

Preface

From being functionally monolithic and binary data based in the past, the real-life applications had been transferred to being quantum big data processing systems that adopt the traditional binary data processing approach. Openness, heterogeneity, adaptivity, and dynamism of work environments are becoming the main characteristics of modern real-life applications and it becomes obvious that they are becoming increasingly interconnected and more difficult to maintain. Due to the increase in these applications size, complexity, and the number of components, it is no longer practical to anticipate and model all possible interactions and data processing in these applications using the traditional data processing model. The emerging of new engineering research areas are a clear evidence of the emergence of new demands and requirements of modern real-life applications to be more intelligent, and quantum computing based. Recently, the intelligent systems gained a great attention in all real-life applications. It is being promoted by the software engineering community to use such systems as the adequate solution to handle the current requirements of complex big data processing problems that demanding distribution, flexibility, and robustness. In addition, the increasing usage of wide area networks such as the Internet as a communication medium for such emerging commercial applications made them more overloaded with big amount of data. Thus, we believe that the near-future scientific research will focus quantum computing and big data processing in intelligent systems.

This book aims to provide a collection of high-quality research works that address broad challenges in both theoretical and application aspects of big data processing for intelligent real-life applications in quantum computing environment. This book contains a set of book chapters that stimulates the continuing effort on the application of the intelligent systems that leads to solve the problem of big data processing in quantum-based environment.

In this book, we present the concepts associated with Quantum Computing applications in three distinct parts.

1. **Part I** discusses the issues surrounding Quantum in Network Cryptology. This part aims to provide a clear view about the fundamental concepts for building a secure data communication in a quantum environment. It contains nine chapters.
2. **Part II** discusses different topics related to the applications of Quantum in Physics. This part includes four chapters.
3. **Part III** discusses the applications of Quantum Computing in intelligent environments. Different topics are covered in that part and are well presented in six chapters to ensure the context is simple for understanding.

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