

A Practical Application using Big Data and IoT

Hwa-Young Jeong¹[0000-0002-5017-934X], Jinho Ahn and Hackyoon Kim²

¹ Kyung Hee University, 26, Kyunghedae-ro, Dongdaemun-gu, Seoul, Korea

² School of AI Computer Science and Engineering, Kyonggi University, Gwanggyosan-ro 154-42, Yeongtong-gu Suwon, Gyeonggi, Korea

³ Cheongju University, Daedung-ro 298, Cheongwon-gu, Cheongju, Chungbuk 28503, Korea

¹hyjeong@khu.ac.kr, ²jhahn@kgu.ac.kr, ³hykim@cju.ac.kr

Abstract. In this paper, we would like to examine the application technologies for IoT and big data. Among the technologies of the 4th industrial revolution, big data and IoT are approaching human life most closely and are leading change, so this paper will look at what these applied technologies are.

Keywords: Big Data, IoT, The 4th industrial revolution

1 Introduction

Recently, big data is the growing emphasis on real-time data processing and analysis. Traditionally, big data analysis involved storing and processing vast amounts of data in batch mode, where data was collected over a period of time and analyzed in batches at a later stage. However, with the increasing demand for real-time insights, organizations are now focusing on analyzing data as it is generated or collected. Real-time big data processing enables businesses to make faster, data-driven decisions, respond promptly to changing market conditions, and gain a competitive edge. It involves capturing data in real time, often from various sources such as sensors, social media feeds, web logs, or customer interactions, and processing and analyzing it in near real-time or with minimal latency [1, 2, 3].

Additionally The Internet of Things (IoT) refers to a network of interconnected physical devices, vehicles, appliances, and other objects embedded with sensors, software, and network connectivity. These devices collect and exchange data with each other and with central systems, enabling them to perform various tasks, communicate, and make intelligent decisions.

The integration of big data and IoT (Internet of Things) technologies is a powerful combination that enables organizations to collect, analyze, and derive insights from vast amounts of data generated by interconnected devices. Several technologies play a key role in harnessing the potential of big data and IoT [4, 5].

In this paper, we show a review for up-to-date technology using big data and IoT. The purpose for this paper shows to introduce various type of application using IoT, and it can be use an analysis by big data for high performance.

2 Related Works

2.1 Big Data

Big data is a term that describes large, complex data sets that are difficult to process using traditional data processing software. Big data is characterized by the three Vs: volume, velocity, and variety. It is a collection of data that is huge in volume, yet growing exponentially with time. Big data sets are so voluminous that traditional data processing software just can't manage them. Big data can come from many sources such as social media, sensors, devices, and more. It can be used to improve business operations and decision-making processes. It is used in many industries such as healthcare, finance, and retail. It can be used to improve business operations and decision-making processes. For example, big data can be used to analyze customer behavior and preferences to improve marketing strategies. It can also be used to detect fraud and improve security [1].

There are many tools used for big data such as Hadoop, Spark, and NoSQL databases. These tools are designed to handle large volumes of data and provide fast processing times [2].

Some challenges of big data include data quality, privacy concerns, and security risks. Data quality is important because inaccurate or incomplete data can lead to incorrect conclusions. Privacy concerns arise when personal information is collected and stored without consent. Security risks arise when sensitive information is stored on servers that are vulnerable to cyber-attacks.

2.2 IoT

IoT stands for the Internet of Things. It refers to the interconnectedness of physical devices, such as appliances and vehicles that are embedded with software, sensors, and connectivity which enables these objects to connect and exchange data. The IoT is a giant network of connected things and people – all of which collect and share data about the way they are used and about the environment around them. The IoT describes the network of physical objects—“things”—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

The IoT uses a variety of technologies to connect the digital and physical worlds. Physical objects are embedded with sensors—which can monitor things like temperature or motion, or really any change in environment—and actuators—which receive signals from sensors and then do something in response to those changes. AWS IoT includes services like security, data encryption, and access control to device data. It is built on secure and proven cloud infrastructure and IoT networks and scales to billions of devices and trillions of messages. AWS IoT also integrates with other AWS services so you can create complete solutions [4, 5].

3 A practical application for Big data and IoT

Big data and IoT are used in many industries such as healthcare, finance, and retail. They can be used to improve business operations and decision-making processes. For example, big data can be used to analyze customer behavior and preferences to improve marketing strategies. It can also be used to detect fraud and improve security¹. A very applicable use of big data in IoT is in predictive analytics. This type of analytics utilizes machine learning by analyzing past data and producing probabilities for how the device will function in the future. This is especially beneficial when it comes to the servicing of IoT devices. Big data analytics help to make sense of the data and information that is gathered by IoT devices. These solutions take the vast, unstructured data that's been collected, and identify ways to organize it into smaller data sets that can give companies insights into how their processes are working, as well as improve decision-making. The Internet of Things is generating an enormous amount of data. Analyzing and managing that data requires programming and statistical approaches. Big Data technology operates on this massive data and pushes new products, applications, future research and developments to improve decision making.

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In the healthcare industry, IoT devices can be used to monitor patients remotely and collect data on their health status. This data can then be analyzed using big data analytics to identify patterns and trends that can help doctors make more informed decisions about patient care. In the finance industry, big data analytics can be used to detect fraudulent activities and make more accurate decisions when trading at a rapid pace. In logistics, IoT devices can be used to track shipments and monitor inventory levels in real-time

An example of big data and IoT, it is used for Energy Power Management field. The economy of energy consumption requires sensors gathering data on their use and sending for analysis of Big Data. Individual devices can collect data in real time from buildings and machines to which they are connected. Other example is Logistics field. IoT devices can be used to track shipments and monitor inventory levels in real-time. And it can be used for Healthcare. IoT devices can be used to monitor patients remotely and collect data on their health status. This data can then be analyzed using big data analytics to identify patterns and trends that can help doctors make more informed decisions about patient care.

4 Conclusion

In this paper, we investigated the latest application technologies for IoT and big data. Technologies using IoT and big data have changed and developed in various ways day by day, making our real lives change from the basics, and providing convenience completely different from the previous one. Therefore, we should know that various technologies as well as the actual applied technologies examined in this paper are continuously being developed and applied.

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