

Evaluating Learning Algorithms A Classification Perspective

Nathalie Japkowicz

S2CID 27083226. Japkowicz, Nathalie; Shah, Mohak (2011). Evaluating Learning Algorithms: A Classification Perspective (1 ed.). Cambridge University Press. doi:10

Nathalie Japkowicz is a Canadian computer scientist specializing in machine learning. She is a professor and department chair of computer science at the American University College of Arts and Sciences.

Machine learning

Machine learning (ML) is a field of study in artificial intelligence concerned with the development and study of statistical algorithms that can learn

Machine learning (ML) is a field of study in artificial intelligence concerned with the development and study of statistical algorithms that can learn from data and generalise to unseen data, and thus perform tasks without explicit instructions. Within a subdiscipline in machine learning, advances in the field of deep learning have allowed neural networks, a class of statistical algorithms, to surpass many previous machine learning approaches in performance.

ML finds application in many fields, including natural language processing, computer vision, speech recognition, email filtering, agriculture, and medicine. The application of ML to business problems is known as predictive analytics.

Statistics and mathematical optimisation (mathematical programming) methods comprise the foundations of...

Outline of machine learning

and construction of algorithms that can learn from and make predictions on data. These algorithms operate by building a model from a training set of example

The following outline is provided as an overview of, and topical guide to, machine learning:

Machine learning (ML) is a subfield of artificial intelligence within computer science that evolved from the study of pattern recognition and computational learning theory. In 1959, Arthur Samuel defined machine learning as a "field of study that gives computers the ability to learn without being explicitly programmed". ML involves the study and

construction of algorithms that can learn from and make predictions on data. These algorithms operate by building a model from a training set of example observations to make data-driven predictions or decisions expressed as outputs, rather than following strictly static program instructions.

Active learning (machine learning)

Active learning is a special case of machine learning in which a learning algorithm can interactively query a human user (or some other information source)

Active learning is a special case of machine learning in which a learning algorithm can interactively query a human user (or some other information source), to label new data points with the desired outputs. The human user must possess knowledge/expertise in the problem domain, including the ability to consult/research authoritative sources when necessary. In statistics literature, it is sometimes also called optimal experimental design. The information source is also called teacher or oracle.

There are situations in which unlabeled data is abundant but manual labeling is expensive. In such a scenario, learning algorithms can actively query the user/teacher for labels. This type of iterative supervised learning is called active learning. Since the learner chooses the examples, the number of...

Ensemble learning

better. Ensemble learning trains two or more machine learning algorithms on a specific classification or regression task. The algorithms within the ensemble

In statistics and machine learning, ensemble methods use multiple learning algorithms to obtain better predictive performance than could be obtained from any of the constituent learning algorithms alone.

Unlike a statistical ensemble in statistical mechanics, which is usually infinite, a machine learning ensemble consists of only a concrete finite set of alternative models, but typically allows for much more flexible structure to exist among those alternatives.

Multiclass classification

In machine learning and statistical classification, multiclass classification or multinomial classification is the problem of classifying instances into

In machine learning and statistical classification, multiclass classification or multinomial classification is the problem of classifying instances into one of three or more classes (classifying instances into one of two classes is called binary classification). For example, deciding on whether an image is showing a banana, peach, orange, or an apple is a multiclass classification problem, with four possible classes (banana, peach, orange, apple), while deciding on whether an image contains an apple or not is a binary classification problem (with the two possible classes being: apple, no apple).

While many classification algorithms (notably multinomial logistic regression) naturally permit the use of more than two classes, some are by nature binary algorithms; these can, however, be turned...

Memetic algorithm

referred to in the literature as Baldwinian evolutionary algorithms, Lamarckian EAs, cultural algorithms, or genetic local search. Inspired by both Darwinian

In computer science and operations research, a memetic algorithm (MA) is an extension of an evolutionary algorithm (EA) that aims to accelerate the evolutionary search for the optimum. An EA is a metaheuristic that reproduces the basic principles of biological evolution as a computer algorithm in order to solve challenging optimization or planning tasks, at least approximately. An MA uses one or more suitable heuristics or local search techniques to improve the quality of solutions generated by the EA and to speed up the search. The effects on the reliability of finding the global optimum depend on both the use case and the design of the MA.

