Type of paper: Book review
Received: 10.06.2023.
Accepted: 03.07.2023.
DOI: https://doi.org/10.18485/edtech.2023.3.1.6
UDC: 004.85:37
004:929 Кадимали, С.(049.32)

Book review: Seda Khadimally (2023). Applications of Machine Learning and Artificial Intelligence in Education. Series: Advances in Educational Technologies and Instructional Design. Information Science Reference.

Valentin Kuleto
University Business Academy in Novi Sad, Faculty of Contemporary Arts, Belgrade; Information Technology School ITS – Belgrade; valentin.kuleto@its.edu.rs

Daniel Gabriel Dinu
Business Administration Doctoral School Bucharest University of Economic Studies 6 Piata Romana 010374 Bucharest, Romania; daniel.dinu90@gmail.com

Abstract:

The book "Applications of Machine Learning and Artificial Intelligence in Education" explores the transformative potential of machine learning and artificial intelligence (AI) in modern education, emphasising the importance of adapting to the needs of 21st-century learners. With the growing demand for innovative technology-moderated tools, traditional learning and instructional practices are evolving into machine-facilitated communication, education, and teaching methodologies.

This comprehensive volume delves into various aspects of remote learning, machine learning, deep learning, and AI in contemporary education, covering topics such as data coding, social networking technology, and computational linguistics. The book aims to provide valuable insights for learners interested in deep learning, educators, educational technologists, instructional designers, data evaluators, and special interest groups (SGIs) in the discipline.

Keywords: Machine Learning, Artificial Intelligence, Education, Deep Learning, Remote Learning, Instructional Design, Educational Technology, Data Coding, Computational Linguistics

Introduction:

Key areas of focus in this publication include, but are not limited to: Artificial Intelligence Research and Practice, Computational Linguistics, Convolutional Neural Networks, Data Coding, Deep Learning, Educational Technology, Implications of Data Coding and Analysis, Instructional Analysis, Machine Learning, Online Education Problems and Remedies, Online Instructor Training, and Social Networking Technology.

"Applications of Machine Learning and Artificial Intelligence in Education" is an essential resource for professionals and enthusiasts seeking to understand and harness the power of AI and machine learning in revolutionising the education landscape and enhancing the learning experience.

Book Structure and Chapter Descriptions:

The book structure consists of an Introduction and three main sections, each containing a series of chapters focused on different aspects of technology in education. The introduction provides an overview of the importance of emerging technologies in modern education. Sections of the book are:

1. Section 1 (Chapters 1–4): Machine Learning and Deep Learning Applications – Explores various applications of machine learning and deep learning in different fields.
2. Section 2 (Chapters 5–8): Artificial Intelligence and Instructional Design – Discusses the integration of artificial intelligence technologies in the instructional process, highlighting their impact on learning, teaching, and design.
3. Section 3 (Chapters 9–12): Post-pandemic STEM Education, Project Management, and Online Learning Challenges – Addresses the challenges and opportunities in STEM education, project management, and online learning in the context of the COVID-19 pandemic and its aftermath.

The introduction section is entitled: "Situating the Unconventional, Emerging Technologies in Education and Other Fields in Today's World" – This introductory section presents an overview of the need for innovative, technology-moderated tools in the current educational landscape and the impact of data-driven research on instructional design, delivery, and evaluation.

Section one is organised within chapters 1–4 and entitled. Machine Learning and Deep Learning Applications.

Chapter 1: "Machine Learning and Deep Learning for Applications – A Hands-on Study With Python" – This chapter introduces machine learning and deep learning techniques through hands-on Python projects, focusing on their importance in processing and analysing big data.

Chapter 2: "Machine Learning in Computer Vision" – This chapter discusses various machine learning algorithms used in computer vision, providing theoretical concepts related to real-world human skin detection problems.

Chapter 3: "Music Therapy-Based Emotion Regulation Using Convolutional Neural Network" – This chapter explores the use of Convolutional Neural Network (CNN) for emotion detection in facial features and the application of music therapy for changing a person's emotional state.

