Neural Network Programming with Java

By Alan M.F. Souza, Fabio M. Soares

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Create and unleash the power of neural networks by implementing professional Java code

About This Book

- Learn to build amazing projects using neural networks including forecasting the weather and pattern recognition
- Explore the Java multi-platform feature to run your personal neural networks everywhere
- This step-by-step guide will help you solve real-world problems and links neural network theory to their application

Who This Book Is For

This book is for Java developers with basic Java programming knowledge. No previous knowledge of neural networks is required as this book covers the concepts from scratch.

What You Will Learn

- Get to grips with the basics of neural networks and what they are used for
- Develop neural networks using hands-on examples
- Explore and code the most widely-used learning algorithms to make your neural network learn from most types of data
- Discover the power of neural network's unsupervised learning process to extract the intrinsic knowledge hidden behind the data
- Apply the code generated in practical examples, including weather forecasting and pattern recognition
- Understand how to make the best choice of learning parameters to ensure you have a more effective application
- Select and split data sets into training, test, and validation, and explore validation strategies
- Discover how to improve and optimize your neural network

In Detail

Vast quantities of data are produced every second. In this context, neural networks become a powerful technique to extract useful knowledge from large amounts of raw, seemingly unrelated data. One of the most preferred languages for neural network programming is Java as it is easier to write code using it, and most of the most popular neural network packages around already exist for Java. This makes it a versatile programming language for neural networks.

This book gives you a complete walkthrough of the process of developing basic to advanced practical examples based on neural networks with Java.

You will first learn the basics of neural networks and their process of learning. We then focus on what Perceptrons are and their features. Next, you will implement self-organizing maps using the concepts you've learned. Furthermore, you will learn about some of the applications that are presented in this book such as weather forecasting, disease diagnosis, customer profiling, and characters recognition (OCR). Finally, you will learn methods to optimize and adapt neural networks in real time.

All the examples generated in the book are provided in the form of illustrative source code, which merges object-oriented programming (OOP) concepts and neural network features to enhance your learning experience.

Style and approach

This book adopts a step-by-step approach to neural network development and provides many hands-on examples using Java programming. Each neural network concept is explored through real-world problems and is delivered in an easy-to-comprehend manner.

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Editorial Review

About the Author

Alan M.F. Souza

Alan M.F. Souza is computer engineer from Instituto de Estudos Superiores da Amazonia (IESAM). He holds a post-graduate degree in project management software and a master's degree in industrial processes (applied computing) from Universidade Federal do Para (UFPA). He has been working with neural networks since 2009 and has worked with IT Brazilian companies developing in Java, PHP, SQL, and other programming languages since 2006. He is passionate about programming and computational intelligence. Currently, he is a professor at Universidade da Amazonia (UNAMA) and a PhD candidate at UFPA.

Fabio M. Soares

Fabio M. Soares holds a master's degree in applied computing from UFPA and is currently a PhD candidate at the same university. He has been designing neural network solutions since 2004 and has developed applications with this technique in several fields, ranging from telecommunications to chemistry process modeling, and his research topics cover supervised learning for data-driven modeling. He is also self-employed, offering services such as IT infrastructure management as well as database administration to a number of small- and medium-sized companies in northern Brazil. In the past, he has worked for big companies such as Albras, one of the most important aluminium smelters in the world, and Eletronorte, a great power supplier in Brazil. He also has experience as a lecturer, having worked at the Federal Rural University of Amazon and as a Faculty of Castanhal, both in the state of Para, teaching subjects involving programming and artificial intelligence. He has published a number of works, many of them available in English, all including the topics of artificial intelligence applied to some problem. His publications include conference proceedings, such as the TMS (The Minerals Metals and Materials Society), Light Metals and the Intelligent Data Engineering and Automated Learning. He has also has published two book chapters for Intech.

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