**CURSO DE MACHINE LEARNING**

Hi, Jason here from Machine Learning Mastery.  
  
[You can download your mind-map here](http://t.dripemail2.com/c/eyJhY2NvdW50X2lkIjoiOTU1NjU4OCIsImRlbGl2ZXJ5X2lkIjoiMTM4NzEzODUwMyIsInVybCI6Imh0dHBzOi8vczMuYW1hem9uYXdzLmNvbS9NTE1hc3RlcnkvTWFjaGluZUxlYXJuaW5nQWxnb3JpdGhtcy5wbmc_X19zPWo4eWt1azdwaGVpcXA4ZWptYTF6In0).  
  
I'm really excited that you have joined me on my machine learning algorithms mini-course.   
  
Over the next 14 lessons, you will discover how machine learning algorithms work and take a tour of 10 top algorithms.  
  
Let's take a look at what is ahead for you in this course:  
  
Algorithm Foundations

* Lesson 1: How To Talk About Data in Machine Learning
* Lesson 2: Principle That Underpins All Algorithms
* Lesson 3: Parametric and Nonparametric Algorithms
* Lesson 4: Bias, Variance and the Trade-off

Linear Algorithms

* Lesson 5: Linear Regression
* Lesson 6: Logistic Regression
* Lesson 7: Linear Discriminant Analysis

Nonlinear Algorithms

* Lesson 8: Classification and Regression Trees
* Lesson 9: Naive Bayes
* Lesson 10: k-Nearest Neighbors
* Lesson 11: Learning Vector Quantization
* Lesson 12: Support Vector Machines

Ensemble Algorithms

* Lesson 13: Bagging and Random Forest
* Lesson 14: Boosting and AdaBoost

Take your time and complete the lessons at your own pace.  
  
This is going to be great!  
I'll send you the first lesson in just a few minutes.  
  
Jason.  
  
P.S. Ready to take the next step? Get 10 gentle algorithm descriptions, 12 tutorial lessons and 16 spreadsheets showing you how it all works in my popular Ebook [Master Machine Learning Algorithms](http://t.dripemail2.com/c/eyJhY2NvdW50X2lkIjoiOTU1NjU4OCIsImRlbGl2ZXJ5X2lkIjoiMTM4NzEzODUwMyIsInVybCI6Imh0dHBzOi8vbWFjaGluZWxlYXJuaW5nbWFzdGVyeS5jb20vbWFzdGVyLW1hY2hpbmUtbGVhcm5pbmctYWxnb3JpdGhtcy8_X19zPWo4eWt1azdwaGVpcXA4ZWptYTF6In0).

1. **Lesson 1: How To Talk About Data in Machine Learning**

Hi, data plays a big part in machine learning.  
  
It is important to understand and use the right terminology when talking about data.  
  
How do you think about data? Think of a spreadsheet. You have columns, rows, and cells.  
  
The statistical perspective of machine learning frames data in the context of a hypothetical function (f) that the machine learning algorithm aims to learn. Given some input variables (Input)  the function answer the question as to what is the predicted output variable (Output).  
  
Output = f(Input)  
  
The inputs and outputs can be referred to as variables or vectors.  
  
The computer science perspective uses a row of data to describe an entity (like a person) or an observation about an entity. As such, the columns for a row are often referred to as attributes of the observation and the rows themselves are called instances.  
  
In the next lesson, you will discover the principle that underpins all machine learning algorithms.  
  
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1. **Lesson 2: The Principle That Underpins All Algorithms**

Hi, there is a common principle that underlies all supervised machine learning algorithms for predictive modeling.

Machine learning algorithms are described as learning a target function (f) that best maps input variables (X) to an output variable (Y).

Y = f(X)

This is a general learning task where we would like to make predictions in the future (Y) given new examples of input variables (X). We don't know what the function (f) looks like or its form. If we did, we would use it directly and we would not need to learn it from data using machine learning algorithms.

The most common type of machine learning is to learn the mapping Y = f(X) to make predictions of Y for new X. This is called predictive modeling or predictive analytics and our goal is to make the most accurate predictions possible.  
  
In the next lesson, you will discover the difference between parametric and nonparametric algorithms.  
  
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1. **Lesson 3: Parametric and Nonparametric Algorithms**

Hi, what is a parametric machine learning algorithm and how is it different from a nonparametric machine learning algorithm?

Assumptions can greatly simplify the learning process, but can also limit what can be learned. Algorithms that simplify the function to a known form are called parametric machine learning algorithms.

The algorithms involve two steps:

* Select a form for the function.
* Learn the coefficients for the function from the training data.

Some examples of parametric machine learning algorithms are Linear Regression and Logistic Regression.

Algorithms that do not make strong assumptions about the form of the mapping function are called nonparametric machine learning algorithms. By not making assumptions, they are free to learn any functional form from the training data.

Non-parametric methods are often more flexible, achieve better accuracy but require a lot more data and training time.

Examples of nonparametric algorithms include Support Vector Machines, Neural Networks and Decision Trees.  
  
In the next lesson, you will discover the bias-variance trade-off.  
  
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1. **Lesson 4: Bias, Variance and the Trade-off**

Hi, machine learning algorithms can best be understood through the lens of the bias-variance trade-off.

Bias are the simplifying assumptions made by a model to make the target function easier to learn.

Generally, parametric algorithms have a high bias making them fast to learn and easier to understand but generally less flexible. In turn, they have lower predictive performance on complex problems that fail to meet the simplifying assumptions of the algorithms bias.

Decision trees are an example of a low bias algorithm, whereas linear regression is an example of a high-bias algorithm.

Variance is the amount that the estimate of the target function will change if different training data was used. The target function is estimated from the training data by a machine learning algorithm, so we should expect the algorithm to have some variance, not zero variance.

The k-Nearest Neighbors algorithm is an example of a high-variance algorithm, whereas Linear Discriminant Analysis is an example of a low variance algorithm.

The goal of any predictive modeling machine learning algorithm is to achieve low bias and low variance. In turn, the algorithm should achieve good prediction performance. The parameterization of machine learning algorithms is often a battle to balance out bias and variance.

* Increasing the bias will decrease the variance.
* Increasing the variance will decrease the bias.

In the next lesson, you will discover the Linear Regression algorithm.  
  
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1. **Lesson 5: Linear Regression Algorithm**

Hi, linear regression is perhaps one of the most well-known and well-understood algorithms in statistics and machine learning.

Isn't it a technique from statistics?

Predictive modeling is primarily concerned with minimizing the error of a model or making the most accurate predictions possible, at the expense of explainability. We will borrow, reuse and steal algorithms from many different fields, including statistics and use them towards these ends.

The representation of linear regression is an equation that describes a line that best fits the relationship between the input variables (x) and the output variables (y), by finding specific weightings for the input variables called coefficients (B).

For example:

y = B0 + B1 \* x

We will predict y given the input x and the goal of the linear regression learning algorithm is to find the values for the coefficients B0 and B1.

Different techniques can be used to learn the linear regression model from data, such as a linear algebra solution for ordinary least squares and gradient descent optimization.

Linear regression has been around for more than 200 years and has been extensively studied. Some good rules of thumb when using this technique are to remove variables that are very similar (correlated) and to remove noise from your data, if possible.

It is a fast and simple technique and good first algorithm to try.  
  
In the next lesson, you will discover the Logistic Regression algorithm.  
  
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