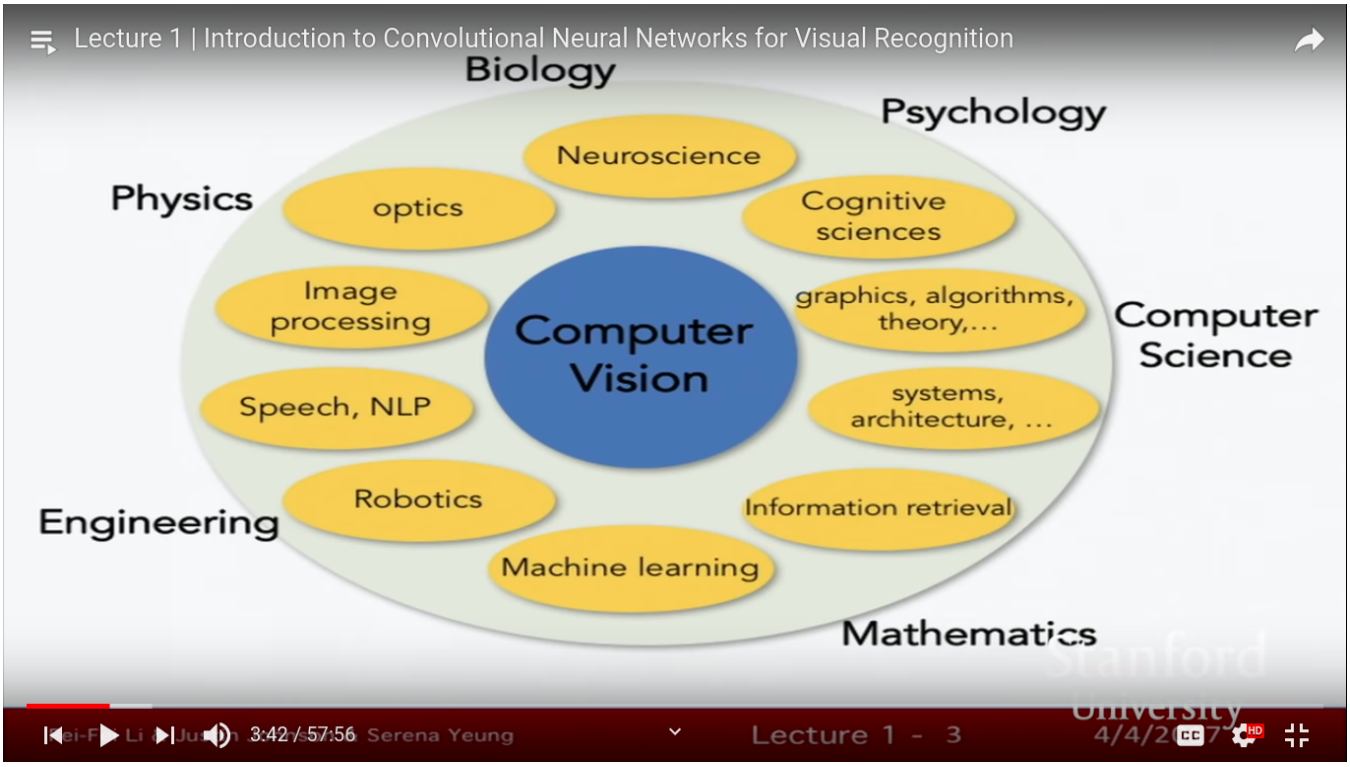
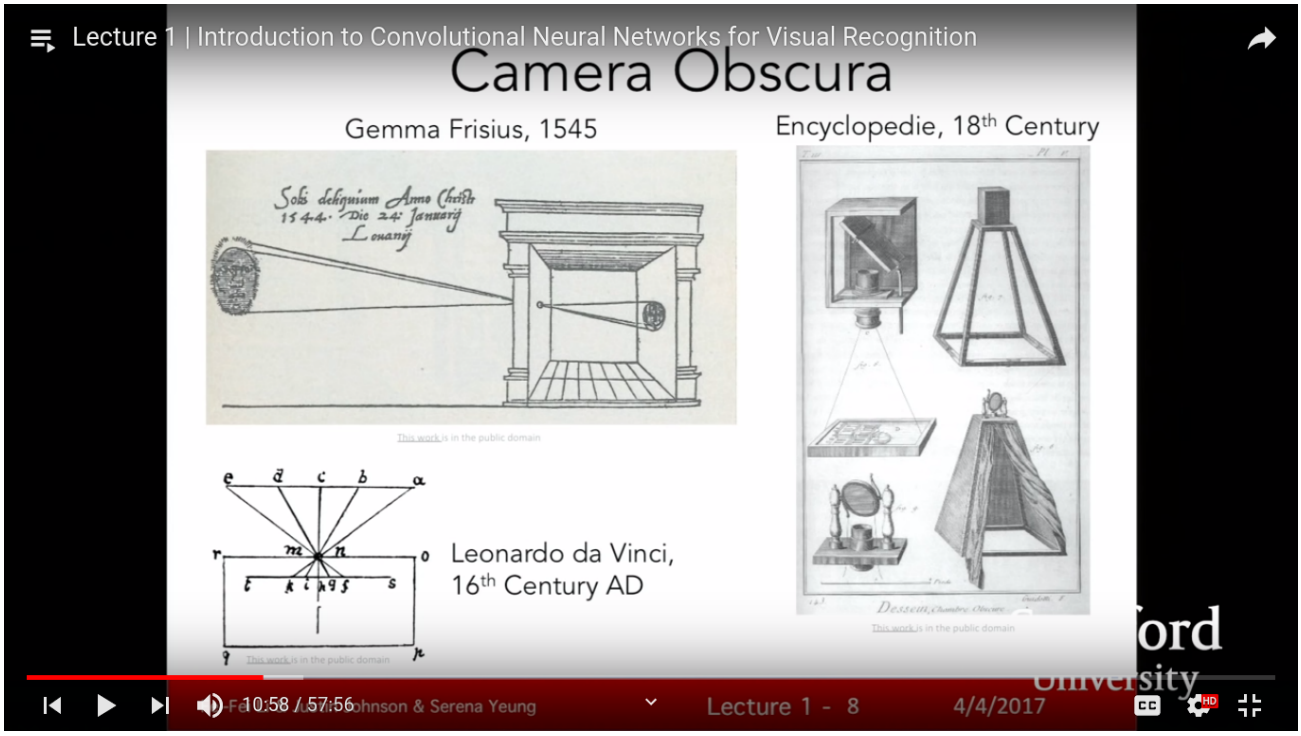
lec1

