IoT- The Smart Technology Behind the Industry 4.0 Movement & It's Benefits

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Abstract - *Before manufacturing industry is working with traditional technology. After a few years, in the 2nd revolution industry developed technology. Then in the 3rd revolution take growth & adopt the digital revolution. Nowadays industry growing towards whole digitalization 4.0 technology is called the 4th revolution. Now all industries are trying to integrate IoT technology by using machine learning, robotics, artificial intelligence, etc. This article presents the IoT technology used in the industry. The different protocols used in the 4.0 industry & manufacturing industry. Also shows how can be used components in the IoT in the industry. The internet-connected network of physical items with sensors, software, and other technologies with the goal of networking and sharing data with other devices and system. Higher efficiency, save energy & time, human safety & security, increase the quality of product & also gives the customer satisfaction are the benefits of IoT use in industry*

Key Words: IoT, Industry 4.0, Smart Industry, Industrial revaluation, Artificial intelligence, IoT Protocols

1. INTRODUCTION

The world moving towards the automation & smart technologies. This technology making things & work simple fast & error free. The manufacturing industries are transforming in to digital industry i.e., industry 4.0 by implementing the smart technologies such as robotics & automation, machine learning, IOT plays important role in digit transformation of industries because of industrial digitization down time is decrease.

Internet of things (IOT) is technology that connects physical (real) objects with sensors, unit s/w and other technologies and exchange and store the data or information with other devices with the help of internet networks.

Industry 4.0 or fourth industrial revolution is focusing on industrial automation & modern technologies rather than traditional manufacturing.

IoT has a lot of applications in production plants. It can facilitate the flow of production in the manufacturing industry, as IoT devices automatically monitor development cycles, and control storage facilities and equipment. It is one of the reasons why investments in IoT devices have increased over the past few decades.

1.1 Industrial Revolutions

The industrial revolution is the transition of traditional manufacturing industry into new smart manufacturing industry with the help of latest technology.
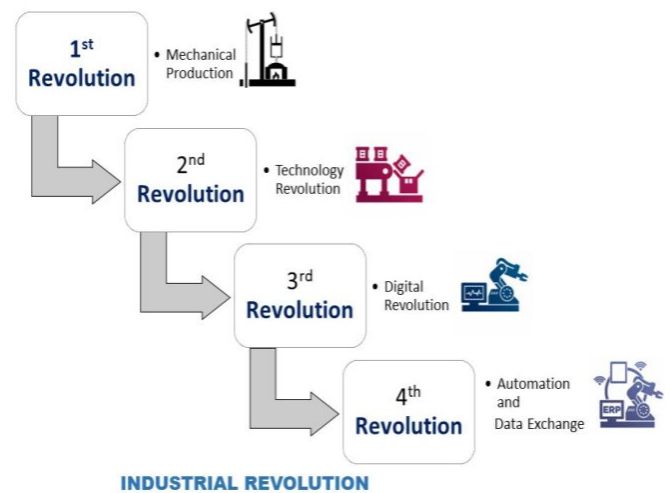

Fig -1: Industrial Revolution

2. INDUSTRY 4.0

The changes and transition of manufacturing industry with new technologies is known as industrial revolution. The main goal behind industry 4.0 is to increase productivity, empower business & innovation in an integrated, data driven manufacturing environment. The industry 4.0 it is a transition powered by data & automation technology that could transform every step of the manufacturing process, from the supply chain & enterprises to the shop floor & end users.

2.1 Key Technologies in Industry 4.0

1. Robotics or autonomous robot
2. Artificial intelligence (AI)
3. IOT
4. Additive manufacturing
5. Cloud computing

6. Cyber security

7. Augmented reality
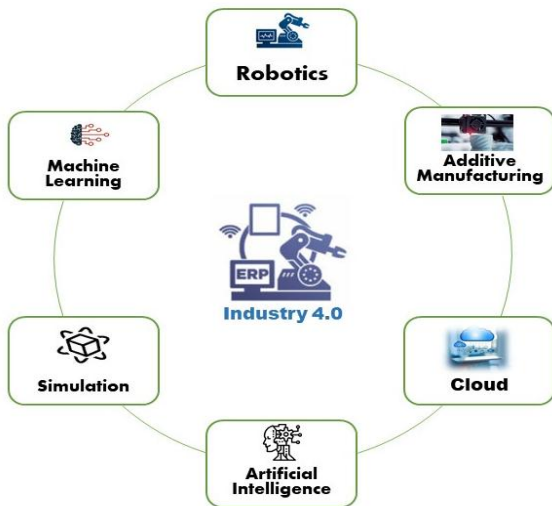
8. Simulation

9. Machine learning

Fig -2: Key technologies in industry 4.0

3. INTERNET OF THINGS (IoT)

IoT (Internet of Things) it is smart technology that connects real world or physical object with sensors, data processing unit, software and other devices to exchange and store the data using internet connectivity.

