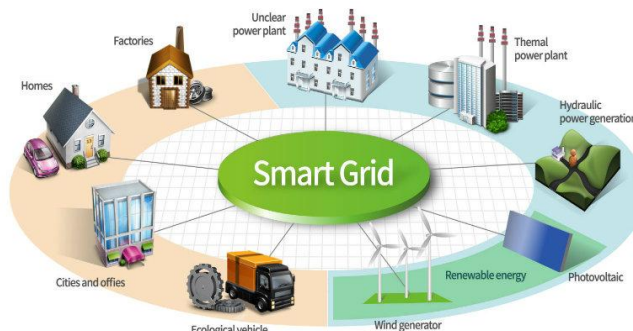


figure 6. smart grid^[10]

4) Travelling:

NFC has initiated an extraordinary simplicity in travelling; it can curtail divergent checks at restaurants. For example, if a hotel room is booked by a person, a confidential digital key will be provided to that person. By utilizing that secret digital ticket, with NFC authorized lock, wasting time in lounges would be reduced as a person can go to the room directly.

5) Health:

NFC also portrays a part in tracking private well-being. It contains data and records about the health of a patient and conveys it to the health recording center. By scrutinizing this information at the health center, valuable data is delivered to an individual.



figure 7. healthcare^[11]

V. CHALLENGES IN IOT

A. Security Concern :

If the IoT device badly concern, cyber muggers will utilize them as arrival points to damage other devices the same network. This will cause the loss of essential private information leaked to the public.

B. Availability :

Availability of IoT must be seen in the software and hardware levels to give whenever and anyplace services for customers. Availability of the software alludes to the ability of the IoT applications to give services for everybody at better places at same time.

C. Privacy Concern:

These devices accumulate user's information without their authorization and evaluate them for intention only known to their parent company. The social clasp of IoT devices governs people to reliance these devices with the gathering of their private information without understanding the future connotation.

D. Inter-operas ability standard issues:

In a flawless habitat, data trading should take place between all the interconnected IoT devices. But the situation is intrinsically more intricate and relies on different levels of broadcasting protocols stacks amidst such devices.

VI. CONCLUSION

Internet and Internet of Things have brought a new pioneering phase to the world. These days IoT is being executed wherever which is for humankind concern like Smart city, smart environment, security and crises, smart business process, smart agriculture, household and home automation and medicinal services. In this paper, we have considered different innovations with its determinations that can bring about making IoT. From that point onwards, we communicated some great cases where the Internet of Things is of exceptional use. Ultimately, we thought of some issues which are still to be understood before the widespread endeavour of this innovation. We finally conclude the required for "smart" programmed administration, data aggregation, and protocol adaptation services to accomplish better combination among IoT service.

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