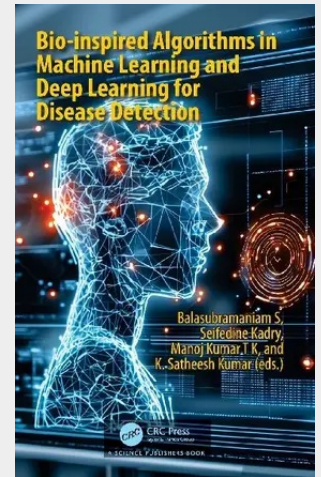


Bio-inspired Algorithms in Machine Learning and Deep Learning for Disease Detection

Currently, computational intelligence approaches are utilised in various science and engineering applications to analyse information, make decisions, and achieve optimisation goals. Over the past few decades, various techniques and algorithms have been created in disciplines such as genetic algorithms, artificial neural networks, evolutionary algorithms, and fuzzy algorithms. In the coming years, intelligent optimisation algorithms are anticipated to become more efficient in addressing various issues in engineering, scientific, medical, space, and artificial satellite fields, particularly in early disease diagnosis. A metaheuristic in computer science is designed to discover optimisation algorithms capable of solving intricate issues. Metaheuristics are optimisation algorithms that mimic biological behaviours of animals or birds and are utilised to discover the best solution for a certain problem. A meta-heuristic is an advanced approach used by heuristics to tackle intricate optimisation problems. A metaheuristic in mathematical programming is a method that seeks a solution to an optimisation problem. Metaheuristics utilise a heuristic function to assist in the search process. Heuristic search can be categorised as blind search or informed search. Meta-heuristic optimisation algorithms are gaining popularity in various applications due to their simplicity, independence from data trends, ability to find optimal solutions, and versatility across different fields. Recently, many nature-inspired computation algorithms have been utilised to diagnose people with different diseases. Nature-inspired methodologies are now widely utilised across several fields for tasks such as data analysis, decision-making, and optimisation. Techniques inspired by nature are categorised as either biology-based or natural phenomena-based. Bioinspired computing encompasses various topics in computer science, mathematics, and biology in recent years. Bio-inspired computer optimisation algorithms are a developing method that utilises concepts and inspiration from biological development to create new and resilient competitive strategies. Bio-inspired optimisation algorithms have gained recognition in machine learning and deep learning for solving complicated issues in science and engineering. Utilising BIAs learning methods with machine learning and deep learning shows great promise for accurately classifying medical conditions. This book explores the historical development of bio-inspired algorithms and their application in machine learning and deep learning models for disease diagnosis, including COVID-19, heart diseases, cancer, diabetes and some other diseases. It discusses the advantages of using bio-inspired algorithms in disease diagnosis and concludes with research directions and future prospects in this field.

This book delves into the history of biometrics, the various systems that have been developed to date, the problems that have arisen from these systems, the necessity of AI-based biometrics systems, the various AI techniques.



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