



A REVIEW ON APPLICATIONS OF INTERNET OF THINGS

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Abstract

Only IoT allows objects to be sensed & remotely controlled over present network infrastructure, which creates opportunities of direct combination of physical world in systems which are computer based & results in improved efficiency, accuracy & economic benefit. IoT offers highly developed connectivity of devices, services & systems, which is over machine to machine communications & it covers a big variety of protocols, domains & application. Objective of research is Home automation using IOT with integration of Solar based energy system. Integration of sensing & actuation systems, connected to Internet, is likely to optimize energy consumption as a whole. IoT devices are expected to integrate into every form of energy including devices such as power outlets, switches, bulbs, televisions etc. & it will be able to communicate with utility supply company in order to effectively balance power generation & energy usage.

Keyword:- IOT, Integration, Home automation, Machine to Machine

infrastructure, which creates opportunities for direct combination of physical world into

Computer based systems, & resulting in improved efficiency, accuracy & economic benefit; when IoT is augmented with sensors & actuators, technology becomes an example of general class of imitated-physical systems, that includes technologies like smart homes, smart grids, smart transportation & advanced cities. Each thing can be separately identified through its implanted computing system but it can interoperate within present Internet infrastructure. Experts have estimated that IoT will include near about 50 billion objects up to 2020.

Scope of IOT

IOT has many advantages into our lives that could help individuals, society & business on daily basis. Its new concept can be presented in many forms which includes safety, health, financial matters, & planning of each day

I. INTRODUCTION

IOT is a keen network of physical devices, buildings, vehicles, & all other items which are embedded with electronics, software, sensors, & network connectivity that enable these objects to collect & exchange data.

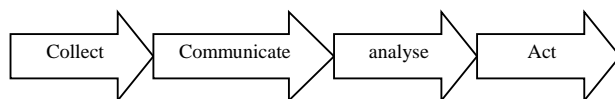


Fig 1 Working of IOT

In IoT objects can be sensed & controlled at a large distance across present network

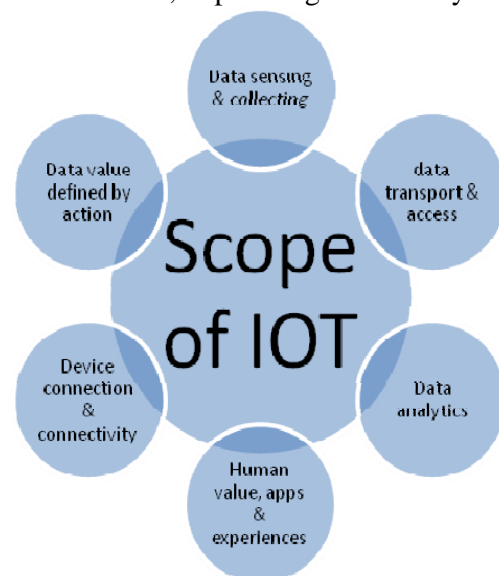


Fig 2 Scope of IOT

IOT Integration in health care system can be very beneficial for both individual & society. A chip can be planted into every individual, which allows monitoring vital signs of patients for hospitals. By finding their important signs, it can help in indicating whether seriously assessment is necessary or not. All of information which is available on Internet, it can also scare people to believe that they have to take more care than what is in need. Hospitals are already struggling to judge & caring of patients that they have it gives them ability to judge who requires primary attention only by monitoring individual's health.

IOT can help people in their personal safety. ADT is a home security system, which permits individuals in monitoring their security systems at home by their phones, with ability to control.

Challenges and Limitations

Internet of Things accompanies three main concerns are over-reliance on technology breach of privacy & job loss. Everything always stays there when it is put on internet. There are security measurements [1] which are used for protection of information, but a possibility of hackers breaking into system & stealing information always remains there. For example, Anonymous is that group of persons who hacks in federal sites & release all confidential information into public. If all of information is placed on internet, people can hack it, & can find out everything about a individuals life Companies can misuse information which is given to access it. Recently Google has caught using information which was private. Information, such as data collected & stored by IoT, could be immensely beneficial to companies.

II. IOT APPLICATIONS

Medical & healthcare systems

IoT devices could be used to enable remote health monitoring & emergency notification systems. These health monitoring devices could range from blood pressure & heart rate monitors to advanced devices capable of monitoring specialized implants, such as pacemakers, Fit electronic wristbands or hearing aids which are very advanced. Specialized sensors can also be equipped within living spaces to monitor health & general well-being of senior citizens, while also ensuring that proper treatment is being

administered & assisting people regain lost mobility via therapy also.

