Chapter 1
Emerging Technologies in a Modern Competitive Scenario:
Understanding the Panorama for Security and Privacy Requirements

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ABSTRACT

Users' personal, highly sensitive data such as photos and voice recordings are kept indefinitely by the companies that collect it. Users can neither delete nor restrict the purposes for which it is used. Learning how to machine learning that protects privacy, we can make a huge difference in solving many social issues like curing disease, etc. Deep neural networks are susceptible to various inference attacks as they remember information about their training data. In this chapter, the authors introduce differential privacy, which ensures that different kinds of statistical analysis don't compromise privacy and federated learning, training a machine learning model on a data to which we do not have access to.

INTRODUCTION

In this chapter, the authors will begin by discussing an applied view for theoretical concepts of emerging technologies like Big Data, Cloud Computing, Internet of Things, Blockchain and Cognitive Computing. In the realm of this book project, this chapter aims to present a leverage of comprehension of these technologies, allowing our reader to improve the overall perception of the problems addressing modern technologies, regarding security and privacy.

To approach in this view, relationships between these technologies are also offered, relating how Big Data and Cloud Computing, Big Data and Internet of Things and Big Data and Cognitive Computing

and Blockchain perspectives regarding all other technologies can be adopted and what are their perspectives and business capabilities.

At the end, authors will present examples and practical applications of each of the concepts presented previously, regarding emerging technologies, as well as examples of how the relationships between these tools and their associated usage methods, reaching a comprehension on how they can motivate and produce digital transformation journey for governments and corporations of all sizes and corporations.

After reading the chapter, the reader should:

- Understand, conceptually and in practice, the concepts of Cloud Computing, IoT, Cognitive Computing and Blockchain and how they relate to Big Data.
- Understand how these concepts and their relationships can foster innovation in areas of knowledge that interact with technology.
- Apply the concepts learned in practice, in the development of applications that implement these concepts and their relationships.

The chapter starts with individual conceptual definitions, advances towards an analysis on how these tools and resources can be understood when observed, planned and adopted together, and, finally, a comprehensive development on their perspectives – analyzed in a superficial, introductory way – about privacy and security, to be contemplated compared to its costs and maintenance.

BIG DATA

According to Davenport (2014):

Big Data refers to data that is too big to fit on a single server, too unstructured to fit into a row-and-column database, or too continuously flowing to fit into a static data warehouse. While the seize receives all attention, the most difficult aspect of big data really involves its lack of structure.

Data such as text, voice and video messages from chat applications, videos and images from social media, data from various types of sensors, read at every millisecond and from other sources, composing an enormous volume on size, are produced every day in all world. These data is also presented in different formats, sizes, and ways of storing and processing. This way, although an opportune context for analysis, data massively produced and collected, without any treatment or preparation, can be useless, as we cannot relate it for an objective interpretation, as to produce a problem solution or answer. This scenario illustrates this as the most difficult aspect of handling this flood of data, as production and collection are, nowadays, with technological support, widely available.

Big Data now plays such an important role in the Information Technology world that even the prestigious Oxford English Dictionary, in its latest editions, has come up with a definition for it as: "*Data of a very large size, typically to the extent that its manipulation and management present significant logistical challenges.*". Ohata and Kumar (2012) pointed out several perspectives and applications for Big Data tools, methods and strategies, relating it do decision-making processes and, moreover, to traditional techniques and IT-related environments like business intelligence.

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