

A Survey on Internet of Things Third Wave

V Vani & D Suvarna Krishna

¹Assistant Professor, CSE Department, St.Martins Engineering College, JNTUH.

¹Team Leader-PHP Developer, Ensofttech Solutions, Hyderabad.

Abstract:

IoT systems allow users to achieve deeper automation, analysis, and integration within a system. They improve the reach of these areas and their accuracy. IoT utilizes existing and emerging technology for sensing, networking, and robotics. IoT exploits recent advances in software, falling hardware prices, and modern attitudes towards technology. Its new and advanced elements bring major changes in the delivery of products, goods, and services; and the social, economic, and political impact of those changes. This paper describes the survey on Internet of Things systems.

Keywords IoT Systems, Applications and Key features.

1. Introduction

IoT has applications across all industries and markets. It spans user groups from those who want to reduce energy use in their home to large organizations who want to streamline their operations. It proves not just useful, but nearly critical in many industries as technology advances and we move towards the advanced automation imagined in the distant future.

Engineering, Industry, and Infrastructure

Applications of IoT in these areas include improving production, marketing, service delivery, and safety. IoT provides a strong means of monitoring various processes; and real transparency creates greater visibility for improvement opportunities.

The deep level of control afforded by IoT allows rapid and more action on those opportunities, which include events like obvious customer needs, nonconforming product, malfunctions in equipment, problems in the distribution network, and more.

Example

Joan runs a manufacturing facility that makes shields for manufacturing equipment. When regulations change for the composition and function of the shields, the new appropriate requirements are automatically programmed in production robotics,

and engineers are alerted about their approval of the changes.

Government and Safety

IoT applied to government and safety allows improved law enforcement, defense, city planning, and economic

management. The technology fills in the current gaps, corrects many current flaws, and expands the reach of these efforts. For example, IoT can help city planners have a clearer view of the impact of their design, and governments have a better idea of the local economy.

Example

Joan lives in a small city. She's heard about a recent spike in crime in her area, and worries about coming home late at night.

Local law enforcement has been alerted about the new "hot" zone through system flags, and they've increased their presence. Area monitoring devices have detected suspicious behavior, and law enforcement has investigated these leads to prevent crimes.

Home and Office

In our daily lives, IoT provides a personalized experience from the home to the office to the organizations we frequently do business with. This improves our overall satisfaction, enhances productivity, and improves our health and safety. For example, IoT can help us customize our office space to optimize our work.

Example

Joan works in advertising. She enters her office, and it recognizes her face. It adjusts the lighting and temperature to her preference. It turns on her devices and opens applications to her last working points.

Her office door detected and recognized a colleague visiting her office multiple times before she arrived. Joan's system opens this visitor's messages automatically.

Health and Medicine

IoT pushes us towards our imagined future of medicine which exploits a highly integrated network of sophisticated medical devices. Today, IoT can dramatically enhance medical research, devices, care, and emergency care. The integration of all elements

Provides more accuracy, more attention to detail, faster reactions to events, and constant improvement while reducing the typical overhead of medical research and organizations.

Example

Joan is a nurse in an emergency room. A call has come in for a man wounded in an altercation. The system recognized the patient and pulls his records. On the scene, paramedic equipment captures critical information automatically sent to the receiving parties at the hospital. The system analyzes the new data and current records to deliver a guiding solution. The status of the patient is updated every second in the system during his transport. The system prompts Joan to approve system actions for medicine distribution and medical equipment preparation.

