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Internet of Things (IoT) and big data for industry 4.0

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Abstract

Big data for industry 4.0 and IoT are explained properly in this study. The concept of IOT and big data evaluate the concept of value chain in the revolution of industry 4.0.The processing of data can be done in an accurate manner in order to deliver the information. The strategies of big data integrate the function by depending on the production of the industry. Along with this, implementation of industry 4.0ismaintained properly with the help of proper Internet of Things. Implementation of IoT can play a crucial role in maintaining huge amount of data, which can play a crucial role in maintaining rapid growth of industry 4.0. In the function of the Internet of things, considerable gains in terms of higher uptime, expedited production, and fewer errors are evaluated. The analysis of big data is used to play a crucial role in the estimation of IOT and industry 4.0. The study describes the domain of internet of things which is a key factor in increasing the efficiency of the industry

Key Words: Internet of things, big data, industry 4.0, value chain, and technology

Introduction

The study is used to evaluate the functions of IOT for industry 4.0. IoT and big data can provide a strategy of solutions to industries, as well as a magnitude of modern and innovative applications and services. The appropriate and sufficient resources evaluate the context and the background of the study. Big data is described as the collection of massive volumes of data made achievable by sophisticated and analytical capabilities for monitoring and analysing various digital data streams. Big data and the Internet of Things are recognised as important components of Industry 4.0, which allow the new industrial revolution. Efficiency of big data is maintained properly for the estimation of industry 4.0. This study can provide all essential information about proper and effective function of Internet of things and big data. There is an overview of literature which is used to find the research gap in the study. Different research questions and objectives are also discussed in the study. Research methodology provides sufficient detail of methods which are also demonstrated in the study. Along with this, the sections of the result provide a finding which is used to highlight the relationship between different items of the data.

Overview of Literature (to find out researchgap)

Concept of IOT and big data

The process of internet of things is regarded as a quickly evolving revolutionary technology with numerous applications, functions, and services in a wide range of markets and industries. According to Manavalan and Jayakrishna (2019), the concept of big data refers to a vast collection of structured, unstructured, or semi-structured data that is utilized to assess process parameters. Big data and IOT is used to handle enormous amounts of data in real time and store it using various storage methods.In big data system big data file can massive massive amount of data properly, which directly has an impact on dist6ributed database properly.. The processing of IOT and big data consist of large amount of data which are used for the evaluation of the system. The concept of Internet of things helps in analyzing the functions that are used to define the functions of velocity, volume, and variety factors. The IOT helps in interacting with the principles to implement the functions of suitable applications.

The IOT is used to relate the functions on the basis of suitable factors of the development process. The different unstructured data are generated with the help of Internet of things required by the system of big data. The Internet of Things (IoT) has enabled this procedure to be performed at a low cost, with ease of access and flexibility of use. The strategy of IOT and big data are changing the evaluation of the process to generate value by extracting as much information as possible from data to gain better business insights. The given diagram shows the processing of IOT and big data (Flores et al. 2018).

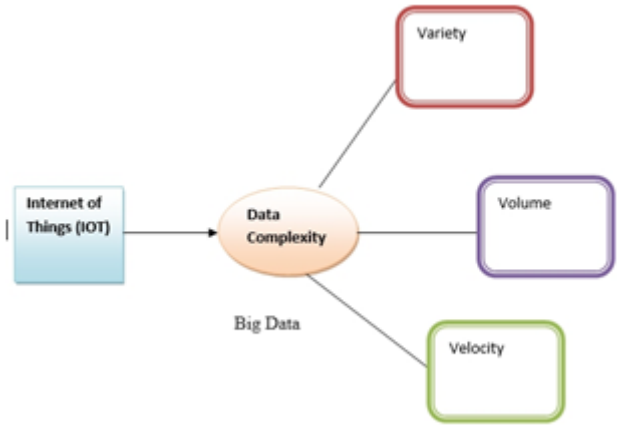

Figure 1. Concept of Internet of things (IOT) and big data

(Source: Suthjiatmo et al. 2019, p. 359)

Industry 4.0 and the different involved key technologies

The efficiency of industry 4.0 consists of different key technologies which are involved in the system. Because of consecutive technological improvements, changes, and inventions, the global industrial landscape has changed dramatically. As per Zawra et al. (2017), diversified creative applications and services can distinguish fourth industrial revolution properly, numerous interconnected gadgets, and revolutionary production operations. Industry 4.0 can be defined as a highly connected, digitally scanned, organized, and efficient production system that provide the use of various essential technologies. Industry 4.0 is an industry-specific component of the Internet of Things (IoT). The fundamental industrial 4.0 core includes IoT and big data analysis features (Puthal et al. 2017).

