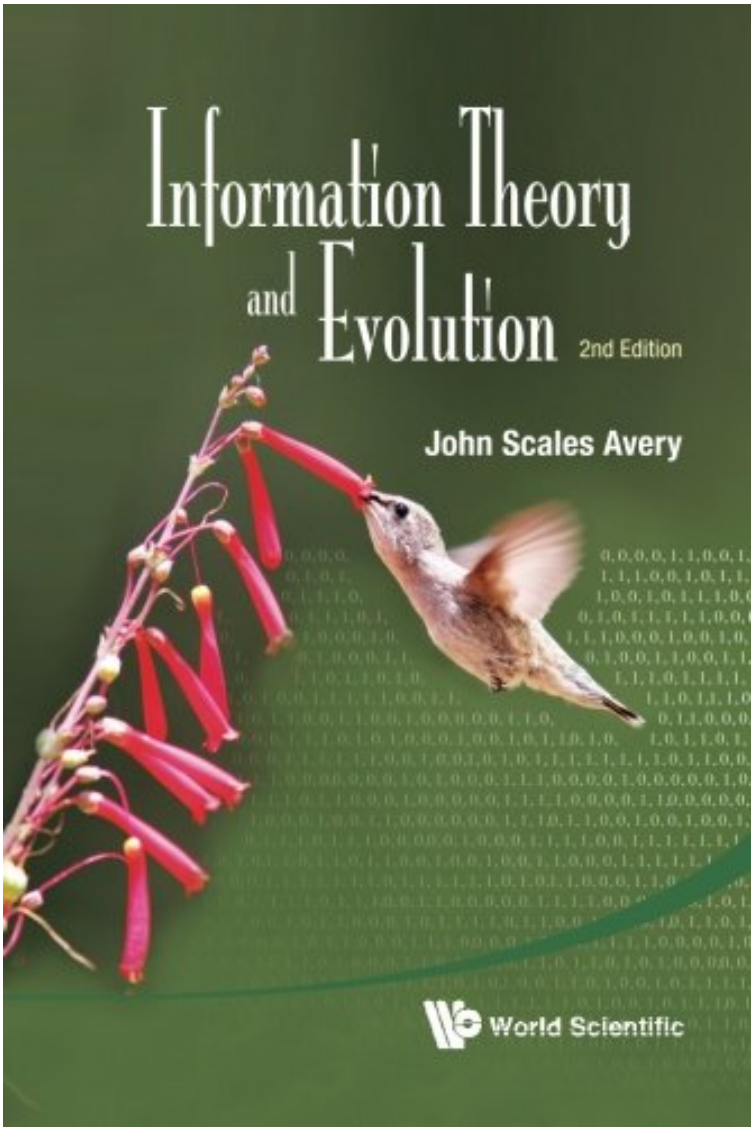
Information Theory And Evolution (2nd Edition)

John Scales Avery
*ePub | *DOC | audiobook | ebooks | Download PDF*



#468215 in Books 2012-07-16 2012-05-21Original language:EnglishPDF # 1 9.00 x .63 x 6.00l, .80 #File Name: 9814401234276 pages | File size: 47.Mb

John Scales Avery : Information Theory And Evolution (2nd Edition) before purchasing it in order to gage whether or not it would be worth my time, and all praised Information Theory And Evolution (2nd Edition):

4 of 4 people found the following review helpful. A fine, erudite bookBy Dr. James V StoneWhy did I review this book? Because I emailed John Avery just to say how much I enjoyed it, and he asked me to write a review, which I was very happy to do.Am I qualified to write this review? I am not an expert on information theory or evolution, but I have read widely on both topics over the last 30 years, and ideas from these inform much of my teaching as a