Applications
Data, Security, BPM, BRM, Analytics, OSS & BSS
WAN(Wired, Wireless) (Gateway Function)
LAN, Low power wireless, RFID (Sensors)

Fig 3 IOT Application

Building & home automation

IoT devices could be used to monitor & control mechanical, electrical & electronic systems used in various types of buildings in home automation & building automation systems.

Transportation

IoT can assist in combination of communications, control, & processing of information over different transportation systems. IoT application extends to all aspects of systems of transportation. Flexible interaction between transport system components enables intra & inter communication of vehicles, smart parking, smart traffic control, logistic & fleet management, toll collection systems which are electronic, control of vehicles, & road assistance.

Deployments on a large scale

Several planned or big scale deployments of IoT are ongoing to enable better citi system. For example, South Korea, Song do. Near about all things this city is planned to wire, monitor & connect into a continuous data stream which can be examined & an array of computers with or without human interference.

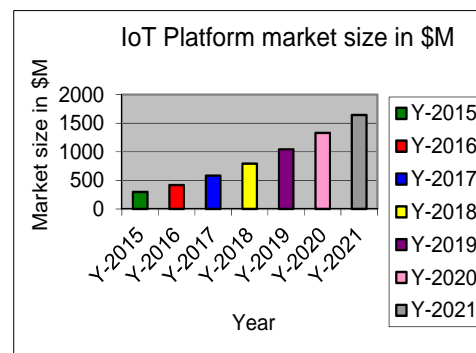


Fig 4 Comparison chart to represent annual market size of IOT

Expected annual growth rate for market for six-year period is considered 33%. There is steady growth from 2015 which is \$298M to \$1.6B in 2021. IoT platforms is considered as quickly developing technology. Currently growing at rates is 33%.

Other application is currently ongoing project in Santander, Spain. For its deployment, two different approaches have adopted a city of 180,000 citizens, already has been seen with 18,000 downloads of city application for their smart phones. application is connected with 10,000 sensors which enables services as environmental monitoring of environment, digital city agenda between others. Context of city information is used in its deployment so that merchants can be benefitted through spark deals mechanism that is based on a city behavior which aims at maximizing e of effect of every notification.

NY Waterway is competent to control its fleet & passengers in such a way that was not possible previously with wireless network in place. New applications can include energy, security, & fleet management, paperless ticketing, public Wi-Fi & others^[24].

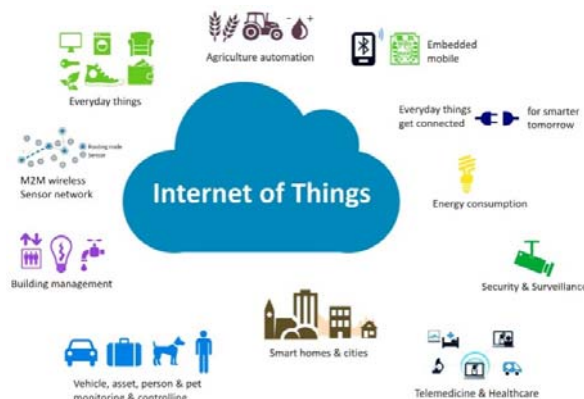


Fig 5 Application of Internet of Things^[20]

Things Unique addressability

Original idea of Auto-ID Center has been based on RFID-tag & different identification by Electronic Product Code however it has evolved into objects having an IP address.

Alternative from world of Semantic Web targets instead on making all things not just those electronic, RFID-enabled addressable by existing naming protocols. Objects usually do not converse but they may be referred to by other agents like powerful centralized servers acting for their human owners.

Next generation of Internet applications that are using Internet Protocol Version 6 could be able to communicate within devices that are attached to all human-made objects due to huge address space of IPv6 protocol. System would be capable to scale to huge numbers of objects envisaged.

III. LITERATURE REVIEW

John A. Stankovic, Life Fellow, IEEE wrote research on Research Directions for Internet of Things

Several technical communities are pursuing researches that donate to Internet of Things. As sensing & actuation control has become ever sophisticated, there is important overlap in such communities, sometimes from slightly many perspectives. Cooperation among communities has been encouraged.

Jayavardhana Gubbi, RajkumarBuyya. Slaven Marusic, MarimuthuPalaniswami Internet of Things: A Vision, Architectural Elements, & Future Directions

Sensing enabled by Wireless Sensor Network technologies cuts across several areas of modern day living. Proliferation of these devices in a communicating actuating network creates Internet of Things, wherein, sensors & actuators blend seamlessly with environment around us, & information is shared across platforms in order to develop a common operating picture.