Industry 4.0 combines multiple unique essential technologies to create a system that performs better than the sum of its parts. There are four main key technologies are used to support the industry 4.0. Connectivity of data, Intelligence and analysis, Interaction between humans and machines, and conversion of digital to physical data. The different processes of digitization are used to integrate with the assets of the system. It has the capability to acquire, analyze, and communicate the data in real time. Industry 4.0 aspires to develop production facilities, by managing and maintaining the technologies to a more intelligent level by using key technologies such as IoT and big data. The given diagram shows the involvements of key technology in industry 4.0 (Liao et al. 2020).

Figure 2. Key technologies involved in industry 4.0

(Source: Mendes et al. 2018, p. 983)

Role of Big data analytics in industry 4.0

The use of sophisticated computing techniques to enormous data sets in order to find important correlations, patterns, trends, and preferences that may help organizations make better decisions is the notion of big data analytics. Big data analytics is utilized to play a key part in Industry 4.0. The efficiency of production is used to improve the systems that are optimized with the help of big data analytics. Industry uses big data analytics to

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improve decisions by recognizing patterns and trends in massive amounts of data from the system.Combining and analyzing industry data are developed properly with the involvement of big data enables corporations. (Jeyanthi 2018).

Available information of a certain business is not determined properly by efficiency of Big data. Every industry makes use of data in its own unique way by accelerating the system's growth. The efficiency of cost, reduction of time is the different sources which are required for the analysis of big data in industry 4.0.Keivanpour and Kadi (2018) stated that, the characteristic of the process helps in determining the growth of the industry. The influence of the industry provides a relation to the global strategy of the process.Different interpretations of data, data storage, and data collecting are all elements of big data. In industry 4.0, all of the parameters of big data play a critical role. Big data analysis in Industry 4.0 is depicted in the figure below.

Figure 3. Role of Big data analytics in industry 4.0

(Source: Kanagachidambaresan et al. 2020, p. 576)

Research questions and Research objectives

Research questions

- What is the role of Internet of Things and Big Data is maintenance of Industry 4.0?
- What is the role of context of data in achieving the objectives of the study?
- What are the effective an essential factors of Big data and IoT?
- What are the factors used to analyze the functions of IOT and big data for industry4.0?
- What are the criteria should be used to generate the efficiency of data?

Research Objectives

- To evaluate the information of IOT which is appropriate for the enhancement of the industry 4.0
- To manage the functions of big data which are relevant to enable the parameters required for the industry.
- To create new growth prospects and altogether new types of things that are capable of combining and analyzing industry data.
- To identify the functionality across a suitable range in order to enhance the big data for industry 4.0.

Research methodology

The concepts of research methodology provide a detail of materials and methods that are used in the study. According to Ivkovic (2017), the innovations in the 4.0 industry comprise of materials that have become crucial for the various uses of systems such as the IoT and big data. The research methodology includes coverage, data collection technique, data analysis, and the interpretation. In the research, the term coverage is used to indicate the functions of IOT and big data based on a survey of the techniques. Research methodology is used for completing the study. The researchers used methodology to complete their objectives of conducting research and they show the result by analyzing the data. In this study the researchers have used both qualitative and quantitative methods by combining the both primary and secondary data analysis (Chen et al. 2017).

In this study quantitative data analysis is used for the context of IOT and big data for industry 4.0. By using the quantitative data analysis, the general facts about the IOT and big data can be collected. Qualitative data has been used in the research to under the experience and detailed concepts regarding the study. According to Lampropoulos et al. (2019), the researchers have used both primary and secondary data to complete the study. Primary data is collected through the survey and the interviews. After gathering the primary data, secondary data is collected to find the findings. The sources for the primary data involve experiments, interviews and observations where the sources for the secondary data include journals, books and blogs. The method of data

collection techniques are based on the source of primary collection. It addresses the particular aspects which are commonly used in the process of implementation. The attributes of the study helps in determining the effect on the aspects of different tools (Sahal et al. 2020).

