Machine Learning

March 11, 2019

Contents

1 Lecture 1

www.image-net.com

1.1 example how to take note in org-mode

- for equations in text, $\sum_1^C n$
- for centered without numered

$$(I_1, I_2)$$

- for numberred and centered

$$f = \frac{1}{2} \tag{1}$$

- multilines

$$f_1 = 2$$
$$f_2 = 3 \tag{2}$$

- `subscript and superscript` I_{12}^{p23}
- `fraction` $\frac{1}{2}$
- `integration` $\int_1^x dx = \iint_\omega f(x,y)dxdy$

2 Lecture 2: Image Classification

Distance Metric to compare images

L1 distnce (Manhattan Distance): $\sum_p |I_1^p - I_2^p|$

2.1 Nearest Neighbor classfier:

Q: With N examples,how fast are training and predicting?

A: Train O(1) Presict O(N)

2.2 K-Nearest Neighbors

take majority Vote form K closest points:

Hyperparameters: k, distance

k-nearest Neighbor on images never used.

- Very slow at test time
- Distance metircs on pixels are not informative
- Curse of dimensionality

CIFAR 10 Parametric Approach

In KNN, there's no weight on each input while in parametric approach, there are parameters or weights.

f(x,W): x : input W: weight/ bias element

For example, f(x,W) = Wx

Linear Classifier: f(x,W) = Wx + b

These functions are score functions.

3 Lecture 3: Loss function

To define the badness (how bad) of the result.

The loss function quantifies our unhappiness with predictions on the training set.