Important components of IoT:

1. Sensor or devices

2. Network and connectivity

3. Data processing unit
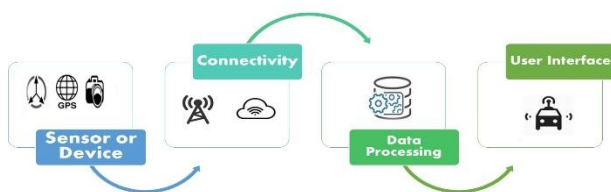
4. Application or user interface

Fig -2: Components of IoT

3.1 The Role of IoT Behind the Industry 4.0 Revaluation

Most of the manufacturing Industries started to use advanced technologies. In industry 4.0 collection and transformation of the data from machine to end user is one of the important tasks. Also monitoring of production line from remotely helps user to monitor production from anywhere. In Industry 4.0 the human interaction is mostly eliminated which gives more better result and efficiency, i.e., industry 4.0 focusing on automation, real-time data monitoring automatically.

IoT plays an important role to make everything Smart. IoT is one of the best technologies which gives valuable outcomes by combining internet and operational technology for processes. IoT provide more automated smart system than ever before, with machine that make decisions based on real-time data. Because of IoT, industry 4.0 not only provide you smart industry but also amazing data to help you make better decision in product management.

3.2 Why IoT Needed in Mechanical Engineering Industry

IOT is computing technology which connect Real world objects with internet & collect the data as well analyze that data. IOT is an important technology that make the devices or machine a "*smart*".

We Need IoT Because:

1. IoT has ability to monitor & track the machine work.

2. Minimize the work load with automation.

3. Minimize to gather data, for better decisions & management

4. Machine down time reduced inspection, repair, maintains & replacement of machine part.

5. Customer also able to track real time production status.

6. Better inventory management.

7. Errors during manufacturing reduces & overall quality of product increased.

4. PROTOCOLS USED IN IO.

1. IoT Data Protocols.

2. Network Protocols.

4.1 IoT Data Protocols

It is used to transfer the data from hardware to user without any internet connectivity. It is wired network.

4.1.1 Some of IoT Data Protocols are as follows:

1. COAP (Constrained application Protocol)
2. AMQP (Advanced Message Queuing protocol)
3. MQTT (Message Queuing Telemetry Protocol)
4. HTTP (Hyper Text Transfer Protocol)
5. DDS (Data Distribution Services)

4.2 Network Protocols

It is used to transfer the data from hardware to user with the help of internet connectivity. It is wireless network.

4.2.1 Some of Network Protocols are as follows:

1. WiFi
2. Bluetooth
3. LaRaWan
4. Zig Bee
5. Z-Wave

5. BENEFITS OF IOT IN MECHANICAL ENGINEERING INDUSTRY

Smart technology is about using data power and using statistics to make better decision. Internet of things technology can talk about what needs to be done in a timely manner. Manufacturing machine can be equipped with sensors to collect data and better understand how machine works.

Some of Important benefits of IoT are as follows:

1. The operating efficiency of machine increases.
2. IoT allow to automate and collect the data, because this data maintains is predictive, since the down time reduced.
3. The use of safety sensor increases the human safety and security.
4. Better customer satisfaction.

5. It allows production flow monitoring for quality control, the cost of rework and repair reduced because of good quality products.
6. Control of machine or device remotely save energy & time.
7. Proper use of rescores: the system generated scheduling & monitoring allow to use rescores at higher efficiency.
8. IoT make the system intelligent which take the appropriate decision according to data & conditions.
9. IoT allow to connect and control the more than one device at a time.
10. Better inventory management and supply chain management.

6. CONCLUSIONS

In fourth industrial revaluation the manufacturing industries are transforming to digital & smart industries, by implanting the latest technologies. This Industry 4.0 revolution aim toward make the industry smart using technologies such as Robotics, IoT, Artificial Intelligence, Machine Leaning, and Simulation. Etc.

Internet of Things (IoT) is one of the latest smart technologies used in industry. IoT has important role for transforming the manufacturing industries into digital industries. i.e., Industry 4.0. The IoT Devices collect the real time data from machine and share or store this data for better decision and management. The IoT helps industry to increases the efficiency of rescores, to increase the quality of products. The unwanted efforts, time and money was reduced because of IoT. The IoT is Backbone of industry 4.0 revolution.

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