MM AI Text Mining Assignment: Chapter 5 "ConvNets and ImageNet"

 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, his postdoctoral advisor was Geoffrey Hinton, and his contribution was a good supervised learning algorithm.

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 is a database of words developed by George Miller. This database could link words together in a hierarchy from specific items to more generic words for said items. The database also contained information to show if two words were synonyms. 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 is a database of images that's development was led by Fei-Fei Li. ImageNet is structured based on the words in WordNet, where a word from WordNet is linked to a large number of images containing examples of the word.

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

ImageNet provided researchers with a database large enough to train image recognition software on various objects, whereas most previous databases would only have about 20 different categories and limit examples of each.

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

Mechanical Turk is a service marketplace developed by Amazon with the purpose of providing a way to pay humans to do something that computers could not. When ImageNet was being created there was a problem with how long it would take to label a vast number of images, but with the discovery of Mechanical Turk this task was able to be done in a more reasonable amount of time.

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

The ImageNet competition was similar to the previous image recognition competitions, but this time with a much larger number of pictures, and thousands of possible categories for said images. Competitors were given a set of labeled images to train their programs in, then given a test set of unlabeled images to test how well their program did.

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

The 2012 ImageNet competition had a record high percentage of correct images. The previous best was 74%, but the new one was 85%, with a neural network instead of the previously used methods.

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

A team from Baidu cheated to get the highest percentage in the competition. Teams were limited to 2 uses of the test server per week, but the Baidu team used the test server at least 200 times giving them an advantage by allowing them to be more accurate on the given set of images instead of general accuracy. 9. Describe some commercial applications of convolutional neural networks

Improving the accuracy of image search engines, such as Google's image search.ConvNets could be applied to videos to help self-driving cars detect pedestrians.

10. Have ConvNets surpassed humans at object recognition?

Not necessarily, while some statistics show that ConvNets have surpassed humans, the fact that results on ImageNet are based on the top five categories selected by a machine means that ConvNets statistics are not based on the top category. When it comes to labeling an image as 1 specific object humans are still better.

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

Object recognition is one of the essential abilities needed for visual intelligence, but AI having the ability to recognize objects does not mean they have visual intelligence, they are still a long way away from being able to describe images like humans.