**Machine learning** (**ML**) is a [field of study](https://en.wikipedia.org/wiki/Field_of_study) in [artificial intelligence](https://en.wikipedia.org/wiki/Artificial_intelligence) concerned with the development and study of [statistical algorithms](https://en.wikipedia.org/wiki/Computational_statistics) that can learn from [data](https://en.wikipedia.org/wiki/Data) and [generalise](https://en.wikipedia.org/wiki/Generalise" \o "Generalise) to unseen data, and thus perform [tasks](https://en.wikipedia.org/wiki/Task_(computing)) without explicit [instructions](https://en.wikipedia.org/wiki/Machine_code).[[1]](https://en.wikipedia.org/wiki/Machine_learning#cite_note-1) Within a subdiscipline in machine learning, advances in the field of [deep learning](https://en.wikipedia.org/wiki/Deep_learning) have allowed [neural networks](https://en.wikipedia.org/wiki/Neural_network_(machine_learning)), a class of statistical algorithms, to surpass many previous machine learning approaches in performance.[[2]](https://en.wikipedia.org/wiki/Machine_learning#cite_note-ibm-2)

ML finds application in many fields, including [natural language processing](https://en.wikipedia.org/wiki/Natural_language_processing), [computer vision](https://en.wikipedia.org/wiki/Computer_vision), [speech recognition](https://en.wikipedia.org/wiki/Speech_recognition), [email filtering](https://en.wikipedia.org/wiki/Email_filtering), [agriculture](https://en.wikipedia.org/wiki/Agriculture), and [medicine](https://en.wikipedia.org/wiki/Medicine).[[3]](https://en.wikipedia.org/wiki/Machine_learning#cite_note-tvt-3)[[4]](https://en.wikipedia.org/wiki/Machine_learning#cite_note-YoosefzadehNajafabadi-2021-4) The application of ML to business problems is known as [predictive analytics](https://en.wikipedia.org/wiki/Predictive_analytics).

[Statistics](https://en.wikipedia.org/wiki/Statistics) and [mathematical optimisation](https://en.wikipedia.org/wiki/Mathematical_optimisation) (mathematical programming) methods comprise the foundations of machine learning. [Data mining](https://en.wikipedia.org/wiki/Data_mining) is a related field of study, focusing on [exploratory data analysis](https://en.wikipedia.org/wiki/Exploratory_data_analysis) (EDA) via [unsupervised learning](https://en.wikipedia.org/wiki/Unsupervised_learning).[[6]](https://en.wikipedia.org/wiki/Machine_learning#cite_note-6)[[7]](https://en.wikipedia.org/wiki/Machine_learning#cite_note-Friedman-1998-7)

From a theoretical viewpoint, [probably approximately correct learning](https://en.wikipedia.org/wiki/Probably_approximately_correct_learning) provides a framework for describing machine learning.