Challenges in Industrial Internet of Things

M.Mahalingam

Government College of Engineering, Bodinayakkanur, Theni District, India.

Abstract:

The adoption of emerging technological trends and applications of the web of Things (IoT) within the industrial systems is leading towards the event of commercial IoT (IIoT).The major objective of IIoT is to realize high operational efficiency, increased productivity, and better management of commercial assets and processes through product customization, intelligent monitoring applications for production. In this paper, we clarify the concepts of IoT, and Industrial IoT, We highlight the opportunities brought in by this paradigm shift also because the challenges for its realization.

Keywords: Internet of Things, Industrial Internet of Things, Challenges.

1.0 Introduction:

The manufacturing sector has played a dominant role within the economy of the countries and corporations. In the day to day point of view, attaining the expansion within the resources and energy efficiency is that the key strategy to succeed in the sustainability in manufacturing [9]. Organizations face many challenges due to technological. In order to overcome these issues, innovation in their product and processes is necessary for entering into the sustainable development in their future. Even though there's an incredible growth of IoT in various sectors, the implementation of IoT within the manufacturing sector is in infancy

The manufacturing industries are enforced to supply more products by using less raw materials and fewer energy. The well sophisticated IoT network results in enhances the entire process of an organization from the supply of raw materials to the customer service. The IoT has more advantages within the manufacturing sector, like the empowered connection between manufacturers and machines. IoT results in the enhancement of the merchandise quality and manufacturing process efficiency, but still there are huge uncertainty issues which the industries face during the implementation.

2.0 IoT Vs IIoT:

Internet of Things (IoT) is an emerging trend and now it's one among the key elements of Digital Transformation drive the planet in various ways. IoT (Internet of Things) and IIoT (Industrial Internet of Things) is exactly the same thing but it has a least difference in coverage of its operation. IoT are often used for industrial, manufacturing, and agricultural applications whereas IIoT emphases on improving connectivity between devices, saving time, efficiency optimization, and other possible benefits. It plays a big role in day-to-day impact on businesses and its safety.

IIoT is the sub category of IoT. IIoT is that the use of IoT technologies in manufacturing and industrial sector. In manufacturing and production, IIoT incorporates the technologies like machine learning, big data, sensor data harnessing, automation and machine-to-machine (M2M) communication. Further, these data are often used for empowering organizations to finish the task in lesser time, solve the issues, economize and support business intelligence efforts.

Internet of Things (IoT)	Industrial Internet of Things (IIoT)
IoT for commercial sector	IIoT for Industrial sector.
Machine to human communication	Machine to Machine (M2M) communication.
Human centered model	Machine centered model
Human and things integrated technology	Machine to Machine (M2M) Integrated digital manufacturing and operational technology.
Medium to high	High to very high
Essentially wireless	Wireless and wired
Consumer oriented applications	Industry- oriented applications
revolution	evolution
Not stringent	Mission critical
A small number of communication standards	A high number of connectivity standards and technologies.

3.0 IIoT adoption in Manufacturing:

The evolution of producing science and technology, alongside the recent advances in computer sciences and therefore the information-communication technologies. The radical evolution of the online into a

network of interconnected objects that make a wise environment is characterized by the term Internet of Things. The definition of IoT that's being adopted during this study is "The Internet of Things allows people and things to be connected Anytime, Anyplace, with anything and anyone, ideally using any path/network and any service". In industry the term Industrial IoT (IIoT) is introduced and refers to the appliance of IoT in industry and implies the utilization of sensors and actuators, control systems, machine-to-machine, data analytics, and security mechanisms. Many significant applications of industrial IoT are emerging. The IoT is a multi-disciplinary field.

The main goal of IoT adoption in manufacturing is to understand smart factories, during which machines and resources communicate and are connected during a network. To achieve that, machine tools, resources also as existing IT tools of an enterprise should be connected to the web directly or through external adapters. As a result, machine tools are going to be transformed into "cyber-machine tools" enriched with knowledge provided by the info capturing and analysis. In addition to the above, resources considering also human operators will be connected to the internet network by using mobile devices, transforming operators into "Cyber- Operators". Finally, existing IT tools and business management tools are going to be connected to the network, capturing heterogeneous data from different sources. Such a sensible enterprise will produce intelligent products (smart products) that skills they need been produced, and can collect and transmit data as they're being used; these huge amounts of data (big data) are going to be collected and analyzed so as to supply meaningful information to the upper levels of the enterprise making them adaptive and versatile .

4.0 IIoT Benefits:

The following are the advantages of IIoT in engineering and manufacturing industries.

4.1 Inventory Management: Controlling things across the availability chain is currently probable through Internet of Things application. Using IoT, tracking of inventory across the world on a plant level is feasible and therefore the customers get alerts of any momentous changes from earlier arrangements.

4.2 Increased Quality Control: The IoT device can supply the various data available at different stages with respect to the customer sentiments on creating the product requirements.

4.3 Smart Metering: By implementation of Smart meters in IIoT, it is possible to monitor the utilization of resources like electric current, fuels used in the plant for various purposes, usage of water etc.

4.4 Predictive Maintenance: Industrial Internet of Things in manufacturing sector has not only perceived a mutiny within the equipment maintenance structure, but also its relief. This provides cost savings over process plan.

4.5 Digital Industrialization: IoT enabled equipment and machinery can convey overall process information data to the partners like original equipment manufacturers and to production engineers.