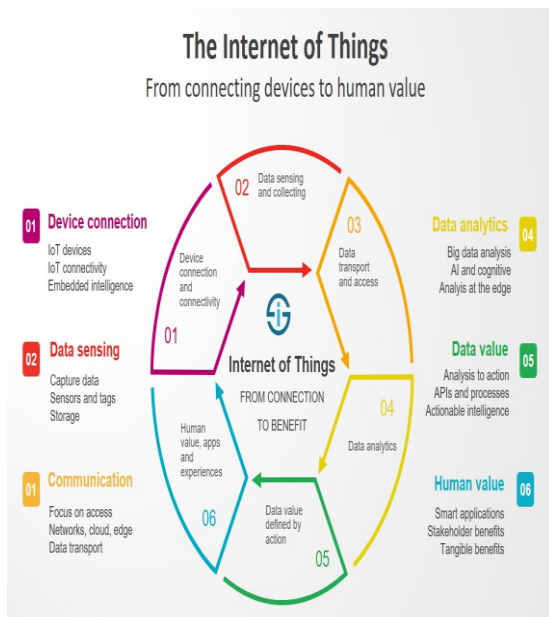


Figure 1: The IoT System Architecture

2. Proposed Work

IoT systems allow users to achieve deeper automation, analysis, and integration within a system. They improve the reach of these areas and their accuracy. IoT utilizes existing and emerging technology for sensing, networking, and robotics.

IoT exploits recent advances in software, falling hardware prices, and modern attitudes towards technology. Its new and advanced elements bring major changes in the delivery of products, goods, and services; and the social, economic, and political impact of those changes.

IoT – Key Features

The most important features of IoT include artificial intelligence, connectivity, sensors, active engagement, and small device use. A brief review of these features is given below –

AI – IoT essentially makes virtually anything “smart”, meaning it enhances every aspect of life with the power of data collection, artificial intelligence algorithms, and networks. This can mean something as simple as enhancing your refrigerator and cabinets to detect when milk and your favorite cereal run low, and to then place an order with your preferred grocer.

Connectivity – New enabling technologies for networking, and specifically IoT networking, mean networks are no longer exclusively tied to major providers. Networks can exist on a much smaller and cheaper scale while still being practical. IoT creates these small networks between its system devices.

Sensors – IoT loses its distinction without sensors. They act as defining instruments which transform IoT

from a standard passive network of devices into an active system capable of real-world integration.

Active Engagement – Much of today's interaction with connected technology happens through passive engagement. IoT introduces a new paradigm for active content, product, or service engagement.

Small Devices – Devices, as predicted, have become smaller, cheaper, and more powerful over time. IoT exploits purpose-built small devices to deliver its precision, scalability, and versatility.

IoT – Advantages

The advantages of IoT span across every area of lifestyle and business. Here is a list of some of the advantages that IoT has to offer –

Improved Customer Engagement – Current analytics suffer from blind-spots and significant flaws in accuracy; and as noted, engagement remains passive. IoT completely transforms this to achieve richer and more effective engagement with audiences.

Technology Optimization – The same technologies and data which improve the customer experience also improve device use, and aid in more potent improvements to technology. IoT unlocks a world of critical functional and field data.

Reduced Waste – IoT makes areas of improvement clear. Current analytics give us superficial insight, but IoT provides real-world information leading to more effective management of resources.

Enhanced Data Collection – Modern data collection suffers from its limitations and its design for passive use. IoT breaks it out of those spaces, and places it exactly where humans really want to go to analyze our world. It allows an accurate picture of everything.

IoT – Disadvantages

Though IoT delivers an impressive set of benefits, it also presents a significant set of challenges. Here is a list of some its major issues –

Security – IoT creates an ecosystem of constantly connected devices communicating over networks. The system offers little control despite any security measures. This leaves users exposed to various kinds of attackers.

Privacy – The sophistication of IoT provides substantial personal data in extreme detail without the user's active participation.

Complexity – Some find IoT systems complicated in terms of design, deployment, and maintenance given their use of multiple technologies and a large set of new enabling technologies.

Flexibility – Many are concerned about the flexibility of an IoT system to integrate easily with another. They worry about finding themselves with several conflicting or locked systems.

Compliance – IoT, like any other technology in the realm of business, must comply with regulations. Its complexity makes the issue of compliance seem incredibly challenging when many consider standard software compliance a battle.

