Life as an ML Engineer

David Rasch - Infinia ML

July 10, 2018

Intro

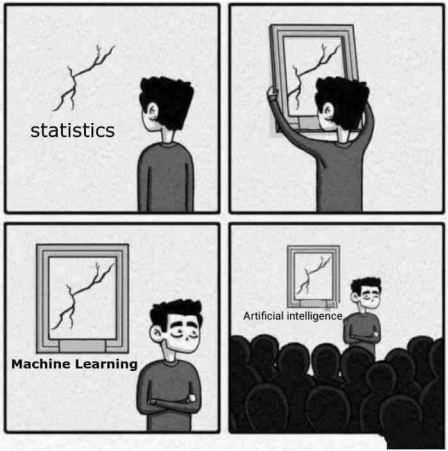
Objectives

1. Think about ML from an engineering perspective

Objectives

1. Think about ML from an engineering perspective
2. Learn some of the terminology used to help converse between Data Scientists and Engineers like:

ai vs statistics



you're going to need some data

you need to know what you're trying to do

- user stories

you need to know what you're trying to do

- user stories
- business problem?

you need to know what you're trying to do

- user stories
- business problem?
- black box function

picking your algorithm

- look at your data

picking your algorithm

- look at your data
- look at your inputs

picking your algorithm

- look at your data
- look at your inputs
- look at your outputs

picking your algorithm

- look at your data
- look at your inputs
- look at your outputs
- phone a friend

picking your algorithm

- look at your data
- look at your inputs
- look at your outputs
- phone a friend
  - scikit learn flow chart

picking your algorithm

- look at your data
- look at your inputs
- look at your outputs
- phone a friend
  - scikit learn flow chart
  - or just use deep learning, it's cool

picking your algorithm

- look at your data
- look at your inputs
- look at your outputs
- phone a friend
  - scikit learn flow chart
  - or just use deep learning, it's cool
- interpretability

don't forget to look for prior art

- Look at UNet, VGG-16, YOLO, and many other hyped algorithms.

don't forget to look for prior art

- Look at UNet, VGG-16, YOLO, and many other hyped algorithms.
- Tensorflow has many sets of "pre-trained" weights available to solve problems without training them all yourself.

this was a whole section on data prep

- new api

this was a whole section on data prep

- new api
- new csv from a customer

things that matter for ML

- noramalizing or "whitening"

things that matter for ML

- noramalizing or "whitening"
- binning

things that matter for ML

- noramalizing or "whitening"
- binning
- missing values

regression

pre-jargon

- letters

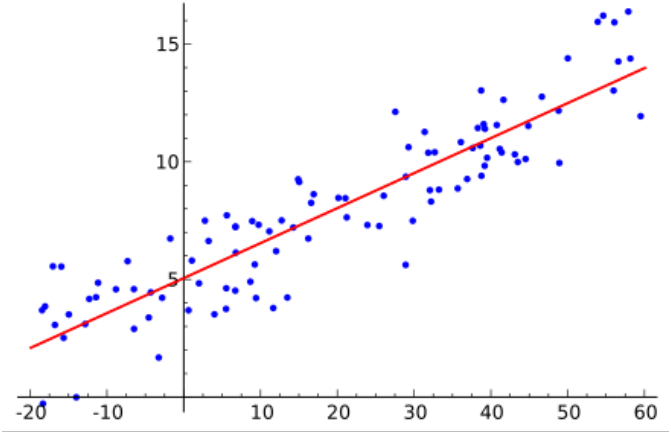
pre-jargon

- letters
- $Y = mx + b$

pre-jargon (cont'd)

$$Y = Wx + b$$

regression



what if there are multiple variables?

- $y = W_1 x_1 + b$

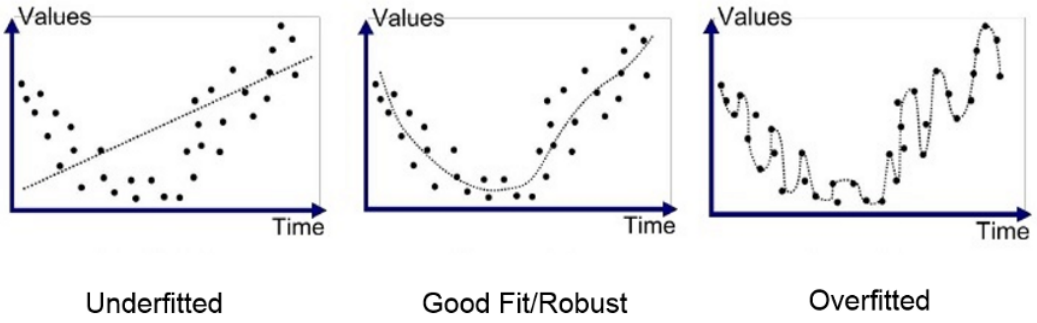
what if there are multiple variables?

- $y = W_1 x_1 + b$
- $y = W_1 x_1 + W_2 x_2 + b$

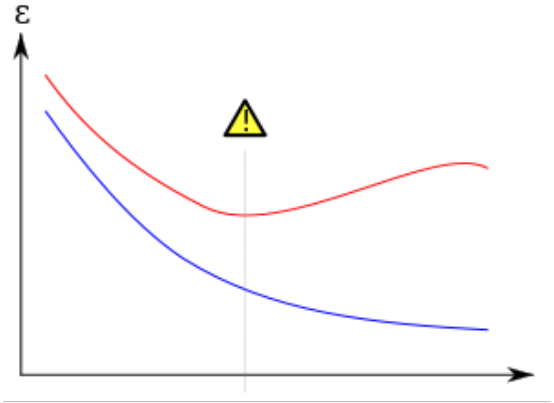
what if there are multiple variables?

