Chapter 5
Critical Approaches to Data Engineering Systems Innovation and Industry Application Using IoT

Naren Kathirvel
Anand Institute of Higher Technology, India

Kathirvel Ayyaswamy
https://orcid.org/0000-0002-5347-9110
Department of Computer Science and Engineering, Panimalar Engineering College, India

B. Santhoshi
St. Anne's Arts and Science College, India

ABSTRACT

The IoT influence presents new design and implementation challenges in a variety of fields, including seamless platform integration, context-based cognitive network integration, new mobile sensor/actuator network paradigms, architectural domains for smart farming, infrastructure, healthcare, agriculture, business, and commerce. Applications for automation in the internet of robotic things (IoRT) are numerous and are developing quickly. IoRT blends the strength of robots and the internet of things (IoT), resulting in creative solutions for a range of sectors. While ensuring the authenticity of the content in this introduction, the authors shall investigate the wide range of IoRT automation applications. IoRT automation refers to a broad range of endeavors that use connected gadgets, sensors, and autonomous machinery to improve production, efficiency, and safety across a variety of industries. These regions are general categories into which these programs can be placed: Industry 4.0 and manufacturing

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1 INTERNET OF ROBOTIC THINGS AUTOMATION

1.1 Artificial Intelligence

The realm of IoT and autonomous operations has shown great potential with the emergence of IoRT technology. Communication-centered robots that connect to wireless sensors and other network resources are becoming increasingly popular in the world of robotics. These robots can easily integrate with wired or IoT networks, allowing for the seamless utilization of IoRT's autonomous functions in this field. The IoRT technology has shown promising results in the domains of IoT and autonomous operations. The latest trend in robotics is centered around communication-oriented robots that can connect with sensors and other network resources wirelessly. These robots can integrate with either wired or IoT networks, and the self-sufficient operations of the IoRT technology can be seamlessly leveraged in this industry. The incorporation of cutting-edge sensing, actuating, communication, and computing technologies elevates the original concept of IoT to new heights. This results in enhanced operational efficiency, enables businesses to uncover fresh prospects, and empowers them to predict potential hazards. These advancements present unprecedented opportunities for both consumers and providers of IoT and robotics solutions.

The Technical Committee on Networked Robots of the IEEE Robotics and Automation Society defines two types of networked robots:

- **Remote -operated robots**,

Networked systems make it simple for human managers to issue directives and get feedback, boosting the availability of crucial resources for study, instruction, and public awareness.This connectivity between robots and humans has a significant impact on shared responsibilities, including teleoperation and human-robot interaction. Additionally, the ability to reprogram and adapt robots on the network is affected. These technologies are now widely available for remote meeting assistance and telepresence medical equipment. Cloud robotic systems allow robots to exchange knowledge and learn from each other, while cloud infrastructure provides elastic resources to help robots overcome limitations in networked robotics.

- **Automated robots**

In highly advanced systems, robots and sensors are able to communicate with one another with minimal human intervention. This network of sensors expands the robots' sensing abilities, enabling them to interact over long distances and plan their actions