

Wireless Sensor Node for Industry 4.0

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Abstract-Internet of thing (IOT) is new trend in the manufacturing Industries. By making use of IOT it is possible to connect all parts of the production process like machines, products and the systems. Industry 4.0 relies heavily on the Internet of Things - objects embedded with technology that can communicate with IT systems and be detected by sensors. The main intension of “Industry 4.0” approach is to achieving intelligent planning, production, manufacturing, maintenance, and servicing in the industry. This paper presents the method to improve the production and maintenance in the manufacturing industries by using wireless sensor node.

Keywords-IOT, BLE, Gateway, Sensors

I. INTRODUCTION

Industry 4.0 or the fourth revolution is the current trend of automation and data exchange in manufacturing technologies. It includes the Internet of things and cloud computing. Industry 4.0 offers, behalf an increase of productivity and quantity, also a promising potential for the domain of quality management by increasing the quality of products, processes and services.

Due to today's manufacturing industries must operate in an intense competitive and highly sophisticated global environment, the pressure on them to offer higher product quality at lowest costs and within the shortest possible time to satisfy customers and retain their position in the market, continuously increases. As a result of the Industry 4.0 driven shift of responsibility and awareness from the manufacturing process to the product itself, the product becomes a smart and interacting key element in the information infrastructure of manufacturing companies.

Production as well as quality management could use these new gathered information and data for better decision-making and evaluation of the organization's processes. Especially, since modern quality management not only means to avoid the delivery of defect products but rather seeks to ensure high performance with maximum efficiency of all processes of an organization, Industry 4.0 and its concepts provide promising opportunities and chances for the domain of quality management.

The use of the term in current context typically involves the creation of a series of supposed "revolutions". Such an account will typically claim the first industrial revolution mobilized the mechanization of production using water and steam power; the second industrial revolution then introduced mass production with the help of electric power,

followed by the digital revolution and the use of electronics and IT to further automate production. However, the term "fourth industrial revolution" has been applied to significant technological developments several times over the last 75 years. Industry 4.0 is making manufacturing increasingly smarter, more flexible, and more transparent.

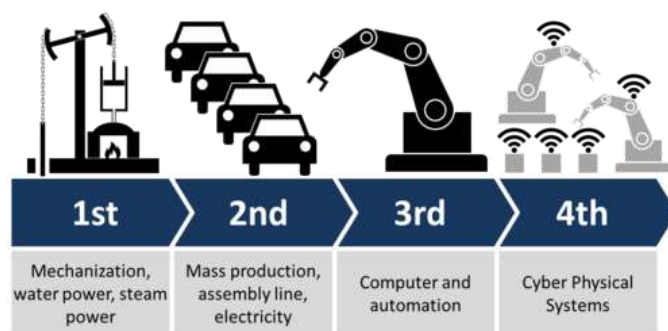


Fig 1. Revolutions in Industry.

II. LITERATURE SURVEY

[1] This paper explains about the Internet of Things, which will transform the real world objects into intelligent virtual objects. The IOT aims to unify everything in our world under a common infrastructure, giving us not only control of things around us, but also keeping us informed of the state of the things. In Light of this, present study addresses IOT concepts through systematic review of scholarly research papers, corporate white papers, professional discussions with experts and online databases. Moreover this research article focuses on definitions, geneses, basic requirements, characteristics and aliases of Internet of Things. The main objective of this paper is to provide an overview of Internet of Things, architectures, and vital technologies and their

usages in our daily life. However, this manuscript will give good comprehension for the new researchers, who want to do research in this field of Internet of Things (Technological GOD) and facilitate knowledge accumulation in efficiently.

[2] In this paper, explains about current trend in manufacturing industry. Today's manufacturing companies have to produce products of highest quality in order to retain competitive and satisfy the steadily increasing customer requirements. Thus, an essential prerequisite and key to sustainable economic success for any company is to focus on quality management. Through its concepts (Smart Factory, Cyber-Physical System, Internet of Things and Services), Industry 4.0 provides promising opportunities for quality management. Therefore, this paper presents research challenges of Industry 4.0 for quality management motivated by a practical insight of an Austrian electronic manufacturing services company.

III. METHADODOLOGY

A. Problem Statement

In the current industry environment, providing high-end quality service or product with the least cost is the key to success and industrial factories are trying to achieve as much performance as possible to increase their profit as well as their reputation. In this way, various data sources are available to provide worthwhile information about different aspects of the factory. In this stage, the utilization of data for understanding current operating conditions and detecting faults and failures is an important criteria to be taken care.

B. Problem Formulation

The wireless sensor node consist set of sensors, Bluetooth Low Energy (BLE) chip, external memory and a battery. Configuring the sensor node can be done by using Android application through Bluetooth.

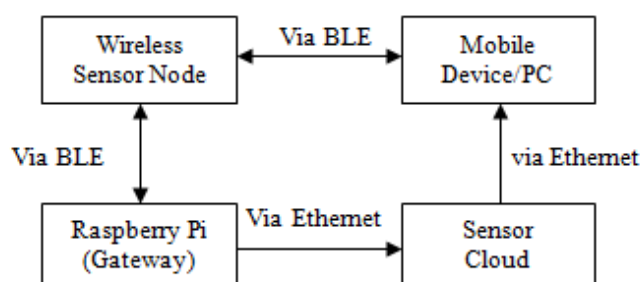


Figure 2.Sensor Node Communication Environment.

A set of sensors called sensor node captures the data on the plant like temperature, pressure, humidity, light intensity and the magnetic fields inside the plants in a production system.

The sensor node will take these data and stores it into memory, later this data can be transmitted to gateway

(Raspberry Pi) and it can transmit that data to sensor cloud. So that anyone can access that data for the analysis. By using these data, analysis can be made for increasing productivity.

Tools Required:

- Sensor Node.
- Bluetooth Chip
- Raspberry Pi(Gateway)
- Mobile Device/PC and Sensor Cloud

By creating different services and characteristics it is possible to configure the different sensors, like which sensor needs to be activated, sampling period of the sensors. Transmission of live data can also be done by using Bluetooth. Throughgateway these data can be transmitted to cloud. So authorized person can analyze these data.

For example, consider a molding machine in a factory and Maintenance should be done for every N number of product produced from the machine. For this we can configure only acceleration sensor. By placing sensor node to the one end of the machine, it is easy to track the number of product produced by molding machine. This information can be stored in the memory and streamed to the cloud and as well as to the mobile devices through gateway and Bluetooth. So by using wireless sensor node we can transmit any type of information to the distant location.

Wireless Sensor node for Industrial 4.0 provides a provision of data monitoring by placing sensors near the machine and monitor from distant location. The main aim is to detect early the inefficiency in the machining process and wear of machine tool components. It is very important for on-line identification of tool condition in machining process for enhanced productivity, better quality of parts and lower costs for unmanned, automated manufacturing systems.

IV. CONCLUSION

By implementing concepts of Industry 4.0, addresses the growing demand of digital production, with greater flexibility, transparency, knowledge and the pervasive use of smart production facilities, strengthen the customer and supplier relationships as well as the potential of offering new business models. Moreover, a further automation of its processes and a high level of digitalization which should make the lives of people easier and reduce their workload.

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