- $y = W_1 x_1 + b$
- $y = W_1 x_1 + W_2 x_2 + b$
- $y = Wx + b$

overfitting

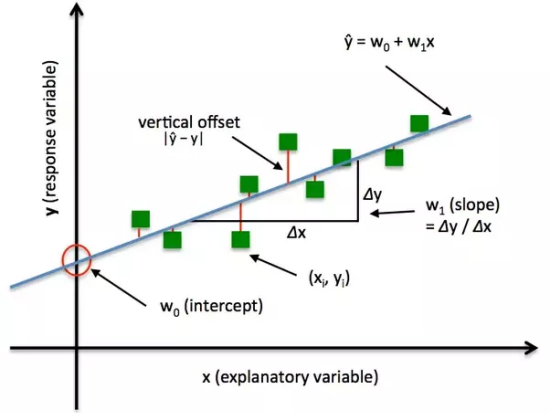


overfitting



gradient descent

losing it (loss function)



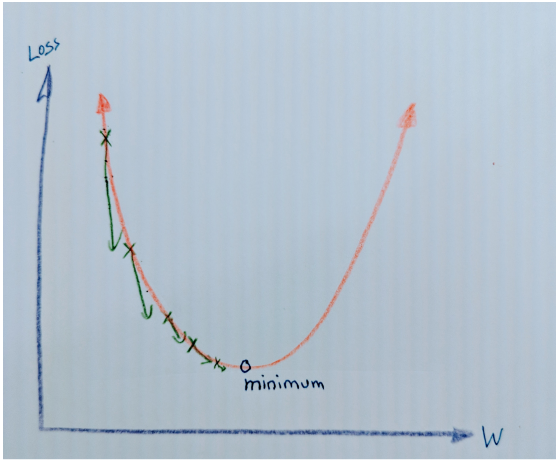
little bit of math

$$\sum_{x}(Wx + b - y_x)^2$$

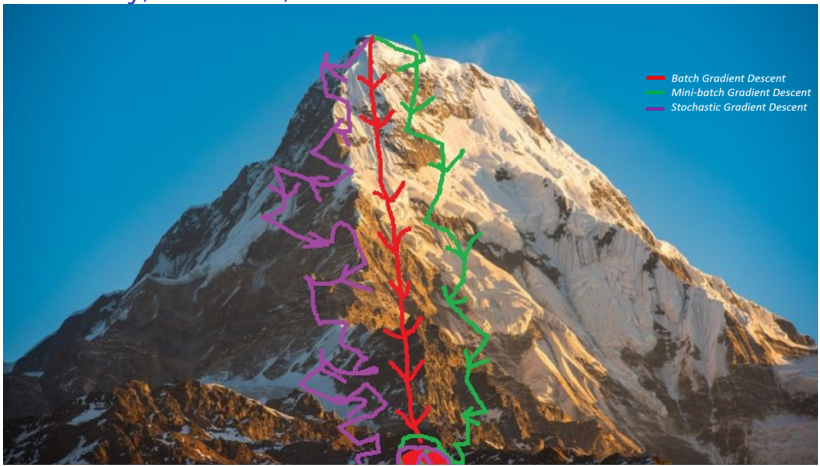
little bit of math

$$\arg\min_{W,b} \sum_{x} (Wx + b - y_x)^2$$

gradient descent



stochasticity, batches, and mini-batches



tensors and flow graph

tensors

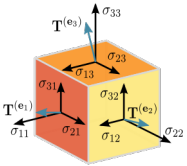
- linear relation between vectors, scalars, or other tensors

tensors

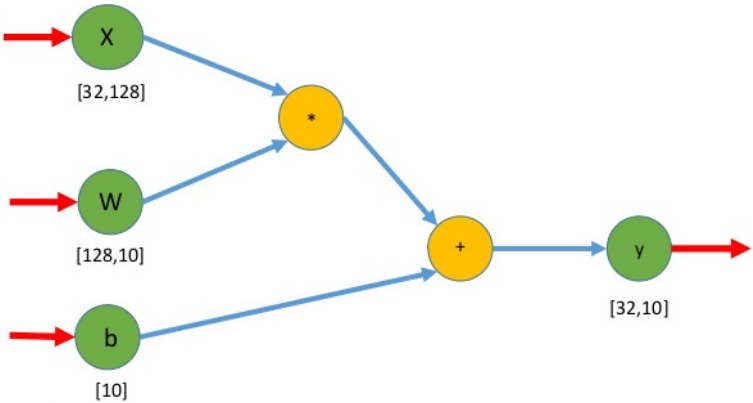
- linear relation between vectors, scalars, or other tensors
- practically: multi-dimensional array

tensors

- linear relation between vectors, scalars, or other tensors
- practically: multi-dimensional array



computational flow graph



questions?

other resources

other learning resources

- http://fast.ai
- https://hackernoon.com/choosing-the-right-machine-learning-algorithm-68126944ce1f
- http://ml-cheatsheet.readthedocs.io/en/latest/linear_regression.html

image credits

- ai vs stats
- regression
- overfitting
- more overfitting
- loss functions
- gradient descent
- tensors
- tensorflow graph