Data Augmentation

- Need more data, esp. for computer vision

- Mirroring

A   B

If A is a cat, B is also a cat

- Random cropping

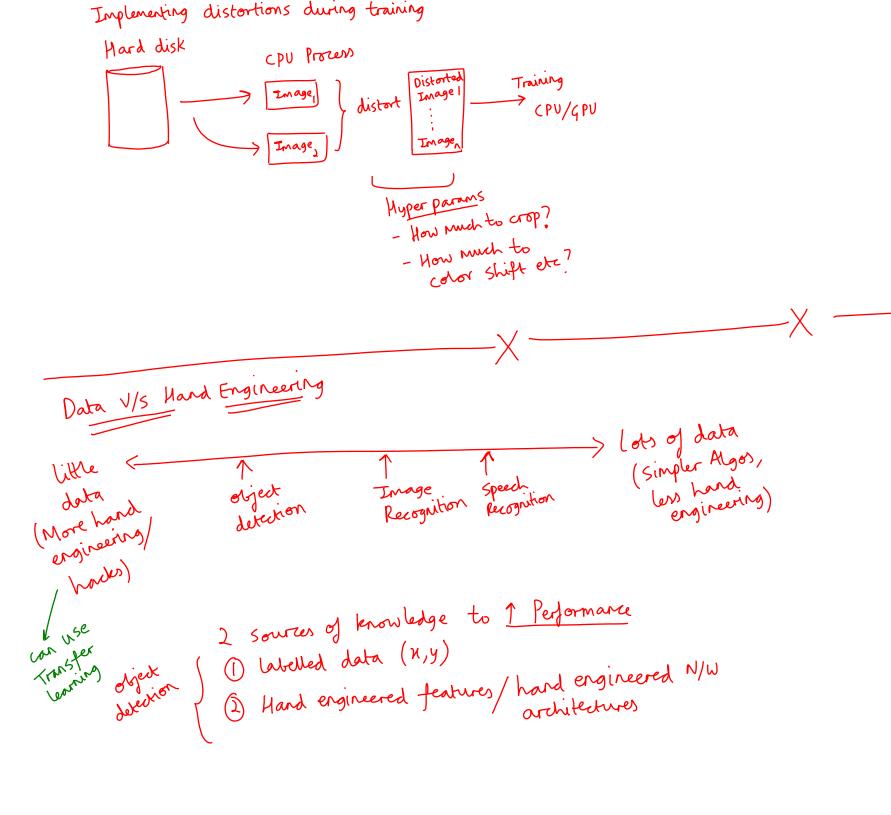→ crop an Image
Randomly, it still preserves
key features to identify it as a cat

- Rotation ⟶

Shearing ⟶
Local wrapping

- Color shifting ⟶ change RGB
values slightly

(PCA color
Augmentation) $(+20, -20, +20)$

Draw these
values from some
prob. dist.

Implementing distortions during training

Hard disk   CPU Process

$Image_1$ distort   Distorted Image 1 ... $Image_n$ → Training CPU/GPU

$Image_2$

Hyper params
- How much to crop?
- How much to color shift etc?

Data V/S Hand Engineering

Little data (More hand engineering/hacks)   ←————————————→   Lots of data (Simpler Algos, less hand engineering)

↑ object detection   ↑ Image Recognition   ↑ Speech Recognition

can use Transfer Learning

2 sources of knowledge to ↑ Performance
object detection {
① labelled data (x, y)
② Hand engineered features/ hand engineered N/W architectures
}

Tips for doing well on benchmarks

① Ensembling
  - Train several networks independently & avg their outputs $(\hat{y})$
        (Not their weights / hyperparams)
        (3 - 15 Networks)

② Multi crop at test time
   Run classifier on multiple versions of test Images & Average Results
        (10 crop)

How 10?

Black center Image
+ Top Left Green
+ Bottom Right Pink
+ Top Right Blue
  + Bottom left orange

   X 2 (Mirror)