university lecturer.Just to be completely open, I have just finished writing a tutorial book on information theory, and I read Avery's book as part of my background reading.The ReviewFrom the title, I thought this would be a book about information theory and evolution. And so it is, but it is much more than that. Avery spreads his intellectual net wide and deep, and hauls up a varied panoply of riches.Chapter 1 starts with Arisotle's thoughts on evolution, followed by a summary of the evolution of evolutionary ideas, leading naturally to Charles Darwin's theory, which is the topic of Chapter 2. But this is not just a summary Darwin's voyage in the Beagle, and his subsequent struggle (mainly with himself) to write and publish his ideas. Avery places Darwin's ideas in a modern context, and traces the political fall-out that followed the publication of Darwin's theory in 1859. This fall-out continued into the 20th century, and Avery refers to the Scopes "monkey" trial of 1925, which challenged the law which stated that, "it shall be unlawful for any teacher ... teach instead that man has descended from a lower order of animals". This law effectively banned the teaching of evolution in the schools of Tennessee until the law was repealed in 1967. Chapter 3 takes us beyond Darwin, and into the modern era of genetics, with a detailed account of the possible origins of life.Having laid the foundations of evolution, Avery then describes the relationship between statistical mechanics, thermodynamic entropy, and Shannon's theory of information. The latter is brief, but insightful, and is supported by an appendix on technical aspects of information theory. The idea of evolution as the inheritance of biological information (i.e. DNA) and cultural information (e.g. tool use) is explored in the context of human evolution, with a summary of the 'out-of-Africa' story, and the dispersion of humans across the globe. Modern DNA evidence that humans inter-bred with previous migrations of Neanderthals and Denisovans is also described. Finally, Avery covers the spread of information in terms of rise of computational power.Good pointsEach chapter has a comprehensive list of references.Bad pointsPerhaps the title should have been evolution and information, because the emphasis is firmly on evolution. Even though mathematical accounts of Shannon entropy and thermodynamic entropy are given, these constitute a relatively small proportion of the book.SummaryThis is a thought-provoking, and even wise, book which integrates knowledge and insights from a wide range of scientific disciplines. It is a fine example of scholarship from a mind which has clearly considered evolution from many perspectives. The result is an erudite analysis of how information and evolution are entwined.0 of 0 people found the following review helpful. More than Smart...Profound.By Scott ZoggThis book is profound! I'm not a biologist...nor anyone else with a background qualified to review this book. It has enough technical detail to dizzy the layman. However, if you do a fair amount of science reading, and have an interest in the fundamental conundrum of life's seeming contraflow against the second law of thermodynamics, this book is unique and fascinating. I didn't really know anything about information theory but I found peering at evolution through that lens was wonderfully new and insightful. The author elaborates on each topic in a way that made me wonder if he (or more likely, I) lost the chain of his argument but each detour was so rewarding that I stopped worrying about it.

Information Theory and Evolution discusses the phenomenon of life, including its origin and evolution (and also human cultural evolution), against the background of thermodynamics, statistical mechanics, and information theory. Among the central themes is the seeming contradiction between the second law of thermodynamics and the high degree of order and complexity produced by living systems. This paradox has its resolution in the information content of the Gibbs free energy that enters the biosphere from outside sources, as the author will show. The role of information in human cultural evolution is another focus of the book. The first edition of Information Theory and Evolution made a strong impact on thought in the field by bringing together results from many disciplines. The new second edition offers updated results based on reports of important new research in several areas, including exciting new studies of the human mitochondrial and Y-chromosomal Dna. Another extensive discussion featured in the second edition is contained in a new appendix devoted to the relationship of entropy and Gibbs free energy to economics. This appendix includes a review of the ideas of Alfred Lotka, Frederick Soddy, Nicholas Georgiescu-Roegen and Herman E. Daly, and discusses the relevance of these ideas to the current economic crisis. The new edition discusses current research on the origin of life, the distinction between thermodynamic information and cybernetic information, new Dna research and human prehistory, developments in current information technology, and the relationship between entropy and economics.

From the Inside FlapInformation Theory and Evolution discusses the phenomenon of life, including its origin and evolution (and also human cultural evolution), against the background of thermodynamics, statistical mechanics, and information theory. Among the central themes is the seeming contradiction between the second law of thermodynamics and the high degree of order and complexity produced by living systems. This paradox has its resolution in the information content of the Gibbs free energy that enters the biosphere from outside sources, as the author will show. The role of information in human cultural evolution is another focus of the book. The first edition of Information Theory and Evolution made a strong impact on thought in the field by bringing together results from many disciplines. The new second edition offers updated results based on reports of important new research in several areas, including exciting new studies of the human mitochondrial and Y-chromosomal DNA. Another extensive discussion featured in the second edition is contained in a new appendix devoted to the relationship of entropy and

Gibbs free energy to economics. This appendix includes a review of the ideas of Alfred Lotka, Frederick Soddy, Nicholas Georgiescu-Roegen and Herman E. Daly, and discusses the relevance of these ideas to the current economic crisis. The new edition discusses current research on the origin of life, the distinction between thermodynamic information and cybernetic information, new DNA research and human prehistory, developments in current information technology, and the relationship between entropy and economics.