

<<群体智能>>

图书基本信息

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前言

At this moment a half . dozen astronauts are assembling a new space station hundreds of miles above the surface of the earth . Thousands of sailors live and work under the sea in submarines . Incas iog through theAndes . Nomads roam the Arabian sands . Homo sapiensliterally, “ intelli-gent man ” has adapted to nearly every environment on the face of theearth . below it , and as far above it as we can propel ourselves . W_e must bedoing something right . In this book we argue that what we do right is related to our socialit . We will investigate that elusive quality known as intelligence , which isconsidered first of all a trait of humans and second as something thatmight be created in a computer,and our conclusion will be that whatever this “ intelligence ” is, it arises from interactions among individuals . We humans are the most social of animals : we live together in families , tribes . cities , nations , behaving and thinking according to the rules andnorms of our communities , adopting the customs of our fellows , including the facts they believe and the explanations they use to tie those factstogether . Even when we are alone , we think about other people , andeven when we think about inanimate things , we think using language the medium of interpersonal communication .

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内容概要

群体智能是通过模拟自然界生物群体行为来实现人工智能的一种方法。

本书综合运用认知科学、社会心理学、人工智能和演化计算等学科知识，提供了一些非常有价值的新见解，并将这些见解加以应用，以解决困难的工程问题。

书中首先探讨了基础理论，然后详尽展示如何将这些理论和模型应用于新的计算智能方法（粒子群）中，以适应智能系统的行为，最后描述了应用粒子群优化算法的好处，提供了强有力的优化、学习和问题解决的方法。

本书主要面向计算机相关学科的高年级本科生或研究生以及相关领域的研究与开发技术人员。

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作者简介

James Kennedy社会心理学家。

自1994年起，他一直致力于粒子群算法的研究工作，并与Russell C . Eberhart共同开发了粒子群优化算法。

目前在美国劳工部从事调查方法的研究工作。

他在计算机科学和社会科学杂志和学报上发表过许多关于粒子群的论文。

Russell C . Eberhart 普度大学电子与计算机工程系主任。
IEEE会士。

与JamesKennedy共同提出了粒子群优化算法。

曾任IEEE神经网络委员会的主席。

除了本书之外，他还著有《计算智能：从概念到实现》（影印版由人民邮电出版社出版）等。

Yuhui Shi (史玉回) 国际计算智能领域专家，现任Journal ofSwarm Intellgence编委，IEEE CIS群体智能任务组主席，西交利物浦大学电子与电气工程系教授。

1992年获东南大学博士学位，先后在美国、韩国、澳大利亚等地从事研究工作，曾任美国电子资讯系统公司专家长达9年。

他还是《计算智能：从概念到实现》一书的作者之一。

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书籍目录

part one Foundations chapter one Models and Concepts of Life and Intelligence The Mechanics of Life and Thought Stochastic Adaptation: Is Anything Ever Really Random? The “ Two Great Stochastic Systems ” The Game of Life: Emergence in Complex Systems The Game of Life Emergence Cellular Automata and the Edge of Chaos Artificial Life in Computer Programs Intelligence: Good Minds in People and Machines Intelligence in People: The Boring Criterion Intelligence in Machines: The Turing Criterion chapter two Symbols, Connections, and Optimization by Trial and Error Symbols in Trees and Networks Problem Solving and Optimization A Super-Simple Optimization Problem Three Spaces of Optimization Fitness Landscapes High-Dimensional Cognitive Space and Word Meanings Two Factors of Complexity: NK Landscapes Combinatorial Optimization Binary Optimization Random and Greedy Searches Hill Climbing Simulated Annealing Binary and Gray Coding Step Sizes and Granularity Optimizing with Real Numbers Summary chapter three On Our Nonexistence as Entities: The Social Organism Views of Evolution Gaia: The Living Earth Differential Selection Our Microscopic Masters ? Looking for the Right Zoom Angle Flocks, Herds, Schools, and Swarms: Social Behavior as Optimization Accomplishments of the Social Insects Optimizing with Simulated Ants: Computational Swarm Intelligence Staying Together but Not Colliding: Flocks, Herds, and Schools Robot Societies Shallow Understanding Agency Summary chapter four Evolutionary Computation Theory and Paradigms Introduction Evolutionary Computation History The Four Areas of Evolutionary Computation Genetic Algorithms Evolutionary Programming Evolution Strategies Genetic Programming Toward Unification Evolutionary Computation Overview EC Paradigm Attributes Implementation Genetic Algorithms An Overview A Simple GA Example Problem A Review of GA Operations Schemata and the Schema Theorem Final Comments on Genetic Algorithms Evolutionary Programming The Evolutionary Programming Procedure Finite State Machine Evolution Function Optimization Final Comments Evolution Strategies Mutation Recombination Selection Genetic Programming Summary chapter five Humans—Actual, Imagined, and Implied chapter six Thinking Is Socialpart two The Particle Swarm and Collective Intelligence chapter seven The Particle Swarm chapter eight Variations and Comparisons chapter nine Applications chapter ten Implications and Speculationschapter eleven And in Conclusion Appendix A Statistics for Swarmers Appendix B Genetic Algorithm Implementation Glossary References Index

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章节摘录

插图：

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媒体关注与评论

“ 本书内容丰富，富于启发性和思想性，强烈推荐给所有的演进计算研究人员。

” ——Genetic Programming and Evolvable Machines “ 这本书极为出色，不愧为PSO和群体智能的最佳参考书： ” ——Konstantions E.Parsopoulos 希腊Palras大学

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编辑推荐

《群体智能》由粒子群优化算法之父撰写，是该领域毋庸置疑的经典著作。

作者提出，人类智能来源于社会环境中个体之间的交互，这种智能模型可以有效地应用到人工智能系统中去。

书中首先从社会心理学、认知科学和演化计算等多个角度阐述了这种新方法的基础，然后详细说明了应用这些理论和模型所得出的新的计算智能方法——粒子群优化，进而深入地探讨了如何将粒子群优化应用于广泛的工程问题。

群体智能是近年来发展迅速的人工智能学科领域。

通过研究分散、自组织的动物群体和人类社会的智能行为，学者们提出了许多迥异于传统思路的智能算法，很好地解决了不少原来非常棘手的复杂工程问题。

与蚁群算法齐名的粒子群优化（particle swarm optimization，简称PSO）算法就是其中最受瞩目、应用最为广泛的成果之一。

《群体智能》的C及Visual Basic源代码可以在图灵网站《群体智能》网页免费注册下载。

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