

Artificial Neural Networks

An Introduction

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Kevin L. Priddy and Paul E. Keller

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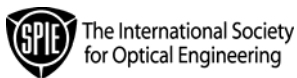
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Introduction to the Series

Since its conception in 1989, the Tutorial Texts series has grown to more than 60 titles covering many diverse fields of science and engineering. When the series was started, the goal of the series was to provide a way to make the material presented in SPIE short courses available to those who could not attend, and to provide a reference text for those who could. Many of the texts in this series are generated from notes that were presented during these short courses. But as stand-alone documents, short course notes do not generally serve the student or reader well. Short course notes typically are developed on the assumption that supporting material will be presented verbally to complement the notes, which are generally written in summary form to highlight key technical topics and therefore are not intended as stand-alone documents. Additionally, the figures, tables, and other graphically formatted information accompanying the notes require the further explanation given during the instructor's lecture. Thus, by adding the appropriate detail presented during the lecture, the course material can be read and used independently in a tutorial fashion.

What separates the books in this series from other technical monographs and textbooks is the way in which the material is presented. To keep in line with the tutorial nature of the series, many of the topics presented in these texts are followed by detailed examples that further explain the concepts presented. Many pictures and illustrations are included with each text and, where appropriate, tabular reference data are also included.

The topics within the series have grown from the initial areas of geometrical optics, optical detectors, and image processing to include the emerging fields of nanotechnology, biomedical optics, and micromachining. When a proposal for a text is received, each proposal is evaluated to determine the relevance of the proposed topic. This initial reviewing process has been very helpful to authors in identifying, early in the writing process, the need for additional material or other changes in approach that would serve to strengthen the text. Once a manuscript is completed, it is peer reviewed to ensure that chapters communicate accurately the essential ingredients of the processes and technologies under discussion.

It is my goal to maintain the style and quality of books in the series, and to further expand the topic areas to include new emerging fields as they become of interest to our reading audience.

*Arthur R. Weeks, Jr.
University of Central Florida*

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Preface

This text introduces the reader to the fascinating world of artificial neural networks, a journey that the authors are here to help you with. The authors have written this book for the reader who wants to understand artificial neural networks without necessarily being bogged down in the mathematics. A glossary is included to assist the reader in understanding any unfamiliar terms. For those who desire the math, sufficient detail for most of the common neural network algorithms is included in the appendixes.

The concept of data-driven computing is the overriding principle upon which neural networks have been built. Many problems exist for which data are plentiful, but there is no underlying knowledge of the process that converts the measured inputs into the observed outputs. Artificial neural networks are well suited to this class of problem because they are excellent data mappers in that they map inputs to outputs. This text illustrates how this is done with examples and relevant snippets of theory.

The authors have enjoyed writing the text and welcome readers to dig further and learn how artificial neural networks are changing the world around them.

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