5.0 Application in Manufacturing Fields:
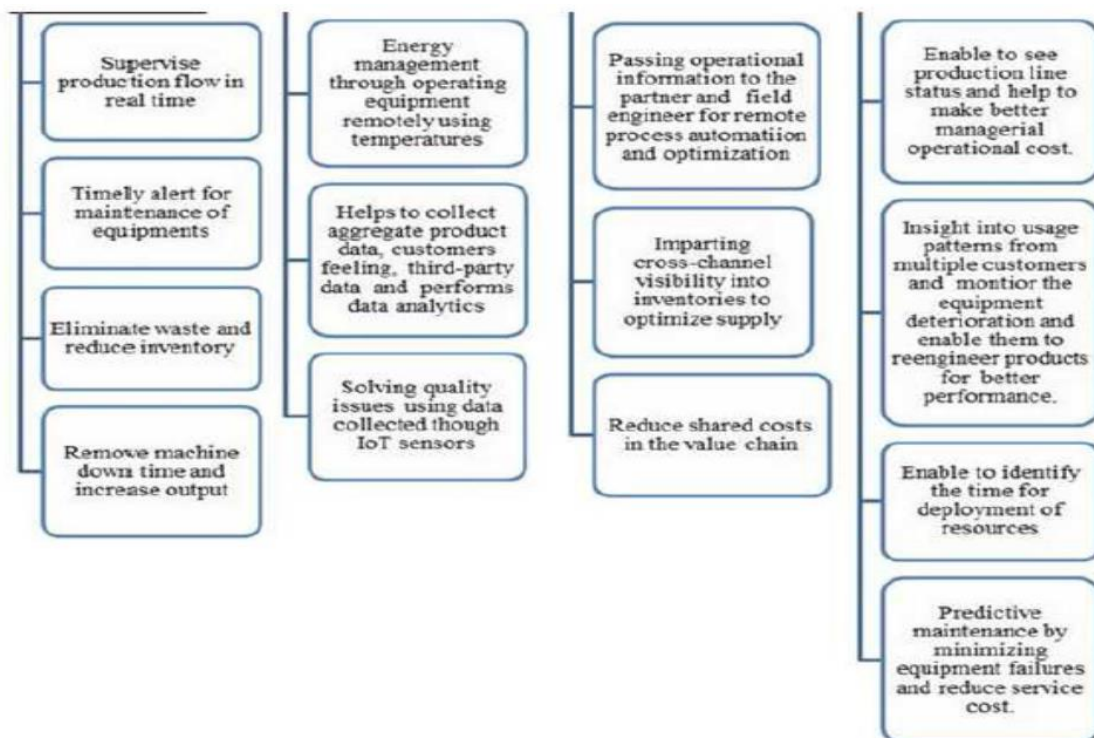
6.0 IIoT Challenges:

Security Issues: Security issue is that the primary challenge on IIoT technologies. As engineering and manufacturing sectors employing a sort of IIoT solutions, they're hospitable security concerns, cyber risks related to information technology and operational technology convergence, and insider threats. Appling IIoT technology is going to be challenged until it's a concrete security feature.

6.1 IIoT Integration: Integrating information technology (IT) and operational technology (OT) is another critical challenge faced by the businesses during Industrial IoT implementation. At most care should be taken while integrating these technologies and make sure that the info are communicated with none loss and vulnerability.

6.2 Connectivity and Visibility: Another complicated challenge during implementation of IIoT is that the lack of connectivity between different components and machine management. Frequent troubles are incurred in synchronizing as a results of internet outages, power loss, manual and technical errors.

7.0 Conclusions:

Manufacturing across the world has evolved to be more intelligent and data driven. In the era of Industrial Internet of Things (IIoT), a smart manufacturing cell can be supposed to be a number of related engineering arrangements of resources, components, equipment and machinery, cutting tools, inventory management and logistics control can communicate data from one to the other.

This review provides a comparison study on IoT and IIoT. Though IIoT benefits through various ways, the manufacturers face many challenges while implementing it in their industries. This explorative study is going to be helpful to the manufacturers to know about the challenges of IIoT implementation and supply them solutions to beat it.

References:

1. Senthil Kumar, Easwaran Iyer, An Industrial IoT in Engineering and Manufacturing Industries – Benefits and Challenges, International Journal of Mechanical and Production Engineering Research and Development, Vol. 9, Issue 2, 2019, pp.151-160.

2. D. Mourtzis, E. Vlachou, N. Milas, Industrial Big Data as a result of IoT adoption in Manufacturing, Procedia CIRP, Vol. 55, 2016, pp.290 – 295.

3. Reddy Sreenivasulu, Srinivasa Rao Chalamalasetti, Applicability of Industrial Internet of Things in Lean Manufacturing: A Brief Study, AKGEC International Journal of Technology, Vol. 10, Issues 2, pp.22-26.

4. Joyce Jacob J, Thamba Meshach W, Industrial Internet of Things (IIoT) – An IoT Integrated Services for Industry 4.0: A Review, International Journal of Applied Science and Engineering, Vol.8, Issues 1,2020, pp.37-42.

5. Emiliano Sisinni, Abusayeed Saifullah, Song Han, Ulf Jennehag, Mikael Gidlund, Industrial Internet of Things: Challenges, Opportunities, and Directions, IEEE Transactions on Industrial Informatics, Vol. X, Issues X, 2018, pp.1-11.

6. Muhammad Hafidz Fazli Md Fauadi, Amir Abdullah Muhamad Damanhuri, Ruzy Haryati Hambali, Ahamad Zaki Mohamed Noor, Nurul Izah Anuar, Recent Applications of Internet of Things (IoT) in Manufacturing Sector–A Review, International Journal of Scientific & Technology Research, Vol. 9, Issue 09, 2020, pp.334-339.

7. D.Gowtham chitha, S.Hari Balaji, S.M.Kavinprabu, Dr.P.Karuppuswamy, Review on Smart Manufacturing Based on IoT: An Industrial Application, International Research Journal of Engineering and Technology, Vol. 04, Issue 11, 2017, pp.920-923.