

AI ALGORITHMS AND MACHINE LEARNING FOR BIG DATA PROCESSING: TRENDS AND PROGRESS

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Abstract

AI and machine learning algorithms play an important role in big data processing, a field that is constantly evolving and innovating. The application of these technologies enables the analysis of huge volumes of data, increasing the ability to discover complex patterns and generate insights that were previously hard to reach. Current trends focus on the adoption of more automated and efficient solutions such as AutoML, as well as improvements in tools and frameworks that facilitate integration on a broader level. While challenges such as interpretability and transparency remain, developments in explainable AI seek to address them. All of these advancements demonstrate the huge potential of AI and machine learning in transforming big data processing, providing significant benefits to various industry sectors through faster and more effective decision-making.

Keywords: AI Algorithm, Machine Learning, Big Data Processing.

Introduction

In today's digital age, the volume of data generated by various sources, such as social media, IoT sensors, online transactions, and mobile devices, is increasing rapidly. This phenomenon is known as big data. Big data has unique characteristics, often summarised in "3V": Volume, Variety, and Velocity. Volume refers to the large amount of data, Variety refers to the different types of data that exist, while Velocity describes the speed at which new data is generated and must be processed. (Madhuri et al., 2022)..

Big data is a collection of very large, diverse, and complex data that cannot be processed using conventional methods and tools. The main characteristics of big data are referred to as "3V": Volume (huge amount of data), Variety (diversity of data types such as text, images, videos, and sensor data), and Velocity (high speed in acquiring and processing data). (Moorthy & Gandhi, 2022). In this context, big data requires advanced technologies and specialised algorithms, such as artificial intelligence (AI) and machine learning (ML), to extract valuable information and support more efficient and effective decision-making in various industry sectors. (Samuel et al., 2023).

Processing big data requires technology that can analyse it quickly and efficiently to extract valuable information from it. This is what makes Artificial Intelligence (AI) and Machine Learning (ML) algorithms increasingly relevant. (Wang, 2024).

Artificial Intelligence (AI) and Machine Learning (ML) algorithms are sets of instructions or procedures designed to enable computers to perform certain tasks that would normally require human intelligence. AI algorithms include various techniques and models that allow computers to perform functions such as reasoning, natural language understanding, and pattern recognition. (Mittal et al., 2021).. Machine Learning is a sub-