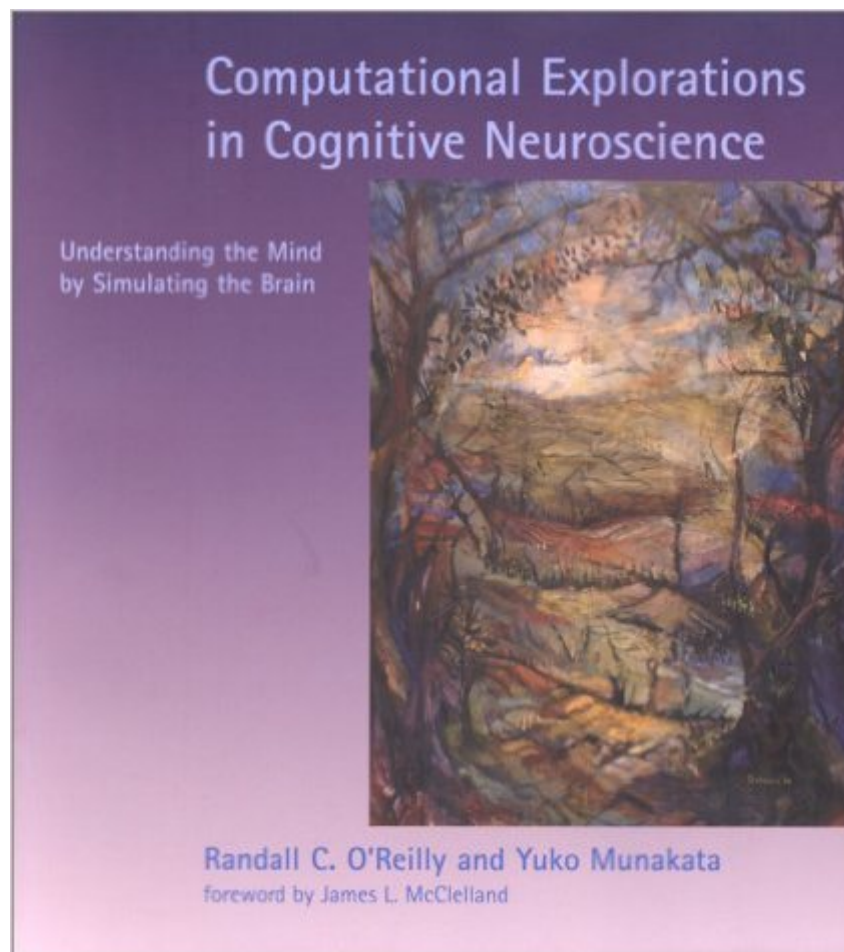# Computational Explorations In Cognitive Neuroscience: Understanding The Mind By Simulating The Brain

Synopsis

The goal of computational cognitive neuroscience is to understand how the brain embodies the mind by using biologically based computational models comprising networks of neuronlike units. This text, based on a course taught by Randall O'Reilly and Yuko Munakata over the past several years, provides an in-depth introduction to the main ideas in the field. The neural units in the simulations use equations based directly on the ion channels that govern the behavior of real neurons, and the neural networks incorporate anatomical and physiological properties of the neocortex. Thus the text provides the student with knowledge of the basic biology of the brain as well as the computational skills needed to simulate large-scale cognitive phenomena.The text consists of two parts. The first part covers basic neural computation mechanisms: individual neurons, neural networks, and learning mechanisms. The second part covers large-scale brain area organization and cognitive phenomena: perception and attention, memory, language, and higher-level cognition. The second part is relatively self-contained and can be used separately for mechanistically oriented cognitive neuroscience courses. Integrated throughout the text are more than forty different simulation models, many of them full-scale research-grade models, with friendly interfaces and accompanying exercises. The simulation software (PDP++, available for all major platforms) and simulations can be downloaded free of charge from the Web. Exercise solutions are available, and the text includes full information on the software.