Lecture 1 notes on 22/10/2019 22:16

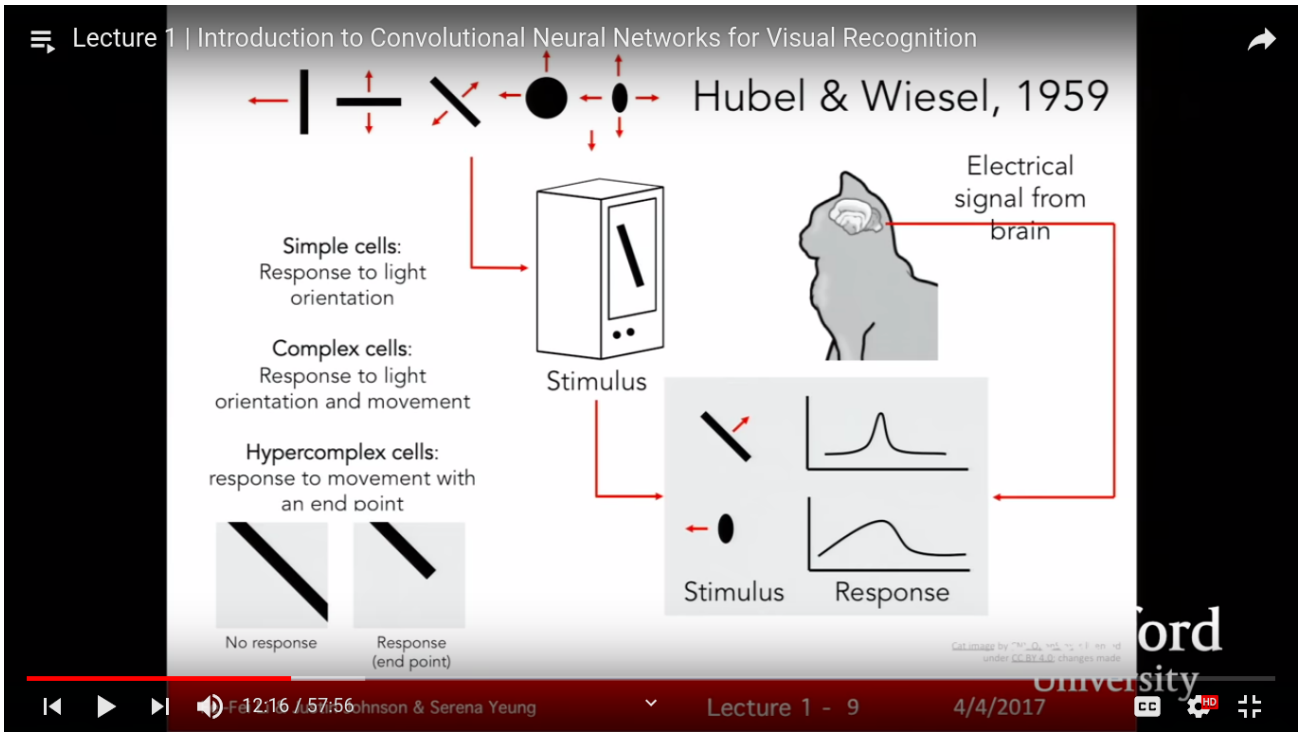
- Videos are the dark matter of the web.
- Every second there is 5hrs of video being uploaded on YouTube.
- CV needs the knowledge of various fields.



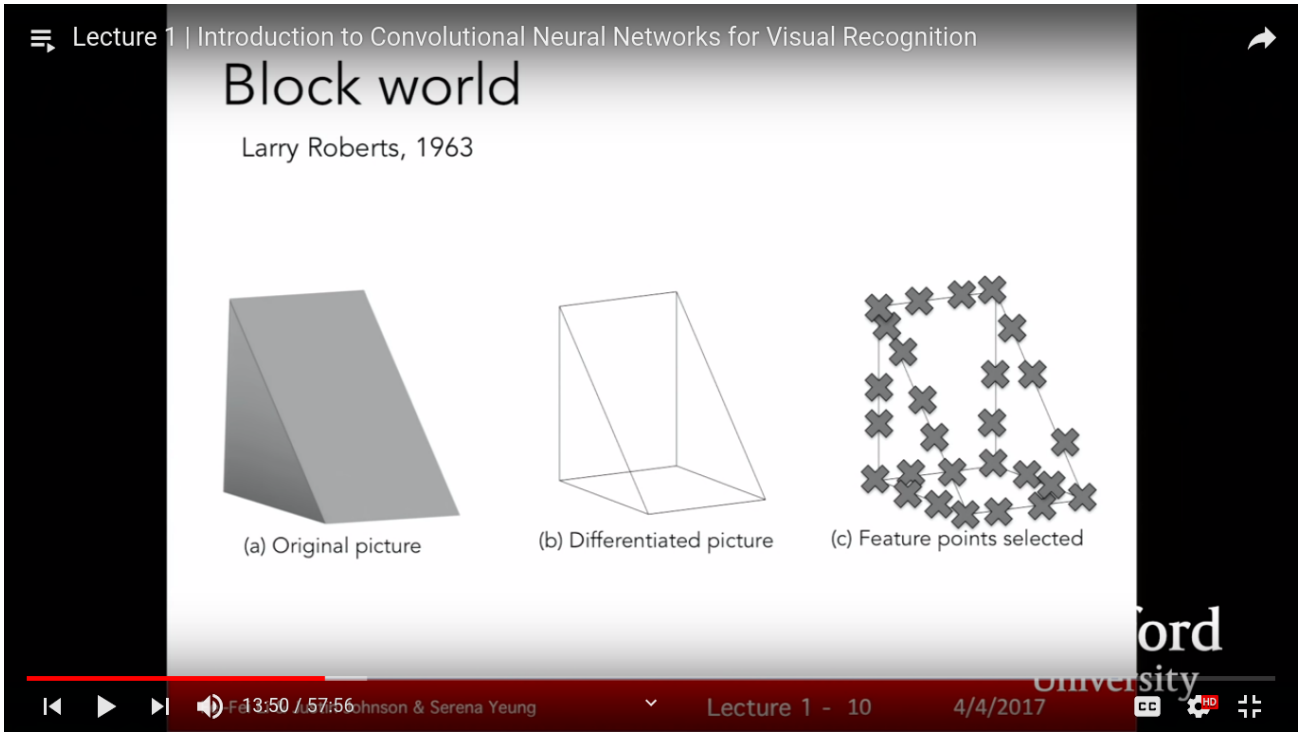
- Brief history of computer vision
  - The history of vision goes back to 543 million years.
  - Within 10 million years the number of species exploded (Evolution's Big Bang).
  - Andrew Parker, an Australian Zoologist proposed a convincing theory, from the study of fossils, it was found that the animals developed eyes and the onset of vision started.
  - So vision gave the power to explore, and this caused species to evolve to survive.
  - In humans 50% of neurons in our cortex involved in visual processing, it is the biggest sensory system.
  - Human vision helps in communicate, entertain, survive, work, move around, manipulate things and many things.



