I ♥ Algorithms!

Welcome to you **print-at-home version** of the I Love Algorithms card deck. Simply print at home (color is best!) and cut out the cards to begin playing with algorithms. This deck can be used as-is, on its own, or go to **https://dschool.stanford.edu/emerging-tech** to pair with other tools we're building.

Spread the love...
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d.
HASSO PLATTNER
Institute of Design at Stanford

d.

I ♥ Algorithms!

I love...what?
An algorithm is a piece of code that helps process, manipulate, or investigate a data set. There are many types of algorithms used in machine learning. Machine learning is a way of analyzing big data sets where the computer learns and gets better at its analysis with time.

This card deck describes six different machine learning algorithms. Since *humans* all learn differently, we show each algorithm in three ways: (1) text description, (2) cartoon, and (3) types of questions you might be asking yourself.

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I ♥ Algorithms!

So...why do I need to know anything about algorithms?
In order for the technologies of today and tomorrow (and all of the things that they power) to *represent* all of us, they need to be *built* by all of us. You don't need to be the coder, but you need to know what the code can do.

If you understand what machine learning algorithms can do, you can better envision the implications of your designs. You can influence conversations about data and bias.

d.

I ♥ Algorithms!

Can my love run deeper than these six algorithms?
Of course. This deck includes the basic types of machine learning algorithms, but there are many ways to expand on this content in future versions.

One concept we have not covered here is deep learning. Deep learning is a type of machine learning where the computer learns what to do without being explicitly programmed to do so. It is the gateway to things like speech and image recognition, analysis of text, and much more. Neat!

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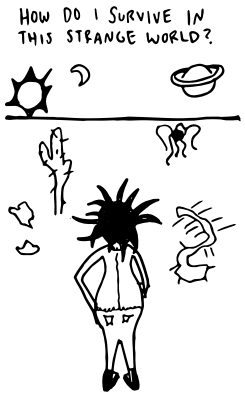
Reinforcement Learning

Put your machine into an environment and give it a goal. It begins to interact and uses trial and error to figure out what to do. It wants to win more than anything. Useful in robotics. Useful for figuring out ideal behavior in a given situation in order to maximize performance.

d.

Reinforcement Learning



d.

Reinforcement Learning

How do I win this game?

How might this car drive itself?

How to optimize marketing so someone will click click click?

d.

Regression

For finding cause and effect between different variables. Useful for forecasting (like the weather) or for things where historical data helps predict the future. Regression is your trend-finder. Feed it the data and example answers. It compares its answers with the right ones to get better.

d.

Regression

d.

Regression

How much will my tiny house on the flood plain be worth in 2020?

Did someone really buy 18 inflatable swans or is that a fraudulent transaction?

(SEEMS LEGIT)

d.

Dimensionality Reduction

Reduces the number of variables in a data set but keeps the important stuff. Good for raw data sets where a lot of features might be redundant or irrelevant. Helps see the forest through the trees. You give it the data but the machine figures out how to clean it up.

d.

Dimensionality Reduction

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Dimensionality Reduction

Can you just tell me what's important in my data!!?

d.

Clustering

Groups similar things together. Makes groups where objects in one group are more similar to each other than to a different group. You give this the data, but the machine figures out how it's related.

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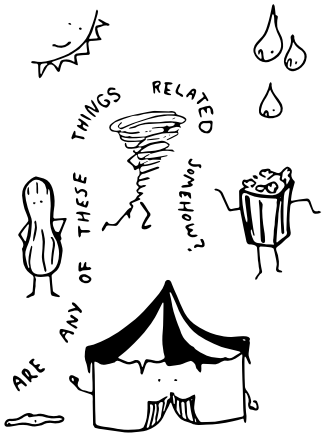
Clustering



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Clustering

ARE YOU WONDERING THINGS LIKE...

I need to market these ripped jeans, are there certain types of groups that I should target specifically?

How are the the world's consumers of kombucha related? What are the sub-segments?

fermentation 4eva!

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Association

Are certain things likely to happen together? The algorithm finds hidden relationships. You give it the data, but the machine figures out how it's related.

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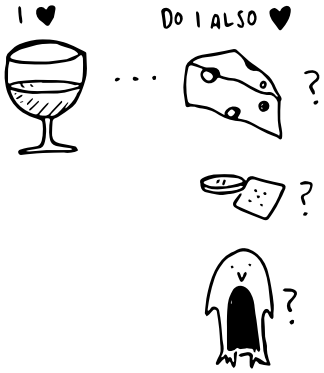

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DO YOU HAVE THIS TYPE OF QUESTION...

If someone buys a donut, are they 99% likely to also get a coffee? DUH

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Classification

This algorithm predicts what category something might land in. You (the human) supervise it. You give it the data and you tell it what categories to pick from. It can compare its answers with the right ones and get better.

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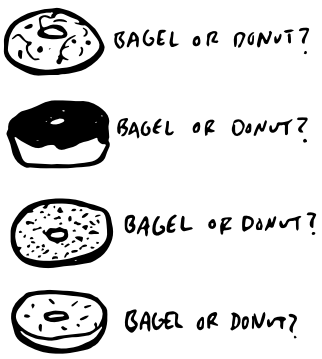

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Classification

Is this a picture of hot dogs or legs?

Does this x-ray indicate the patient has pneumonia?

Is that a noun or a verb or an adjective?

Am I in the car lane or the bike lane?

ARE YOU ASKING YOURSELF...

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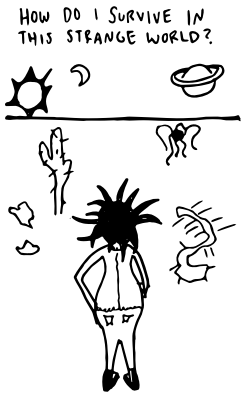

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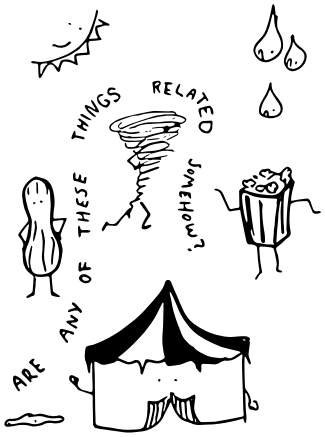

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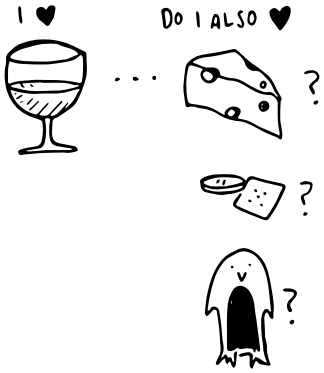

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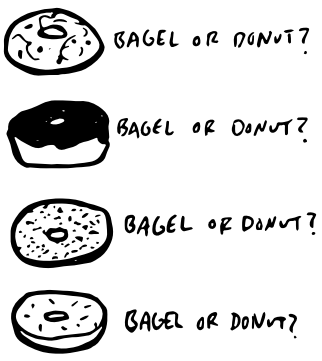

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