Memetic algorithms represent one of the recent growing areas of research in evolutionary computation. The term MA is now widely used as a synergy of evolutionary...

Meta-learning (computer science)

Meta-learning is a subfield of machine learning where automatic learning algorithms are applied to metadata about machine learning experiments. As of

Meta-learning

is a subfield of machine learning where automatic learning algorithms are applied to metadata about machine learning experiments. As of 2017, the term had not found a standard interpretation, however the main goal is to use such metadata to understand how automatic learning can become flexible in solving learning problems, hence to improve the performance of existing learning algorithms or to learn (induce) the learning algorithm itself, hence the alternative term learning to learn.

Flexibility is important because each learning algorithm is based on a set of assumptions about the data, its inductive bias. This means that it will only learn well if the bias matches the learning problem. A learning algorithm may perform very well in one domain, but not on the next. This poses strong...

Algorithmic bias

Some algorithms collect their own data based on human-selected criteria, which can also reflect the bias of human designers. Other algorithms may reinforce

Algorithmic bias describes systematic and repeatable harmful tendency in a computerized sociotechnical system to create "unfair" outcomes, such as "privileging" one category over another in ways different from the intended function of the algorithm.

Bias can emerge from many factors, including but not limited to the design of the algorithm or the unintended or unanticipated use or decisions relating to the way data is coded, collected, selected or used to train the algorithm. For example, algorithmic bias has been observed in search engine results and social media platforms. This bias can have impacts ranging from inadvertent privacy violations to reinforcing social biases of race, gender, sexuality, and ethnicity. The study of algorithmic bias is most concerned with algorithms that reflect...

Deep learning

In machine learning, deep learning focuses on utilizing multilayered neural networks to perform tasks such as classification, regression, and representation

In machine learning, deep learning focuses on utilizing multilayered neural networks to perform tasks such as classification, regression, and representation learning. The field takes inspiration from biological neuroscience and is centered around stacking artificial neurons into layers and "training" them to process data. The adjective "deep" refers to the use of multiple layers (ranging from three to several hundred or thousands) in the network. Methods used can be supervised, semi-supervised or unsupervised.

Some common deep learning network architectures include fully connected networks, deep belief networks, recurrent neural networks, convolutional neural networks, generative adversarial networks, transformers, and neural radiance fields. These architectures have been applied to fields...

https://uk.fulldoc.me/lib/160926/69345HU135/honda_accord-repair-manual_download_free.pdf

https://uk.fulldoc.me/edu/cp162609/P79C961180224540/honda_cbr600rr-workshop_repair_manual-download_2007_2009.pdf

https://uk.fulldoc.me/ppt/jn/3J1671N133260916/solution_manual_of_computer_concepts-2013.pdf

https://uk.fulldoc.me/doc/et162609/37796T9E46224540/answers_to_questions_about-the_nightingale_and-the_glow.pdf

https://uk.fulldoc.me/ppt/ht162609/9593547HT1224540/mechanics_of_materials_solution-manual-pytel.pdf

https://uk.fulldoc.me/lib/160926/82A177R347/college_1st_puc_sanskrit_ncert_solutions.pdf

https://uk.fulldoc.me/pub/160926/D66Q282143/johnson_outboard-115etl78-manual.pdf

<https://uk.fulldoc.me/short/67141UV672/88109UV/electrical-insulation.pdf>

https://uk.fulldoc.me/journal/224540/UQ86626/ch_12_managerial-accounting-edition_garrison_solutions.pdf

https://uk.fulldoc.me/lib/224540/97834YY/african_american_womens_language-discourse-education_and-identity.pdf