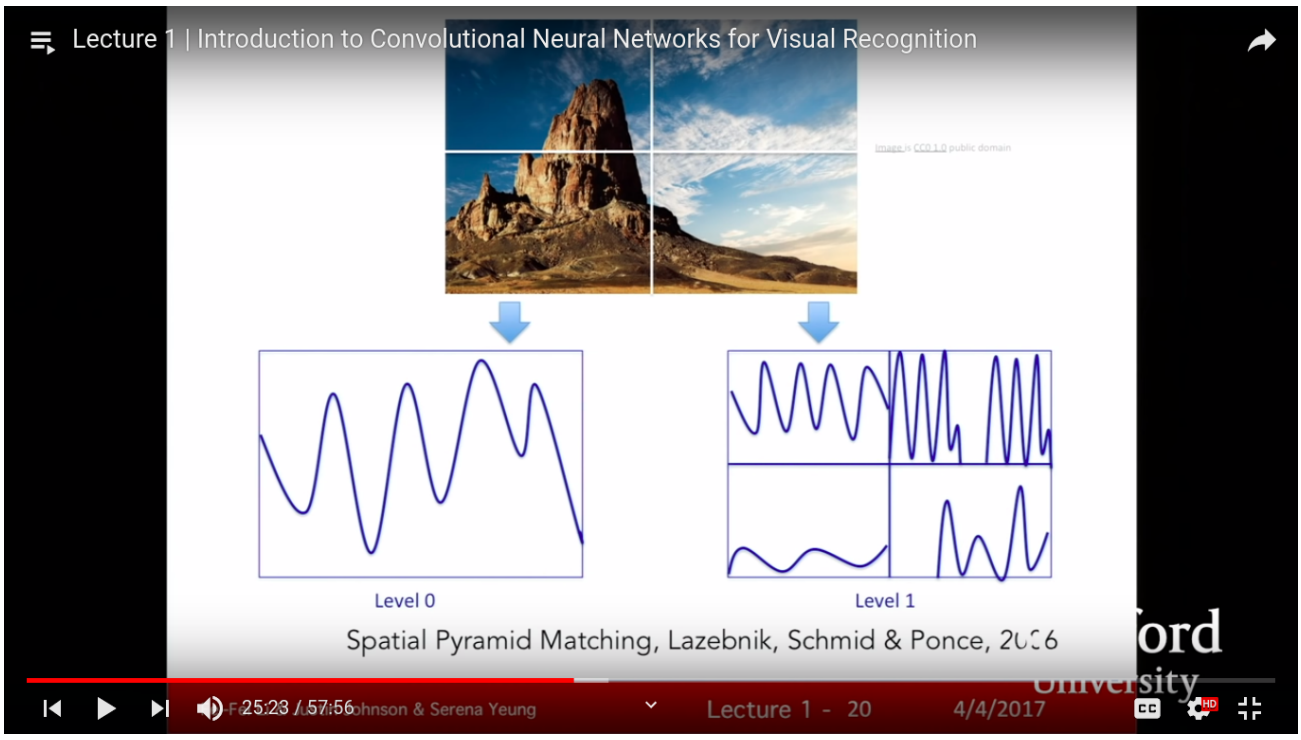
- The eye responds to oriented edges



- The history of CV also starts in the early 60s.

