MLRF Lecture 06

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Conclusions

Lecture 06 part 05

Course overview: a very small glimpse of CV/PR/ML

Bayes' Theorem – 1763

Template matching – 30+ years

Geometric moments – Hu 62

Many **character descriptors** – 60s-80s

Perceptron – Rosenblatt 62

Texture Features, GLCM – Haralick 73

kD-Trees – Bentley 75

RANSAC – Fischler Bolles 83

Canny detector – Canny 86

Harris detector – Harris Stephens 88

Color histograms – Swain 91

Scale space – Lindeberg 90s

SVMs – Cortes & Vapnik 95

SIFT – Lowe 1999

Random Forests – Breiman 2001

BoVW – Sivic Zisserman 2003

MSER – Matas 2004

LSH – Lv et al 2007

Fischer vector – Perronnin & Dance 2007

SURF – Bay et al 2008

FLANN – Muja & Lowe 2009

Minibatch k-Means – Sculley 2010

VLAD – Jégou, Douze, Schmid, Pérez 2010

ORB – Rublee et al 2011

Welcome to 2012

AlexNet by A. Krizhevsky, I. Sutskever, G. E. Hinton halved error rate on ImageNet competition

ImageNet competition: ~30k categories, 1k sample/category

Synset: people has bounding box
Definition: (plural) any group of human beings (men or women or children) collectively; "old people"; "there were at least 200 people in the audience".

Synset: homo, man, human being, human has bounding box
Definition: any living or extinct member of the family Hominidae characterized by superior intelligence, articulate speech, and erect carriage.

Synset: child, kid has bounding box
Definition: a human offspring (son or daughter) of any age; "they had three children"; "they were able to send their kids to college".

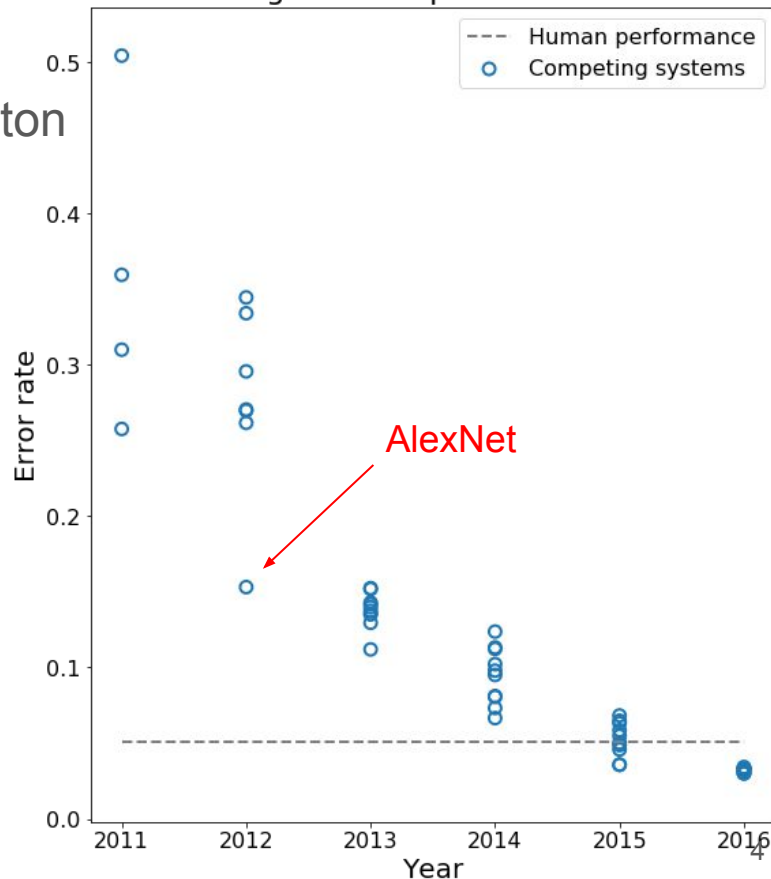**Synset:** case, display case, showcase, vitrine has bounding box
Definition: a glass container used to store and display items in a shop or museum or home.

Synset: house has bounding box
Definition: a dwelling that serves as living quarters for one or more families; "he has a house on Cape Cod"; "she felt she had to get out of the house".

ImageNet competition results

AlexNet

Deep learning

Will be there for a few years!

Is a natural extension of what we saw: feature extraction, encoding, pooling, classification in a **single, integrated, globally optimized pipeline.**

Requires skills you learned: **dev, math, data preparation, evaluation.**
Input data still need to be properly normalized, for instance.

Requires **a lot of practice**: read papers, don't be impressed by the math, implement them.

If not applicable, then pick one of the good old technique we talked about.