The data which has been collected from the given source analyze the functions of IOT and big data for industry 4.0. The different information is analyzed on the strategy of the study. Both the primary and secondary source of information is relevant for the study. The research data interpretation refers to the task of making conclusions from the facts gathered following an analytical and experimental research. In reality, it is a search for a broader interpretation of research findings. As per Bartodziej (2017), the interpretation of data is concerned with the relationships that exist within the collected data, which is a somewhat overlapping analysis. Interpretation also extends beyond the study's data to include the findings of the big data analytics. Survey with closed-ended questions, experiments recorded as numbers are the qualitative way through the data has been gathered (Marjani et al. 2017). The smart city is a developing market that will play an essential role in future infrastructure [21]

Results

This section provides the implications which are used to highlight the findings of the study. There are different trends are used to extract the relationship among different data items. The given table demonstrates the function of IOT and big data for industry 4.0.

SI NO.	Attributes of Internet of things (IOT)	Attributes of Big Data	Industry 4.0
1	Provides dynamic change of technology	Provides the amount of data	Factors of integration
2	Evaluation of the data	Provides the type of data that are collected	Value creation network
3	Increase in the factor of production	Evaluate the data which are analyzed	Exponential technology

4	Associated	Structured	Value chain
5	Enormous rate of changes	Enhance the form of data	Interaction of the process

The table describes the result of big data and IOT by analyzing the attributes of the industry 4.0. The result of the study says that dynamic change of technology illustrates the phenomenon of IOT for industry 4.0. The different variation shows the overall effectiveness of software to regulate the functions of the process. According to Lu (2017), the study depicts different factors which consist of both positive and negative aspects of the prediction. The high level opportunities are used to reduce the description based on the approach of certain aspects. It helps to manage the functions which are relevant to enable the parameters required for the industry.

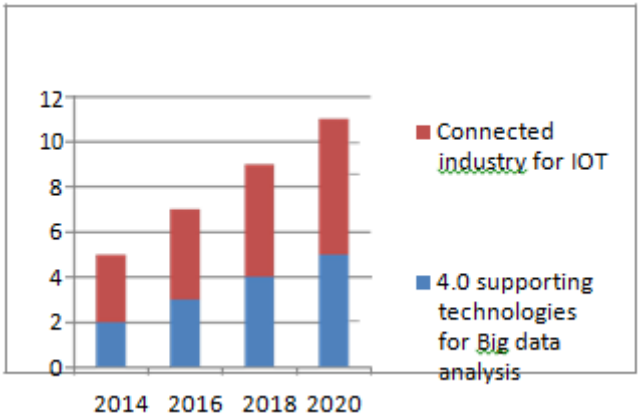

Figure 4. Analysis of global industry 4.0 for the evaluation of IOT and big data

(Source: Santos et al. 2017, p. 768)

The trend of global industry 4.0 for the evaluation of IOT and big data are shown in the graph. From the year 2016 to 2020, the connected industry of IOT and 4.0 supporting technologies of big data are estimated. In the year 2014, the ranges of IOT are less as compared to that in the year 2020. In the year 2020, the technology of big data analysis shows higher rate than that in the year 2016 (Xu et al. 2019).

Discussion

The study provides an interpretation by analyzing the findings of the system. The different observations are used to describe the characteristics of the technology for industry. Application of big data and Internet of Technology is implemented successfully to maintain industry 4.0, which is evaluated properly in this study. According to Rehman et al. (2019), the findings of the study are enhanced by providing the effectiveness of technology. In general, the findings of the studies included in our systematic review were in conclusive. The studies are used to discuss a different factor which helps in determining the functions of technology in industry 4.0. Production of the industry is maintained properly by effective technologies, different variation of industry is maintained by this aspect. IoT and big data are two of the most important sources of data required for efficiency. Interaction between IoT and big data is required to maintain processing, transformation and evaluation of large amount of data.

Conclusions and Implications

From the above study, it can be concluded that the internet of things (IOT) and big data opens up a new possibilities in terms of performance. First, we look into a review of IOT big data processing and analytics

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solutions for industrial 4.0. Secondly, there is a representation of different functions of IOT which must be addressed in the future. The integration of internet of things requires different processing of data in terms of big data analytics. Change of industrial production is contributed properly by intimately connected big data and Internet of Things. The Internet of Things, on the other hand, is made up of a network of interconnected data sources that create data and interact efficiently with one another. The study's conclusion is that the efficacy of big data and the Internet of Things paradigms are linked in order to establish a data processing framework for Industry 4.0 that must be reviewed in the future.

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