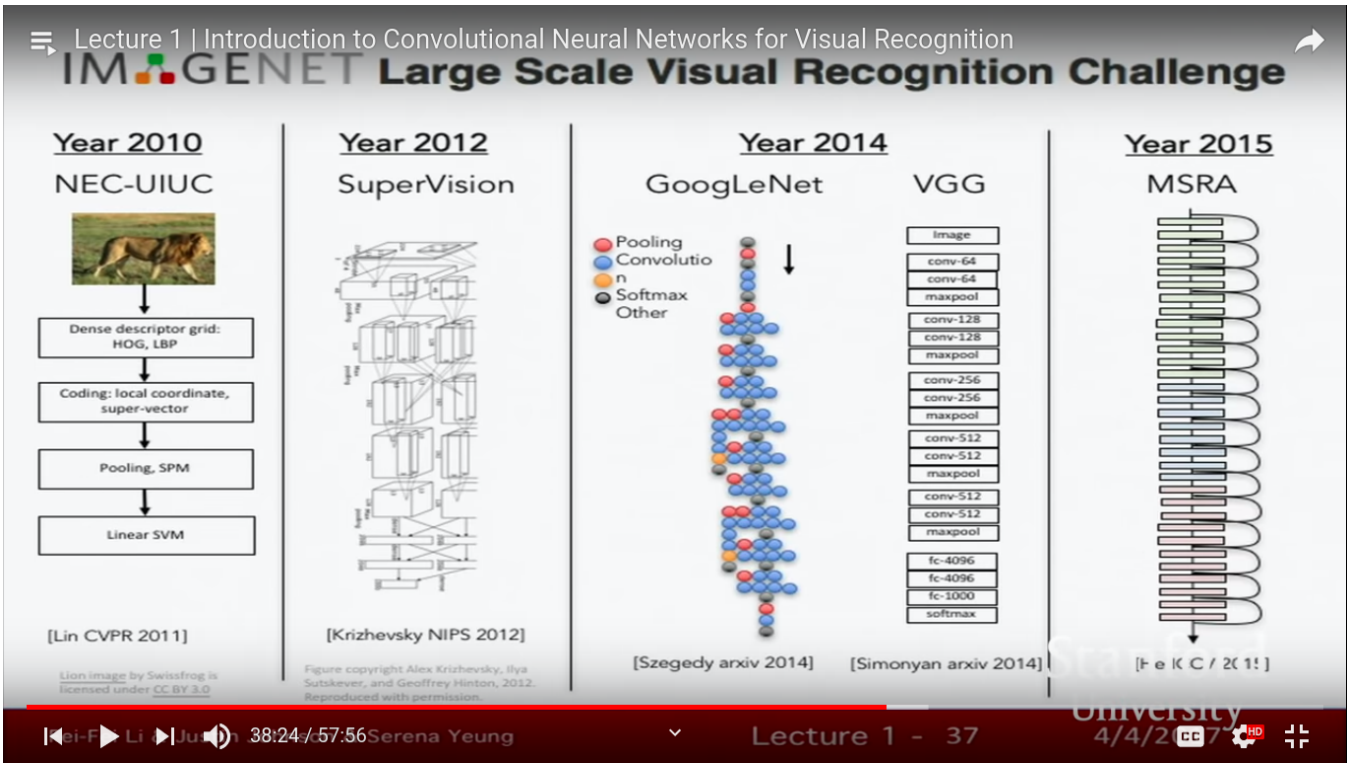


- 'Block world' can be considered the first PhD thesis on computer vision where the visual world was simplified into simple geometric shapes.
- In 1966 MIT had the 'THE SUMMER VISION PROJECT', which attempted to develop "pattern recognition"
- The task of object recognition began with identifying features in an image which are invariant to changes in the image.
- **Spatial Pyramid Matching** can be used to find the type of scene in the given image. Eg. Kitchen scene, landscape scene, traffic scene.