machine learning for artists

RAY LC

traditional programming: explicitly declare

machine learning: fuzzy knowledge

machine learning: inductive trained experience

Conventional Program

\[ 2 + 2 = 4 \]
\[ 4 + 3 = 7 \]

Machine Learning Algorithm

\[ \text{\textit{Person}} \]

Always correct about mundane things.

Often correct about complicated things.

varieties of machine learning

SUPERVISED LEARNING

unsupervised learning

depth learning combines this with supervised

SUPERVISED LEARNING

REINFORCEMENT LEARNING

today's topic

learning of actions-values or state-values
so what is supervised machine learning?

move the line to minimize errors

supervised machine learning workflow

single layer perceptron vs human neuron

in reality in the human neuron
multilayer neural network

\[ \Delta w = w - w_{old} \]
\[ = -\text{LearningConstant} \frac{\partial E}{\partial w} \]
\[ = (\text{LearningConstant})(y_{\text{target}} - y)(\varepsilon) \]
\[ w = w_{old} + (\text{LearningConstant})(y_{\text{target}} - y)(\varepsilon) \]

multilayer neural network: credit assignment

gradient descent in weight space

weight updating using backpropagation

multilayer net for statistical regression

over generalization

mitigate using unsupervised learning (nonsep. patterns)
and now, your exercise

- find photos online that you want to use ML to recognize.
- use ml5.min.js package and an online engine to classify them.
- let's write classifying.html together (or just use mine).
- run local SimpleHTTPServer.
- in js (given you), the call is:
  ```javascript
  classifier = ml5.imageClassifier('MobileNet', function()
    console.log('Model Loaded!');
  });
  then call classifier.predict to make classifications.
  CONTEST: look for images that machines most likely will get wrong.

example images found on web

dishwasher: easier for machine than humans
sun that got classified as orange: harder for machines

Image classification

The MobileNet model labeled this as basketball with a confidence of 0.9907.

Image classification

The MobileNet model labeled this as orange with a confidence of 0.99.

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