Chapter 4: "Speech Recognition via IPA-Based Phonetic Data Coding and Analysis – Descriptive Coding, Pattern Coding, and Phonetic Transcription in Phenomenological Research" – This chapter describes the process of speech recognition through IPA-based phonetic data coding and analysis, and its application in phenomenological research.

Section two is organised within chapters 5–8 and entitled Artificial Intelligence and Instructional Design.

Chapter 5: "Deep Learning in Instructional Analysis, Design, Development, Implementation, and Evaluation (ADDIE)" – This chapter discusses the application of deep learning technologies in the instructional process, focusing on the integration of deep learning in remote learning systems and the potential benefits for learners and instructors.

Chapter 6: "Mastery of Learning via Social Networking Technology – A Comprehensive Literature Review With a Systems Approach" – This literature review explores the role of social networking tools in adult learning, instructional design, and project management, highlighting innovative applications and potential risks and challenges in incorporating social networking technology into education.

Chapter 7: "Prevention is Better than Cure – Use of Dashboard in a University English Course" – This chapter describes the design, development, and evaluation of a learning dashboard for a university English course, providing insights for learning designers, teachers, and researchers on the potential of dashboards in language learning.

Chapter 8: "Corpus-Aided Grammar Teaching Materials Development" – This chapter examines the implementation of corpus data in developing learning materials for grammar teaching, discussing vital theoretical concepts, relevant teaching frameworks, and practical teaching activities in corpus-aided grammar teaching.

Section 3 is organised within chapters 9–12 and entitled; Post-pandemic STEM Education, Project Management, and Online Learning Challenges.

Chapter 9: "Implementing New Resources for STEM Education – 21st-Century Skills After COVID" – This chapter highlights the importance of refining educational goals and incorporating 21st-century skills into STEM education in the context of the COVID-19 pandemic. In addition, the chapter discusses the role of digital literacy and applied skills in facilitating adaptation and transition to new educational models.

Chapter 10: "Executive Project Management Plan for an Online Course Instructor Training in Higher Education – A Three-Tier Change Model" presents a project-management-based online learning design (PMBOLD) project to provide online instructor training in higher education institutions. The chapter discusses implementing a three-tier change model and using the ADDIE design framework to support the post-pandemic transition to online or hybrid learning.

Chapter 11: "Problems With Online Education and Possible Remedies" – This chapter explores the widening achievement gap between students of different socioeconomic statuses due to the pandemic and issues such as chronic absenteeism and lower student motivation. The chapter offers potential solutions to these problems to improve online learning and overall educational outcomes in the post-pandemic era.

Chapter 12: "Impact and Contribution of the Book to the Field" – The conclusion summarises the essential findings and insights presented throughout the chapters, emphasising the relevance of machine learning, artificial intelligence, and deep learning in transforming the current educational landscape and addressing the challenges faced by educators, instructional designers, and learners in the 21st century. The book's contributions to the literature in these areas, particularly in the field of Education, are highlighted.

Author

Seda Khadimally is an expert in Computer Assisted Language Learning (CALL) and second language acquisition, specialising in teaching English as a Second/Foreign Language (ESL/EFL) to speakers of other languages. With 19 years of experience, she has designed, delivered, and evaluated instruction using educational technologies for online and blended learning to teach diverse groups of English language learners. Her expertise lies in teaching ESL/ELL students of all ages through emerging educational technologies, particularly mobile learning (m-learning).

As a published author in prominent journals, a book reviewer, and an Editorial Advisory Board (EAB) member for renowned journal publications and scholarly works in her field, Seda has presented her research at various regional, national, and international conferences held at esteemed public and private educational institutions.

Concluding remarks

The book concludes by summarising the essential findings and insights presented throughout the chapters, emphasising the relevance of machine learning, artificial intelligence, and deep learning in transforming the current educational landscape and addressing the challenges faced by educators, instructional designers, and learners in the 21st century.

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