(It uses image at different resolution to find feature descriptor and then use SVM to classify the scene.)

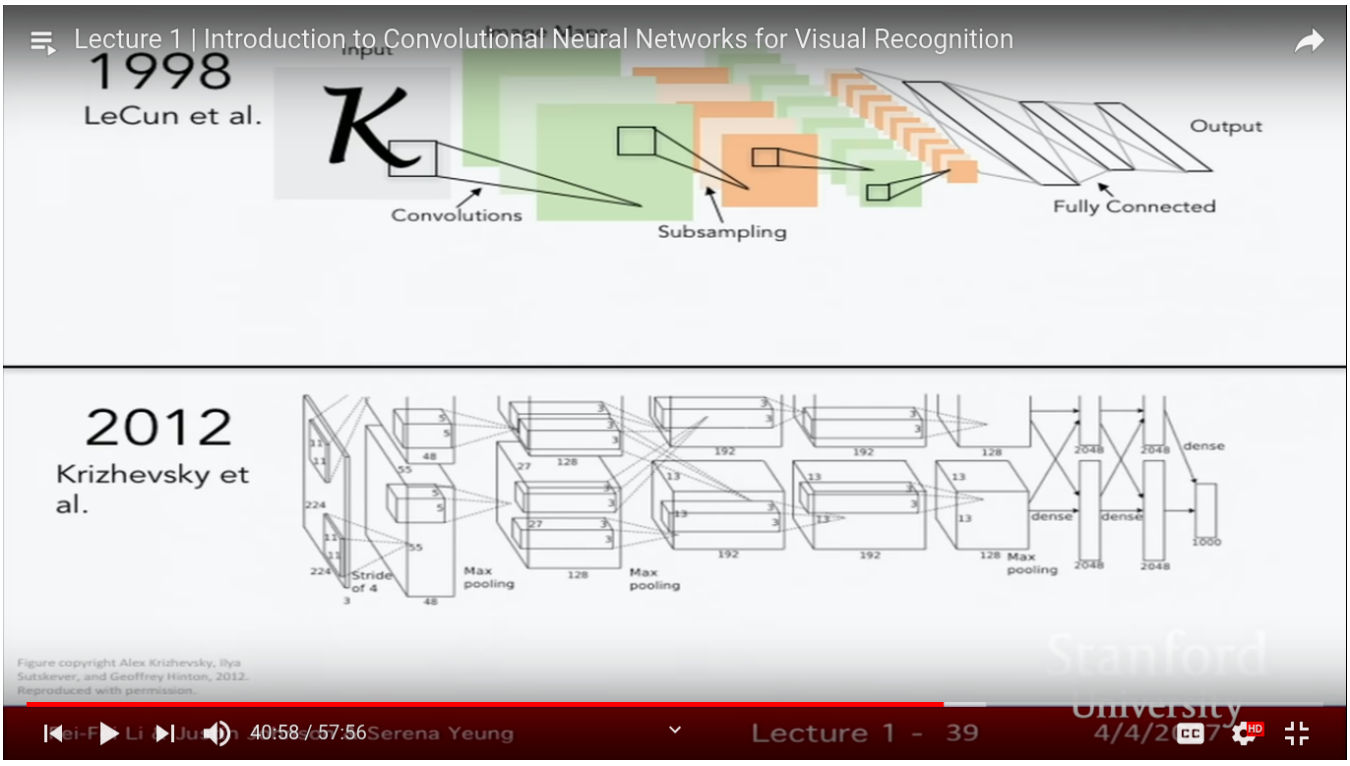


- PASCAL VOC(Visual Object Challenge) 2007 has 20 object categories and was one of the earliest benchmark dataset for object detection.
- ImageNet has 22K categories with 14M images, this was created in 2009 mainly to combat over-fitting issue caused by less data but large amount of features.

