

# The Contribution of Modern Technologies in IoT

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**ABSTRACT:** Internet of things is always developing field for sharing data and communication and from this present reality objects such as Actuators, RFIDs, Sensors, Machines etc. whereas each object has a one of a kind framework for data sharing, data processing and communication. IOT inserts splendor in inside connected objects for decision making, communication, giving serviceability according to the need and sharing information. Nowadays, millions of things as objects are associated together employing various mediums, produces data with various formats and follows the various models to offer the various services. In this way, the architecture heterogeneity, network protocols employed objects or things and data produced by objects or things prompts the few problems like privacy and security issues, complexity in network, standardization, scalability etc. This paper demonstrates the brief concept regarding different challenges and issues of IOT and prompting technologies that could be connected with IOT for providing the solution of these issues.

**KEYWORDS:** Electronic Devices, Internet of Things (IOT), Intelligent Services, IOT Architecture, Network.

## I. INTRODUCTION

Modification is only one element which is continuous in this universe. Smaller advances in technology are transforming people's lives and their way of living. In previous years, for example, there was no telephone devices, people were working to exchange information or to communicate by letters with each other. At the moment that the invention of the telephone was popular, human life changed. Individuals can communicate efficiently from their home, and then there is the advent of cell phones, in which people can communicate from anywhere with each other. In the same way, the Internet of Things (IOT) is the latest new technology of this century to make life comfortable and easier for humans today. The name of the technology itself means that it is essentially used to connect the different items and give the organisation and community a massive level of services[1]. IOT thus offers a stage for devices not only to communicate with each other, but also to make it easier to compute, feel and process each time from everywhere by connecting the different devices with each other.

IOT offers different types of technologies that can be used in various fields such as agriculture, factory, home automation, transportation, healthcare, etc., such as smart transportation, smart home, smart parking, smart city, etc. IOT delivers various benefits and makes human life simpler and more relaxed, but with the advancement of related network equipment, it also extends numerous challenges[2]. Expanding associated system rates prompts energy usage that raises environmental CO2 emissions, accessibility problems, mutual information protection and protection, standardisation of different devices, sophistication of the network, heterogeneity of content, interoperability of associated devices manufactured by different communication protocols and companies employed by them, etc. This paper is sorted out in a

few parts in which it discusses IOT architecture and its fundamentals, latest IOT problems and concerns, primary challenge solutions, and eventually ends the paper[3].

### *The Overview of Iot:*

IOT can be described as a global network of physically connected machines or devices that can interact with each other. According to the concept, without human intervention, IOT is nothing but connected entities or artefacts that

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communicate with each other to provide intelligent services. The reach of the Internet is expanded by IOT. The relation between electronic devices and computing is now masked by the internet reach, while IOT evolves this for interconnecting physical objects or different items. These real items or objects, such as air conditioners, lamps, fans, etc., may be anything they see around them. These physical objects or objects are loaded with information technologies, embedded electronics, embedded networks, so they have a basic processing process in them, linked to them, and then they go around as separate nodes of the particular internet in which nodes connect with each other and exchange data for various errands to be executed. This is essentially the way IOT works.

Objects that are interacting with another object connect and deliver the same form of operation. Physical objects are detected by sensors or remembered. Dependent on the sensor being used, the sensors detect different parameters, such as pressure, temperature, light, etc. The sensed data can be sent and data will be sent through the network or through the linked device, it may also lastly include cloud, the data is transferred depending on which one has been sensed based on the requires, a few human movement collected by an actuator[4].

The 5-layer construction of the IOT is prescribed by the International Telecommunication Union. Researchers suggested splitting the IOT, IOT system architecture into three major layers, such as operation layer, vision layer, and network layer. Knowledge from physical objects is obtained by the vision layer[5]. The network layer is assumed to provide the communication between the device layer and the vision layer in the 3-layer architecture. It remotely or securely moves data from the experience layer to the device layer. Be it as it might, the 5-layer access gateway layer architecture that is used to provide communication between the network layer and the awareness layer is involved. It deals with the structures and objects of communication and also in the IOT world. The Middleware layer is also one improvement in the 5-layer architecture that offers an increasingly scalable interface between equipment and applications[6].