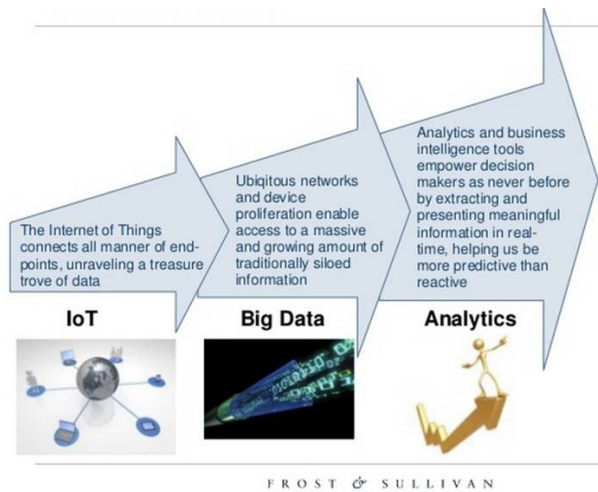


Figure 2: Internet of Things Third Wave

3. Conclusion

The Internet of Things guarantees to convey a stage change in people's personal satisfaction and undertakings' efficiency. Through a broadly dispersed, locally insightful system of keen gadgets, the IoT can possibly empower expansions and improvements to crucial benefits in transportation, coordination's, security, utilities, instruction, social insurance and different zones, while giving another biological system to application advancement. A deliberate exertion is required to move the business past the beginning times of market advancement towards development, driven by regular comprehension of the particular idea of the open door. This market has unmistakable qualities in the territories of administration dissemination, business and charging models, capacities required to convey IoT administrations, and the contrasting requests these administrations will put on versatile systems. GSMA's Connected Living Program is an industry activity which looks to facilitate the advancement of versatile empowered IoT administrations. It is trusted that a typical comprehension of the attributes of IoT will empower industry partners to work together more adequately all together to impel the market forward for the advantage of buyers and society.

4. References

[01] <http://www.itu.int/en/ITU-T/techwatch/Pages/internetofthings.aspx>

[02] <https://www.thingworx.com/ecosystem/markets/smart-connected-systems/smart-cities/>

[03] Eiman Al Nuaimi et al., *Applications of big data to smart cities. Journal of Internet Services and Applications* 2015.

[04] <http://www.7wdata.be/article-general/how-big-data-and-internet-of-things-builds-smart-cities/>

[05] A. Murray, M. Minevich, and A. Abdoullaev. *Being smart about smart cities. KM World, October 2011.*

[06] Farheen Fatima, et al., *Internet of things: A Survey on Architecture, Applications, Security, Enabling Technologies, Advantages & Disadvantages. International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 12, December 2015.*

[07] http://www.connected-living.org/content/4-information/4-downloads/4-studien/20-mind-commerce-smart-homes-companies-and-solutions-2014/mind-commerce_smart-homes-companies-and-solutions-2014_glo_12-2014.pdf

[08] <http://www.gsma.com/connectedliving/wpcontent/uploads/2012/03/vision20of20smart20home20report.pdf>

[09] Jukka Suhonen. *Experiences and Future Plans for WSN-enabled Service Development in Home Environment. Realin white paper 2013*

[10] Amrita Sajja, D. K. Kharde, Chandana Pandey. *A Survey on efficient way to Live: Smart Home - It's an Internet of Things. ISAR - International Journal of Electronics and Communication Ethics, Volume 1. Issue 1, 2016.*

[11] Gabriele Lobaccaro, Salvatore Carlucci and Erica Löfström (2016). *A Review of Systems and Technologies for Smart Homes and Smart Grids. www.mdpi.com/journal/energies*

[12] Tiago D. P. Mendes et al., *Smart Home Communication Technologies and Applications: Wireless Protocol Assessment for Home Area Network Resources. Energies* 2015.

[13] [http://energy.gov/sites/prod/files/oeprod/Documents andMedia/DOE_SG_Book_Single_Pages\(1\).pdf](http://energy.gov/sites/prod/files/oeprod/Documents%20and%20Media/DOE_SG_Book_Single_Pages(1).pdf)

[14] *Smart Grid enabling energy efficiency and low-carbon transition, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321852/Policy_Factsheet_-_Smart_Grid_Final_BCG_.pdf*