


# Chapter 19

## Integration of Data Science and Cloud-Based IoT Networks: Techniques and Applications

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### ABSTRACT

*In contemporary times, data science has made significant strides across various commercial domains, spanning business, finance, space science, healthcare, telecommunications, and the Internet of Things (IoT). The IoT emerges as a pivotal platform, orchestrating the convergence of people, processes, data, and physical objects to enhance our daily lives.. In light of these considerations, this chapter explores diverse frameworks for synchronized data processing, leveraging the strengths of various platforms. Numerous challenges impede the seamless integration of cloud computing, IoT, and data science collaboration. The integration of cloud and IoT offers a promising avenue to surmount these challenges, harnessing the wealth of data resources available in the cloud. This chapter presents a comprehensive overview of the technologies involved in merging data science with cloud-based IoT; this would expand the cloud capabilities and scope to scale for higher data storage and accessibility along with examining their advantages and confronting the associated challenges.*

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## INTRODUCTION

The term “Internet of Things” (IoT) is a popular one in information technology. Thanks to the Internet of Things, intelligent virtual things can be made from actual objects in the future. The Internet of Things (IoT) attempts to bring everything in our surroundings under one unified infrastructure so that we may have control over them and be informed of their status(Evans, 2011).

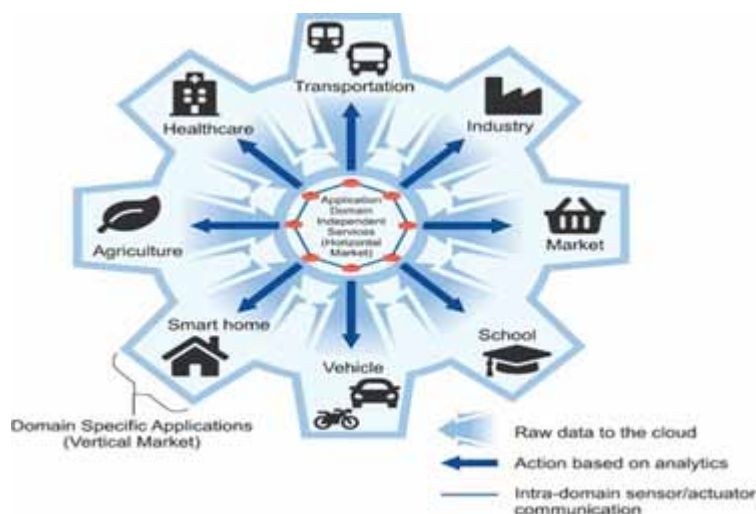
The potential for intelligent connectivity and applications across a variety of human undertakings has significantly grown as a result of the advent of the Internet of Things (IoT). Smarter technology can give people a smart and active existence by enabling contextual awareness, sensing, and actuation abilities.

Simple examples of these products include thermostats and HVAC (Heating, Ventilation, and Air Conditioning) monitoring and control systems, which enable smart homes. But it won't be easy because there are still a lot of issues that need to be resolved and looked at from different perspectives in order for them to realize their full potential. The main objective of this review article is to provide the reader with a comprehensive study from both a technological and sociological perspective. By allowing physical things to “talk” to one another, share information, and coordinate actions, the IoT makes it possible for them to see, hear, think, and carry out tasks(Khan et al., 2012). By utilizing its supporting technologies, such as embedded devices, communication technologies, sensor networks, and Internet protocols, the IoT converts these conventional things into intelligent ones as shown in figure 1.

Emerging technologies, innovations, and service applications must expand proportionately to keep up with market demands and consumer wants in order to fulfil this potential growth. Additionally, gadgets must be created to meet consumer requirements.

The IoT, however, has a sensing layer that reduces the needs on those devices' abilities and allows their inter-connection. Purchasers of sensor facts interact with sensors or sensor owners via the data integration layer, which manages all interactions and transactions. meanwhile, converting requirements, demanding situations with information sharing, records integration and filtering, advent of new consumer services, and complexity of network architecture the usage of cloud computing is likewise developing

Figure 1. IoT based market environment



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