Official Textbooks for Huawei ICT Academy

ARTIFICIAL INTELLIGENCE TECHNOLOGY

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Preface

The rapid development of information technology in China since the twenty-first century has completely changed the way people study, work, and live. As a key research topic in information science, artificial intelligence, also known as AI, has gone through tumultuously good and hard times ever since the concept was coined half a century ago. It is inspiring to see that AI has achieved a tremendous progress and has been applied in a wide range of fields over the past several years, as a result of the advancements in computing power and big data technology. Today, AI is developing at an exponential rate, and its fruits will be continuously consolidated and deepened.

Despite its drawbacks, the future of AI is believed to be promising. As China has put AI on its national agenda, the interests of almost all the industries have been triggered, and the relevant practitioners are eager to know the status quo and research hotspots of AI, as well as its basic principles and research methodologies.

Although a bulk of AI themed books have been published both in China and the world, providing insightful and precise analysis covering almost all the topics of almost the entire AI sub-disciplines, we have to admit that they could be esoteric for beginners. Artificial Intelligence is a typical interdisciplinary science concerned with wide-ranging aspects and a subject unlikely to be exhausted by only one or two monographs. Therefore, this book aims at presenting our readers fundamental AI knowledge through a streamlined structure and thought-provoking cases. As a Chinese saying goes, "the teacher can teach you the skills, but it depends on yourself to master them." We expect our readers could find the topics they are interested in after reading this book and press ahead with more in-depth studies.

Since intelligence is a very complicated subject, different people could generate distinctive understanding and simulation of intelligence from different perspectives and viewpoints. Therefore, this book explores AI from diversified perspectives in the eight chapters. Chapter 1 is the general introduction, which introduces the origin, technology, fields of application, and trend of the development of AI, as well as Huawei's AI development strategy. Chapter 2 focuses on the machine learning, illustrating the types, overall process, and the popular algorithms of machine

learning, such as the decision trees, support vector machine, and clustering algorithms commonly in use today. Chapter 3 gives an overview to the deep learning by reviewing its evolvement, and elaborating on its training rules, activation functions, regularization, and optimizers on the basis of neural networks, a widely adopted approach in deep learning. Chapter 4 is about the deep learning frameworks, exemplified by TensorFlow 2.0 as one of the three mainstream frameworks. Chapter 5 brings up the topic of MindSpore, centering on the AI development framework of Huawei and MindSpore's development and application. Chapter 6 is about Huawei Atlas AI computing solution, with the discussion revolving around the software and hardware architecture of Ascend AI processor, Atlas AI computing platform, and its industrial applications. Chapter 7 introduces Huawei's smart terminal AI open platform known as the HUAWEI HiAI platform and the apps developed on it. Chapter 8 looks at the enterprise intelligence application platform Huawei CLOUD by taking Huawei CLOUD EI and ModelArts as major examples. In terms of the narrative style, each chapter has the theories and methods thoroughly expounded, characterized by relatively independent and integral contents. Meanwhile, the chapters are presented in a progressive order to offer asystematic reading experience. Our readers can either read the book chapter by chapter or just jump to certain chapters to have a detailed reading. The chapters are written in concise languages while dealing with profound theories, with part of the derivations of formulas and theorems provided and palpable examples quoted to help beginners to master the basic knowledge, grasp the essence, and put it into practice flexibly. For those abstruse theories, this book only gives a brief overview without any further discussions.

The book is edited by Huawei Technologies Co. Ltd, with LvYunxiang, Wang Luting, Gong Xiaogang, and Chen Miaoran working as the specific editors. Zeng Hongli also contributed to the compilation of several chapters and prepared materials and relevant supporting resources for writing.

Although we worked as careful and prudent as possible during the editing, the inadequacy is inevitable due to our limitations. Therefore, any comments and corrections from our readers are most welcome. In the meantime, we also invite you to share your feedbacks regarding reading this book with us (yunxianglu@hotmail.com).

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