

MACHINE LEARNING APPLICATIONS

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INTRODUCTION



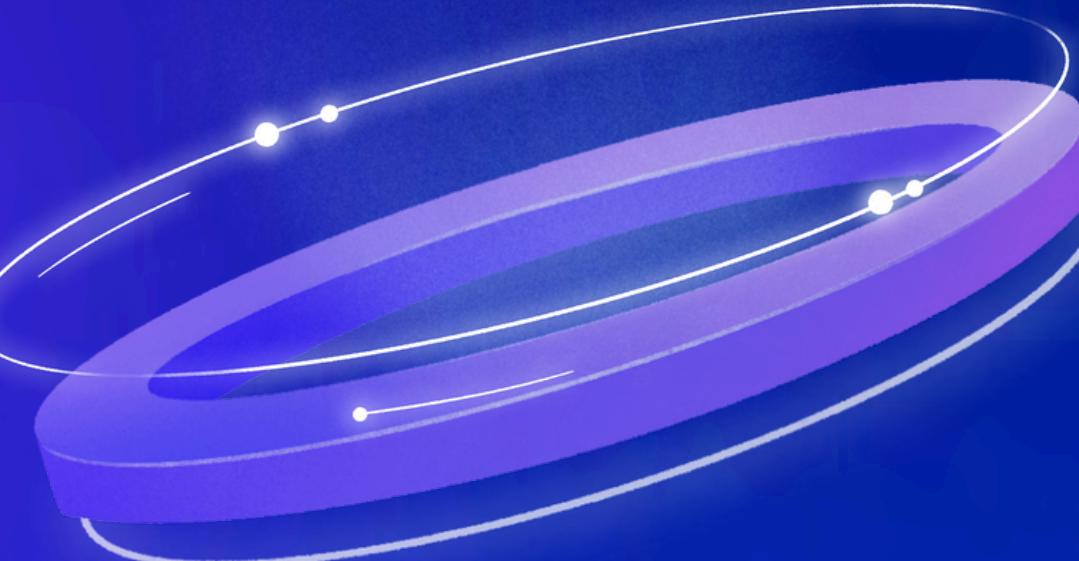
MACHINE LEARNING

Machine learning (ML) is a branch of artificial intelligence focused on creating and analyzing statistical algorithms that learn from data. These algorithms can apply their knowledge to new, unseen data, allowing them to perform tasks without direct instructions. Recently, artificial neural networks have achieved better performance than many earlier methods.

Machine learning is continually evolving, with advancements in deep learning, transfer learning, and automated machine learning (AutoML) fueling new innovations and applications across diverse fields.



TYPES OF ML



DIFFERENT TYPES OF MACHINE LEARNING

01

Supervised Learning involves training a model on a labeled dataset, where each example has a corresponding output label. The objective is to learn the mapping from inputs to outputs, enabling predictions on new, unseen data. Common algorithms include linear regression, logistic regression, decision trees, and support vector machines.

02

Unsupervised Learning involves training a model on unlabelled data to discover patterns or structures. It's commonly used for clustering and association tasks, with popular algorithms including k-means clustering, hierarchical clustering, and principal component analysis (PCA).

03

Reinforcement Learning This method enables an agent to make decisions by acting in an environment to maximize cumulative rewards. The agent receives feedback through rewards or penalties based on its actions. It is widely applied in robotics, gaming, and autonomous systems. Key concepts include exploration vs. exploitation and Markov decision processes.

APPLICATIONS



HEALTHCARE



Disease Diagnosis

Machine learning algorithms analyze medical data, including X-rays, MRIs, and patient records. This analysis aids healthcare professionals in diagnosing diseases and improving accuracy. Deep learning models are effective in identifying tumors in imaging, helping radiologists make better-informed patient care decisions. Incorporating machine learning enhances the quality of healthcare.

The type of machine learning described in the text is primarily supervised learning. This approach involves training algorithms on labeled datasets, such as annotated medical images (e.g., X-rays, MRIs) and patient records, to teach the models to recognize patterns associated with specific diseases or conditions. Additionally, the mention of deep learning models suggests the use of neural networks, which are a subset of supervised learning techniques particularly effective for image analysis tasks.

FINANCE



Fraud Detection

Financial institutions use machine learning to detect fraudulent transactions by analyzing transaction data patterns. Algorithms learn from historical data to identify anomalies and flag suspicious activities in real-time, reducing financial losses and improving security.

The system described uses supervised learning, as it relies on historical transaction data that is labeled as either fraudulent or non-fraudulent. The algorithms learn from this labeled data to identify patterns and anomalies, allowing them to predict and flag suspicious activities in real-time. Additionally, unsupervised learning techniques may also be employed to detect anomalies without labeled examples, but the primary approach in this context is typically supervised learning.

RETAIL



Recommendation System

E-commerce platforms utilize machine learning to provide personalized product recommendations to users. By analyzing customer behavior, purchase history, and preferences, these systems can suggest items that a customer is likely to buy, improving user experience and increasing sales.

This approach significantly enhances the quality of recommendations by continuously learning from user interactions and experiences. It effectively adapts to changes in user preferences over time, ensuring that the suggestions remain relevant and aligned with the evolving interests of the users.

THANK YOU!

