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Effects of Data Overload on User Quality of Experience



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Preface

This book introduces a unique perspective on the use of data from popular emerging technologies and the consequent effect on user quality of experience. The term data is refined into specific flavours of data such as financial data, personal data, public data, context data, generated data, and the ever-so-popular big data. As different flavours of data have different uses, the book tries to focus on ways that data is responsibly used, and thus domains such as ethics and wellbeing are taken into consideration.

Moreover, the specific nuances of different technologies bring forth interesting case studies, which, in some cases, the book tries to break down into mathematical models so that they can be analysed using theoretical tools, e.g., game theory. At the same time a detailed state-of-the-art account is provided for each specific data perspective. Hence, the book offers a unique point of view on the use of data and the resulting quality of experience (QoE), through a set of chapters that can benefit researchers, educators and students in fields related to ICT studies especially where there is additional interest in emerging technologies, ethics and well-being, user experience, and the role of data management. Specifically, the book teaches the reader how to approach specific scenarios related to the above-mentioned aspects, oftentimes using game theoretic tools, while at the same time exploring current trends in state-of-the-art emerging technologies and consequent use of data. The analysis of specific scenarios aims at highlighting the responsible use of these technologies, especially as this relates to user QoE. The book may additionally benefit other stakeholders such as policymakers and system developers.

Overall, this book covers a variety of emerging technology examples and provides an updated technology review of a number of emerging technologies that share the characteristic that there is significant use of data (personal, financial, generated, etc.), which may impact the user QoE. Furthermore, it provides new mathematical example models of scenarios with the above-mentioned emerging technologies, in an attempt to further explore the technologies themselves and to resolve some of the data-related issues, while simultaneously elaborating on both a technical and a non-technical perspective to highlight the inter-disciplinary nature of these issues and the need to revisit them from different points of view.

Chapter 1 explores the links between quality of user experience and the impact of emerging technologies, reaching the conclusion that there are issues that must be dealt with, when it comes to the innovative ways in which data is used by technology and how users and service providers play a role in this new digital ecosystem with challenging dynamics. The concept of responsibility comes in as a necessary parameter to be able to manage the impact from the needs of these new emerging technologies in society, and particularly on individuals.

Chapter 2 focuses on financial data, specifically on blockchain, a technology that enables cryptocurrency. The chapter approaches the idea of cryptocurrency more generally as a digital payment system that does not rely on intermediary nodes to complete transactions. Recognizing the game theoretic aspects of the blockchain model, the chapter proposes a model of decision-making between miners, when they have to make the decision of acting honestly versus acting dishonestly, showing the need for the system to motivate honesty.

Chapter 3 investigates the capabilities of cloud technology, focusing on the idea of how data stored on the cloud can be viewed as a commodity, and as such motivates the interaction between the data owner and a malicious attacker who is after the data. The chapter focuses mainly on investigating the interactive model between the data owner and the attacker, using a stochastic approach in order to understand the motivations behind the two interacting entities.

Chapter 4 deals with the case of public data and media platforms and the experience of users of social media platforms when dealing with public information. The example of the infodemic, the highly impactful surge of information that is facilitated by social media platforms, was discussed in this chapter by approaching it from a perspective of interactions between social media users and social media platforms.

Chapter 5 introduces the idea of smart information systems, i.e., systems that employ AI and big data technologies. One of the challenges for smart information systems is training an AI model. Training an AI model requires a huge amount of data, which is not always available. A solution to using existing datasets is that they use generated or synthetic data, but more investigation is needed to determine the cases where this is a useful and accurate alternative.

Chapter 6 revisits big data analytics in tandem with the idea of transparency and how this affects the overall quality of experience of the users in smart information systems. Although the big data area has been visited in terms of use for AI, the synthetic data case study, Chap. 6, approaches the area of big data and big data analytics more holistically.

Chapter 7 explores IoT and context data. When “things” such as wearable devices, refrigerators, digital assistants, sensors and other equipment are connected to the Internet and can be recognized by other devices, and collected and process data, we can refer to this system as the Internet of Things (IoT). IoT can support data collection and data sharing processes for big data. Connected things can signal the environment, can be remotely monitored and are increasingly able to make decisions without human intervention. A number of ethical values often come across

when we discuss the potential and challenges of IoT, which are further explored in this chapter.

The book overall explores the links between quality of user experience and the impact of emerging technology, reaching the conclusion that there are issues that must be dealt with when it comes to the innovative ways in which data is used by technology and how users and service providers play a role in this new digital ecosystem with challenging dynamics. The concept of responsibility comes in as a necessary parameter, in order to be able to manage the impact arising from the needs of these new emerging technologies in society, and particularly on individuals. In essence, the idea of responsibility as a concept works as a template for ethical guidelines and societal and environmental considerations, for pushing these innovations into the future and achieving responsible innovation and responsible technology. The implementation of this concept, however, presents its own conceptual and practical difficulties. Taking responsibility means to exercise foresight, and to be able to do that, there is a need for a deeper understanding of the use of data within different contexts, and this is what the book aims to achieve through its different perspectives and scenarios.

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