

Applied Machine Learning and Deep Learning: Architectures and Techniques



Nitin Liladhar Rane, Suraj Kumar Mallick, Ömer Kaya, and Jayesh Rane

Applied Machine Learning and Deep Learning: Architectures and Techniques

Nitin Liladhar Rane

Vivekanand Education Society's College of Architecture (VESCOA), Mumbai, India

Suraj Kumar Mallick

Department of Geography, Shaheed Bhagat Singh College, University of Delhi, New Delhi India

Ömer Kaya

Engineering and Architecture Faculty, Erzurum Technical University, Erzurum, Turkey

Jayesh Rane

Pillai HOC College of Engineering and Technology, Rasayani, India



Published, marketed, and distributed by:

Deep Science Publishing
<https://deepsclenceresearch.com/>
editor@deepsclenceresearch.com
WhatsApp: +91 7977171947

ISBN: 978-81-981271-9-8

E-ISBN: 978-81-981271-4-3

<https://doi.org/10.70593/978-81-981271-4-3>

Copyright © Nitin Liladhar Rane, Suraj Kumar Mallick, Ömer Kaya, and Jayesh Rane

Citation: Rane, N. L., Mallick, S. K., Kaya, O., & Rane, J. (2024). *Applied machine learning and deep learning: architectures and technique*. Deep Science Publishing. <https://doi.org/10.70593/978-81-981271-4-3>

This book is published online under a fully open access program and is licensed under the Creative Commons "Attribution-Non-commercial" (CC BY-NC) license. This open access license allows third parties to copy and redistribute the material in any medium or format, provided that proper attribution is given to the author(s) and the published source. The publishers, authors, and editors are not responsible for errors or omissions, or for any consequences arising from the application of the information presented in this book, and make no warranty, express or implied, regarding the content of this publication. Although the publisher, authors, and editors have made every effort to ensure that the content is not misleading or false, they do not represent or warrant that the information-particularly regarding verification by third parties-has been verified. The publisher is neutral with regard to jurisdictional claims in published maps and institutional affiliations. The authors and publishers have made every effort to contact all copyright holders of the material reproduced in this publication and apologize to anyone we may have been unable to reach. If any copyright material has not been acknowledged, please write to us so we can correct it in a future reprint.

Preface

This book provides an extensive overview of recent advances in machine learning (ML) and deep learning (DL). It starts with a comprehensive introduction to the latest architectural and design practices, with an overview of basic techniques and optimization algorithms and methodologies that are fundamental to modern ML/DL development followed by the tools and frameworks that are driving innovation in ML/DL. The presentation then points to the central position of ML and DL in developing generative AI like ChatGPT. Then look at different industrial applications such as explaining the real-world impacts of each. This includes challenges around corroborate artificial Intelligence (AI), and trustworthy AI, and so on. Finally, the book presents a futuristic vision on the potentials and implications of future ML and DL architectures, making it an ideal guide for researchers, practitioners and industry professionals. This book will be a significant resource for comprehending present advancements, addressing encounter challenges, and traversing the ML and DL landscape in future, making it an indispensable reference for anyone interested in applying these technologies across sectors.

Nitin Liladhar Rane
Suraj Kumar Mallick
Ömer Kaya
Jayesh Rane

Contents

- 1 Machine learning and deep learning architectures and trends: A review1**
- 2 Techniques and optimization algorithms in machine learning: A review.....39**
- 3 Techniques and optimization algorithms in deep learning: A review.....59**
- 4 Tools and frameworks for machine learning and deep learning: A review.....80**
- 5 Role of machine learning and deep learning in advancing generative artificial intelligence such as ChatGPT.....96**
- 6 Applications of machine learning in healthcare, finance, agriculture, retail, manufacturing, energy, and transportation: A review.....112**
- 7 Applications of deep learning in healthcare, finance, agriculture, retail, energy, manufacturing, and transportation: A review.....132**
- 8 From challenges to implementation and acceptance: Addressing key barriers in artificial intelligence, machine learning, and deep learning.....153**
- 9 Explainable and trustworthy artificial intelligence, machine learning, and deep learning.....167**
- 10 Emerging trends and future directions in machine learning and deep learning architectures.....192**