Applications or utilities that analyse the data obtained from the rest of the layers are given by the upper application layer. During the design time of the IOT architecture, variables such as privacy & protection, networking & connectivity, device intelligence, scalability, data processing, business modelling must be involved. The IOT concept should look like it offers interoperability, respectability, portability, flexibility, quality measurement, protection. SOA is a Service Focused Architecture that fulfils all the characteristics already reported as a better approach to management[7].

➤ *Sensing layer:*

Wireless or wired or remote systems with RFID and sensor tags may exchange information and context among the different devices in this layer. Distinctive sensors or markers are used for detecting objects and exchanging information in the context of the application.

➤ *Network layer:*

The second layer is also known as the Transmission Layer, and is the network layer. The main role of the transmission layer is to link everything together. Thanks to the provision of availability, it is also capable of data sharing between the different devices and used to share data from the sensor to data processing[8].

➤ *Service layer:*

This layer is in charge of coordinating IOT apps and utilities and consists of middleware technology. It consists of service APIs, aggregation of services, and maintenance of services and exploration of services. In addition, this layer forms any service-located problem, including web index, exchange of data, contact, and handling of data.

➤ *Interface layer:*

Users can interact with the IOT with the aid of this layer. Just like IOT is intertwined with everything, it offers different modes of connectivity, such as machine to entities, machine to machine, machine to application, etc. This coating has a major influence on the SOA of the IOT along these directions. As it is understood as a whole that separate devices are related in the IOT and these devices are presumably generated by the individual agency so that they do not comply with

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a similar specification or protocol. In this case, when sharing information and interacting with the different devices, there may be a problem. This layer takes care of these kinds of issues[9].

## *The Challenges in Iot:*

### *Standardization:*

The ISO is a "International Organization for Standardization" arising from their research over the past 10 years that standards are essential for the economic and organisational advancement of any form of company that uses technological growth. It focuses on environmentally sustainable policies, efficiency and protection. Because of the use of contradictory approaches for management and development, it disperses information among users about possible threats. In IOT assessment, the major obstacles are requirements. In addition, other challenges such as interoperability increases, network asset implications and stability are all due to the lack of standardisation of IOT products. Therefore, standardisation of IOT devices, design and artefacts are important elements for IOT architectures to be accomplished.

### *Privacy and Security:*

Privacy and confidentiality are an integral aspect of the IOT process. For storage, personal, data processing and transportation operations, for example, it is important to protect different IOT network activities. The security priorities of Principle 3 are secrecy, honesty and verification in order to provide general privacy and security. In all IOT architecture layers, such as middleware layer, awareness layer, device layer, network layer, and IOT protection must be used. As a result of this clarification, it is still important to improve the protection IOT architecture and to develop different privacy and security frameworks to address privacy and security issues. Authentication is a critical feature of the IOT ecosystem that needs to be changed for each IOT layer implementation to have complete authentication. Authentication allows IOT devices to protect the identity of the contact system for safe data transfer between different devices[10].

Therefore, failure to enforce an accurate and acceptable authentication protocol on any layer of the IOT framework will cause a few possible attacks. Confidentiality is likewise allowed on the network for safe exchange of messages between users. To provide secrecy, encryption methods or control structures must be enforced. During the transmitting process, the confidentiality and anonymity of the information must ensure that, in any event, the information cannot be altered. Data injection can change full data during the exchange of messages on the network.

### *Energy Consumption:*

The use of IOT devices is rising every day in the modern period, thereby increasing energy consumption every day and releasing tremendous carbon dioxide into the atmosphere. The energy used for charging IOT computers, sensors, data processing, gateways, IOT entry points originating from different sensors in IOT infrastructures will be key areas for potential energy use. It is also important for the design of self-sustainable and energy efficient devices that do not need to recharge the battery until it is distributed as a battery replacement after object mobilisation is another challenge.

## II. CONCLUSION

IOT is an Internet of Things that is a framework or infrastructure of interconnected mechanical machines, objects, computing devices, animals or humans, digital machines that are equipped with one-of-a-kind identifiers and the ability to transmit information across a network without the requisite contact between humans, computers or humans. IOT puts together a wide variety of items found in daily life and encourages them to communicate and facilitate a smarter and simpler life.

In the current situation, IOT is the primary infrastructure that delivers facilities such as smart communities, healthcare, robotics, smart schools, etc. Despite the fact that it still offers numerous types of advantages in different locations, many areas still face problems in terms of data protection and security, accessibility, scalability, etc. Different companies produce different types of computers, cameras, sensors, etc. that use different types of protocols and technology of different kinds.

