

# Reading Assignment from Melanie Mitchell's "Artificial Intelligence: A Guide for Thinking Humans"

## Assignment by Carrie Corcoran

### Chapter 5: ConvNets and ImageNet

1. He combined ideas from Fukushima's neocognitron with the back-propagation algorithm to create the semi-eponymous "LeNet" – one of the earliest ConvNets. Who was he? Who was his postdoctoral advisor? And, in addition to developing "LeNet", what was his contribution to the field of neural network research?

Yann LeCun developed LeNet along with his advisor Geoffrey Hinton. LeCun's determination in the field of neural network research "carried the torch through the Dark Ages" according to Hinton.

2. What is WordNet? Please answer by referencing its creator (the human most responsible for its existence), saying something about its use, and presenting, in just two or three sentences, a high-level description of its structure?

WordNet was developed by George Miller, a psychology professor at Princeton. It is a database of English words arranged in a hierarchy. For instance, it notes which words have the same meaning, such as rug and carpet, and what words are in a hierarchical structure, like saying that carpet is a type of floor.

3. What is ImageNet? Please answer by referencing its creator (the human most responsible for its existence), saying something about its use, and presenting a high-level description of its structure, being sure to mention WordNet in doing so.

ImageNet was developed by Fei-Fei Li, a computer vision professor at Princeton. It contains nouns along with a series of images of each noun, structured similarly to WordNet.

4. Specifically, what role did ImageNet play in the advancement of computer programs dedicated to the problem of "object recognition."

ImageNet created large pool of data it could use to train object recognition programs. It also spawned its own competition in the field of object recognition.

5. What is the Mechanical Turk (Amazon's Mechanical Turk), and what role did it play in building ImageNet?

The Mechanical Turk is a service provided by Amazon that connects people looking for simple work with people who need work done that is not yet possible for computers. Prof. Li used this service to have images labeled for the ImageNet database.

6. Describe the nature and operation of the ImageNet competition.

The ImageNet competition was a large-scale object recognition challenge. Competitors were given a set of training data to use in preparing their machines. Machines were then tested on a separate set of data to see if the machine could correctly identify the object within 5 guesses.

7. What was the most notable thing about the 2012 ImageNet competition?

In 2012, the winning entry in the ImageNet competition had 85 percent of its answers correct, up from 74 percent the previous year. The winning entry was AlexNet, a convolutional neural network developed by Alex Krizhevsky.

8. What was the most notable thing about the 2015 ImageNet competition?

The 2015 ImageNet competition involved the Chinese internet company Baidu cheating by data snooping.

9. Describe some commercial applications of convolutional neural networks.

Some commercial applications are Facebook labelling uploaded photos with names of people who are in the images, or Google Street View automatically blurring out addresses and license plate numbers.

10. Have ConvNets surpassed humans at object recognition?

Not exactly. ConvNet's object recognition has an error rate of around 2 percent in its top 5 guesses, and humans are estimated at a 5 percent error. However, the human error rate comes from a single individual, Andrej Karpathy. ConvNet is also much less accurate at its number 1 guess, coming in at around 82 percent accuracy.

11. What is the relationship between “object recognition” and “visual intelligence?”

Object recognition is a portion of visual intelligence. Visual intelligence also involves how objects relate to each other and interact with the world.