Applications of Internet of Things in Manufacturing

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ABSTRACT- Paper presents the literature study on Internet of thing-based manufacturing. In today competitive markets, Industry not only used Automatic machine but also make co-ordination between them. Nowadays there is need to maintain balance between Man and machine. Used available resources effectively in order to achieve optimal performance and improve efficiency. Data is a source of information and Industry has been handled huge amount of data. There is need of tool to process, operate and remotely access this huge amount of data, here IoT makes its possible. Through IoT we can change whole scenario of Industrial working environment. It's increased the production rate as well as improve the efficiency of Industry. This provides a promising opportunity to build powerful services and applications for manufacturing.

INTRODUCTION

With the globalization of the world's economy, manufacturing enterprises are facing severe competition from their worldwide counterparts in terms of product price, function, quality, cost, lead-time, etc. and growing pressure to meet higher environmental standards due to the "enhanced producer responsibility". Meanwhile, consumers have more diversified and demanding needs, e.g., customized products.

These challenges push the manufacturing industry to embrace new technologies to keep competitive and meet user demands. The Internet of Things (IoT), which has great potential in transforming the manufacturing sector, attracts tremendous attention from both academia and industry. IoT envisions the seamless interconnection of the physical world and the cyber space, and the pervasive presence of them around us. The embedding of tiny electronics into physical objects and the networking of them, make them "intelligent" and seamlessly integrated within the resulting cyber-physical infrastructure. Thus, IoT can bring the greatly enhanced horizontal integration of various manufacturing resources used in different stages of manufacturing processes, and vertical integration of them at different hierarchical system levels. This provides unprecedented opportunities for existing or whole new manufacturing services and applications to leverage such advanced interconnection. For example, the connectivity between smart machines, production facilities, etc. will enable them to autonomously exchange information, trigger actions and control each other independently.

REVIEW OF LITERATURE

A recent executive survey conducted by Forbes Insights found that the biggest challenge in building out IoT capabilities is the quality of IoT technology. Many companies are facing problems with the adoption of industrial IoT during identification of automated process for achieving highest effectiveness (Raj Ven, 2018). Adopting IoT technology in the manufacturing industry is one of the shot ways for getting competitive advantages and it helps to create enterprise value in the process (Toya Peterson, 2016). Press release of IoT Analytics (2018) said that the 4th industrial revolution (I4.0) employs a combination of multiple technologies that manufacturers are implementing to realize key use cases for improving efficiencies, generating revenues and reducing risks. The product and service market of I4.0
is predicted to grow to $310 billion by 2023. As per the survey conducted by the Accenture, Business insider & SAP (2015) of 1400 owners of business, 60 percent of the global manufacturers will use connected devices to analyse and optimize processes, 36 per cent of the business leaders understand IoT, out of this, only seven per cent are able to implement it. Also, it is found that $70 billion would be capitalised by manufacturers in IoT by 2020 and product development and assembly costs can be reduced to 50 per cent.

KEYWORDS-

Internet of Things, Manufacturing, Remote Accessing process and control

METHODOLOGY- During manufacturing, IoT gives alert and reminder about various operation carried out in operation floor. It's always Indicates us about sequence of operations and SOP at successive stages of the production. IoT enabled manufacturing in term of architecture, deployment and business model, data acquisition and processing, model-based decision-making. It greatly reduces the manufacturing errors/ defects which increase production rate and quality of the product. This paper analyses how IoT strategy facilitates to increase customer value, creates different opportunities for competitive advantage, and transform the business process to increase profit in industries. In order to achieve the objectives of the study, secondary data were collected from web sources and journals to identify the benefits and challenges on implementation of IoT in the engineering and manufacturing sectors.

OBJECTIVES

1. To understand the concept of Internet of things and smart manufacturing.
2. To study the application of IoT in manufacturing process
3. To analyze the impact of IoT on manufacturing process.

APPLICATIONS OF IOT IN MANUFACTURING

Digitally Connected and Remote Management: IoT enabled tools and machines digitally connect the partners like user, equipment manufacturers and field engineers that can transmit operational information and commands. This will help the managers and process heads to identify the key result areas and remotely manage the factory units to take advantage of process automation and optimization.

· **Facility Management:** The application of IoT sensors in manufacturing equipment/machines enables condition-based repair and maintenance alerts. Many critical machine tools in a factory are designed to function within temperature constraint and vibration ranges. IoT sensors can monitor these machines and communicate the alert message when the machine/equipment deviates from its prescribed parameters. Using this alert data, manufacturers can preserve energy, reduce costs also increase operational efficiency.

· **Auto Supervision:** IoT helps to monitor the production flow activities starting from the refining process to the packaging of final products reaches to consumers. This real-time monitoring process provides better management of operational cost and thus eliminating wastes and unnecessary work in progress inventory. IoT supports 'auto supervise' the activities known as 'process2device'. Workers can transfer the workload to the machine devices which are embedded with sensors and actuators helps to auto-supervise internal and external processes.

Real-Time Asset and Inventory Management: IoT sensors help to locate and monitor key assets, track and trace the inventory, events across the supply chain and the clients are informed of any significant deviations from the plans. Digitization has opened up untapped areas to optimize production costs and agility by giving a complete view of logistics, inventory levels, market demand, etc. IoT applications provides cross channel visibility into inventories, so that the realistic estimates of the available material, arrival time of new material and work in progress can be performed by the managers. This process helps to optimizes supply and reduces shared costs in the value chain.

· **Plant Safety and Security:** IoT enables workers to communicate with machines and IoT device apps and monitors the Key Performance Indicators of health and safety, providing a real-time view of the on-going activities, property damage or loss during operation time, the number of injuries and illness rates, near-failures, absences in different terms, vehicle incidents etc. Such communication helps in predicting mishaps and responding to emergencies in time (Toya Peterson, 2016). IoT associated big data analysis helps to improve the overall personnel's safety, health, and security in the factory.

· **Quality Control**: IoT enables the manufacturers to collect aggregate product data relates to raw materials used and its composition, heat and temperature in the factory field, working environment, waste management, transmit of products and its impact, customer feeling on using the product etc. on the final products. These data can be utilized for solving various quality related issues and correct them.

· **Reduced Downtime:** IoT enables the operation managers to monitory entire real-time manufacturing process, allowing them to assess the quality and efficiency of each machine and equipment, ultimately reducing downtime.

· **Manufacturing Insight and Packaging Optimization:** IoT sensors in products/packaging help the manufacturers can gain insights into the usage patterns, product handling of multiple customers, trace product deterioration during transit, impact of weather, road and other environment variables on the product. The sensor data helps the manufacturer to improve their performance in packaging and customer experience. IoT assists manufacturers to connect machines and control systems together, allowing them to get deep insight into the manufacturing process.

CONCLUSION

IoT has been gradually bringing a sea of technological changes in our daily lives, which in turn helps to making our life simpler and more comfortable, though various technologies and applications. The Internet of Things has a catchy ring to it, but for many the possibilities are almost too far-reaching to imagine. For manufacturers the likely impact of IoT in smart manufacturing looks very big indeed. In future manufacturers will rely on connected products to provide product as a service. They will explore the viability of micro logistics networks to make better business decisions through investments in operational intelligence and enable the promise of accelerated delivery for select products and customers.

REFERENCES

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