Book Information

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Customer Reviews

In this book, research themes, which include perception, memory, language as well as high-level cognition, are explained in terms of computation. Their theory is based on brain science, computer science, and psychology. Though the authors speculate about the functions of each part of the brain and the relation among them to some extent, the authors propose a new paradigm to existing sciences. Their integrative approach and method are very simulative, and I've got a lot of hints from this book. But I don't need the usageof particular software, PDP++ in such a theoretical book. The authors explain and demonstrate their models and theories using PDP++ at the end of each chapter. If you want to study how to use PDP++ as well as their theories, this book will be extremely good one.

With a background in chemistry, biology, psychology, and neuroscience, I believed a course on simulating the the brain to understand the mind would be incredibly fascinating. However, this book, in spite of various claims to be an introduction to cognitive neuroscience, is full of technical jargon that is mostly likely only understood by those familiar with the subject.The book itself comes off as extremely condescending to any beginner who is frustrated with the book because throughout the text, the authors repeat over and over and over again some variation of, "Here is a SIMPLE example..."****ALSO IMPORTANT TO NOTE: As for the free software you can download online, PDP++, it is prone to errors (random quitting, functions not working properly) and DOES NOT work on many newer versions of Mac OS X. You have to download a different program called Emergent, which is not compatible with what you read in this text; this is also an annoying problem.The aspects of the book that focus on the biology of the mind are like breaths of fresh air, but every chapter inevitably leads into mind-numbing instructions and equations that are difficult to comprehend.This is by far the most frustrating book I've had to deal with. The other one-star review was shrewd in warning undergrad students and beginners about this text.

I am currently taking a honors psych class which utilizes this textbook as a lab handout (we solve the exercises closing out each chapter). I find this book very hard to read due to the language and the explanations the authors use to explain certain topics. The book reads more like a guide for those already familiar with the subject matter, and the questions closing out each chapter are even harder to understand than the chapter text itself. If the authors wish the book to be of any help to undergrads who are not already familiar with the topic they should take a step back and revise the text so that it is understandable for all. NOTE TO UA STUDENTS THINKING OF TAKING THE

CLASS WHICH UTILIZES THIS BOOK---->dont.

Computational Explorations in Cognitive Neuroscience: Understanding the Mind by Simulating the Brain From Computer to Brain: Foundations of Computational Neuroscience Cognitive Neuroscience: The Biology of the Mind (Third Edition) The Computational Beauty of Nature: Computer Explorations of Fractals, Chaos, Complex Systems, and Adaptation Biomimetic Neural Learning for Intelligent Robots: Intelligent Systems, Cognitive Robotics, and Neuroscience (Lecture Notes in Computer Science) Visual Population Codes: Toward a Common Multivariate Framework for Cell Recording and Functional Imaging (Computational Neuroscience Series) Fundamentals of Computational Neuroscience Graphical Models: Foundations of Neural Computation (Computational Neuroscience) Body Language: Discover How To Connect, Analyze And Influence People In A Subconscious Level By Understanding Their Nonverbal Communication (Behavior, ... Mind, Mind Power, Brain Hidden Power) The Nature of Code: Simulating Natural Systems with Processing Building a SharePoint 2016 Home Lab: A How-To Reference on Simulating a Realistic SharePoint Testing Environment Buddha's Brain: The Practical Neuroscience of Happiness, Love, and Wisdom Buddha's Brain: The Practical Neuroscience of Happiness, Love & Wisdom Neuroscience: Exploring the Brain, 3rd Edition Neuroscience: Exploring the Brain Deep Sleep: Brain Wave Subliminal (Brain Sync Series) (Brain Sync Audios) Sleights of Mind: What the Neuroscience of Magic Reveals About Our Everyday Deceptions National Geographic Kids Brain Games: The Mind-Blowing Science of Your Amazing Brain Your Brain on Latino Comics: From Gus Arriola to Los Bros Hernandez (Cognitive Approaches to Literature and Culture) The Traumatized Brain: A Family Guide to Understanding Mood, Memory, and Behavior after Brain Injury (A Johns Hopkins Press Health Book)