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Low-standard and low-rate system manufacturing generates risks linked to interoperability, safety, scalability, security, energy usage, etc. The expansion rate of the related machines also increases the consumption of electricity or power consumption, which significantly affects the environment. In addition, these threats open the door for other researchers to overcome problems in order to create smarter and simpler lives. Here, it revealed the numerous difficulties and problems that need to be focused in the IOT.

## REFERENCES

- [1] A. Al-Fuqaha, M. Guizani, M. Mohammadi, M. Aledhari, and M. Ayyash, "Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications," *IEEE Commun. Surv. Tutorials*, 2015, doi: 10.1109/COMST.2015.2444095.
- [2] C. Zhu, V. C. M. Leung, L. Shu, and E. C. H. Ngai, "Green Internet of Things for Smart World," *IEEE Access*, 2015, doi: 10.1109/ACCESS.2015.2497312.
- [3] S. Nižetić, P. Šolić, D. López-de-Ipiña González-de-Artaza, and L. Patrono, "Internet of Things (IoT): Opportunities, issues and challenges towards a smart and sustainable future," *J. Clean. Prod.*, 2020, doi: 10.1016/j.jclepro.2020.122877.
- [4] P. Fraga-Lamas, T. M. Fernández-Caramés, and L. Castedo, "Towards the internet of smart trains: A review on industrial IoT-connected railways," *Sensors (Switzerland)*, 2017, doi: 10.3390/s17061457.
- [5] L. Minh Dang, M. J. Piran, D. Han, K. Min, and H. Moon, "A survey on internet of things and cloud computing for healthcare," *Electron.*, 2019, doi: 10.3390/electronics8070768.
- [6] M. S. Farooq, S. Riaz, A. Abid, K. Abid, and M. A. Naeem, "A Survey on the Role of IoT in Agriculture for the Implementation of Smart Farming," *IEEE Access*, 2019, doi: 10.1109/ACCESS.2019.2949703.
- [7] M. Ferretti and F. Schiavone, "Internet of Things and business processes redesign in seaports: The case of Hamburg," *Bus. Process Manag. J.*, 2016, doi: 10.1108/BPMJ-05-2015-0079.
- [8] N. Papakostas, J. O'Connor, and G. Byrne, "Internet of things technologies in manufacturing: Application areas, challenges and outlook," in *International Conference on Information Society, i-Society 2016*, 2017, doi: 10.1109/i-Society.2016.7854194.
- [9] G. Choudhary and A. K. Jain, "Internet of Things: A survey on architecture, technologies, protocols and challenges," in *2016 International Conference on Recent Advances and Innovations in Engineering, ICRAIE 2016*, 2016, doi: 10.1109/ICRAIE.2016.7939537.
- [10] I. Stellos, P. Kotzanikolaou, M. Psarakis, C. Alcaraz, and J. Lopez, "A survey of iot-enabled cyberattacks: Assessing attack paths to critical infrastructures and services," *IEEE Communications Surveys and Tutorials*, 2018, doi: 10.1109/COMST.2018.2855563.
- [11] S. Balamurugan, K. Amarnath, J. Saravanan and S. Sangeeth Kumar, "Scheduling IoT on to the Cloud : A New Algorithm", *European Journal of Applied Sciences* 9 (5): 249-257, 2017.
- [12] S. Balamurugan et al., "Smart Healthcare: A New Paradigm", *European Journal of Applied Sciences* 9 (4), 212-218, 2017
- [13] Ritika Wason and Vishal Jain, "Auto Scaling in the Cloud", Book Title "E-commerce Data Security with Cloud Computing", Cambridge Scholars Publishing, U. K. page no. 29 to 44, June, 2019.
- [14] Ritika Wason, Mandeep Kaur and Vishal Jain, "Content Delivery Networks" Book Title "E-commerce Data Security with Cloud Computing", Cambridge Scholars Publishing, U. K. page no. 84 to 107, June, 2019.
- [15] Ritika Wason, Vishal Jain, Gagandeep Singh Narula, Anupam Balyan and Mandeep Kaur, "Smart Robotics for Smart Healthcare", *Advances in Robotics & Mechanical Engineering (ARME)*, Volume 1, Issue 5, January, 2019, DOI: ARME.MS.ID.000121.