In 2014 Abhay Kumar & Neha Tiwari published a research titled Energy Efficient Smart Home Automation System told about energy required by home instruments & air-con systems ,develops homes one among foremost important areas for impact of energy consumption on natural surroundings. Objective for planning of such system is to reduce energy wastage with efficiency controlling devices operation modes.

Authors Juan Felipe Coors Arias in 2014 published their research paper heading "Wireless Sensor System According to Concept of IOT -Internet of Things

In this research they focus on design of a wireless communication system. They keep responding to sensor concept that has been applied to industrial process. Here temperature variables used. Sensors have been connected to internet in order to be monitored remotely. Sensor data gets downloaded from cloud with

graphical programming in order to control. It communicates system with programmable logic controller. Monitoring process was done with a SCADA system & modeling of communication system was done using formalism of Petri nets, as a system that responds in terms of several events.

Chirag M. Shah, Vamil. Sangoi& Raj M. Visharia. in 2014 Smart Security Solutions based on Internet of Things

Popularity of Internet of Things & devices are getting smarter. Paper represents idea to reform access control systems. Approach of boosting access control system sure that system is wireless. Prototype described in this paper has provision of accepting inputs from a smart card reader or a biometric sensor. Such inputs are processed inside controller. If inputs are found to be valid, access is granted to user & logs are wirelessly transmitted to computer using a WiFi module. Machine learning algorithms have been implemented to monitor & analyse collected data.

ByungMun Lee in 2014 wrote **Design Requirements for IOT Healthcare Model using an Open IOT Platform** that tells most IOT platforms are developed to be universally applied to many services & applications. However, critical success factor of IOT is an explosion of demand for services. Therefore goal would be achieved if service & application are reflected their characteristics for each use case. Hence it presented an IOT platform for healthcare & suggested to configure it with 5 components in this paper. This paper introduced REST APIs as an interface in platform for interoperability with any service & device.

ByungMun Lee & Jinsong Ouyang in 2014 wrote on **Intelligent Healthcare Service by using Collaborations between IOT Personal Health Devices** where they opine that management of chronic diseases is important to self-management for health. The IOT concept plays a significant role in self-management for health. In order to accomplish it, personal health devices need two functions such as application network protocol & intelligent service. But, most of them have only simple function such as indicating measured data & storing data temporarily

IV. Distributed IOT Based Home Automation System

Distributed **IOT Based** home automation system, consists of server, hardware interface modules used. Server controls hardware one interface module, & could be easily configured to handle more hardware interface module. Hardware interface module in turn controls its alarms and actuators. Server is a normal PC, within built in Wi-Fi card, acts as web server. System could be accessed from web browser of any local PC in same LAN using server IP, or remotely from any PC or mobile handheld device connected to internet within appropriate web browser supports asp.net technology through server real IP. Wi-Fi technology is selected to be network infrastructure that connects server and hardware interface modules. Wi-Fi is chosen to improve system security by using secure Wi-Fi connection, & to increase system mobility & scalability.

INTERNET OF THINGS, WORLD, 2011-2025

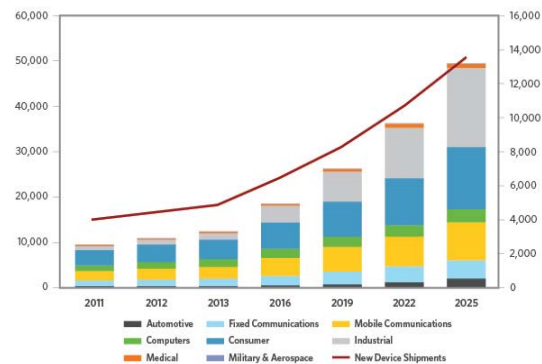


Fig 7 Growth of IOT FROM 2011 TO 2015 in different sectors[22]

Though user intends to add latest hardware interface modules out of coverage of central access point, repeaters or managed wireless LAN would perfectly solve that type of problem. Main functions of server are to manage, control, & monitor distrusted system components that enables hardware interface modules to execute their assigned tasks through actuators, & to report server within triggered events from sensors.

V. CONCLUSION

In order to program & control flow of information in Internet of Things, a predicted architectural direction is necessary. It is being called BPM. Everywhere that is a blending of traditional process management & special

capabilities to automate control of large numbers of coordinated devices. In Internet of Things, significance of an event will not essentially base on a deterministic approach but would in its place to be based on framework of event itself: this is also being a semantic web. Consequently, this will not necessarily require common standards that will not be able to prefer every context or use: some actors' services, components, avatars accordingly be self-referenced & if ever needed, adaptive to active common standards. Some researchers give that sensor networks are most essential component of Internet of Things.

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