- There is a number of visual recognition problems that are related to *image classification*, such as *object detection, image captioning*, *Action classification* and so on.

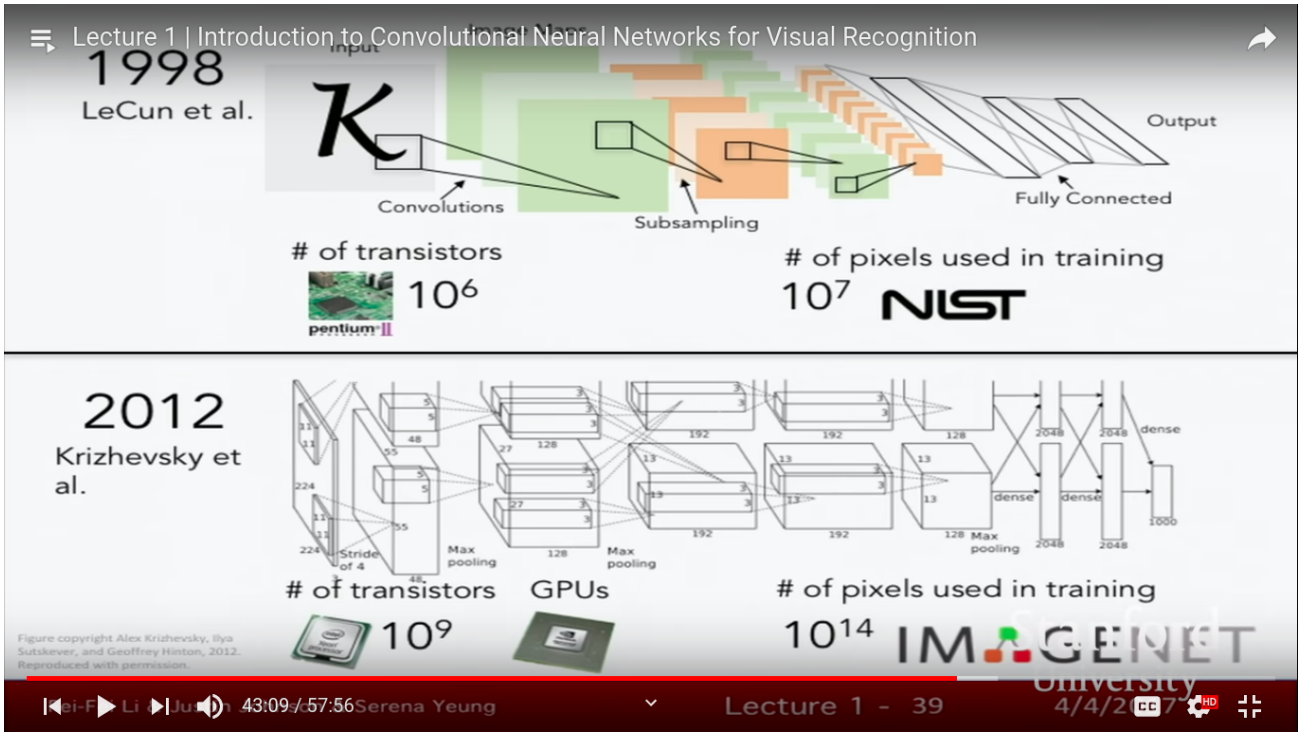


- CNN were not invented overnight.



- Key innovations which helped the field are:
  - Computing Power (By Moore's Law)

- GPUs (Parallel computation)
- Data availability



- The quest for visual intelligence goes far beyond object recognition
  - Semantic Segmentation
  - 3D Reconstruction
  - 3D pose construction
  - Activity Recognition

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