Neural nets unit:

- ▶ General introduction (last week Wednesday)
- ▶ Trying out neural nets (last week Friday, in lab)
- ▶ How to train your perceptron (Monday)
- ▶ The feed-forward and back-propagation algorithms (Wednesday)
- ▶ Deep learning: CNNs (**Today** and next week Monday)
- ▶ Deep learning in practice (next week Wednesday, in lab)

Today:

- ▶ Vision and image recognition
- ▶ The general idea of a convolutional network
- ▶ CNN terminology
- ▶ Filters and other feature maps

Coming up:

Due Fri, Apr 11:
Read and respond to two articles about bias in algorithms
(See Canvas)

Also Due Fri, Apr 11:
Read excerpt from Geron introducing convolutional neural nets
(See Canvas)

Due Wed, Apr 16:
Implement perceptron training, feed-forward, and back-propagation

Sometime between Mar 31 and Apr 17:
Make an office-hours appointment for project check-in
(Originally the deadline was Apr 11)
(So far I have met with only two groups)

(There will be one more ethics reading)

Apr 28 and 30: *Final versions of the project*
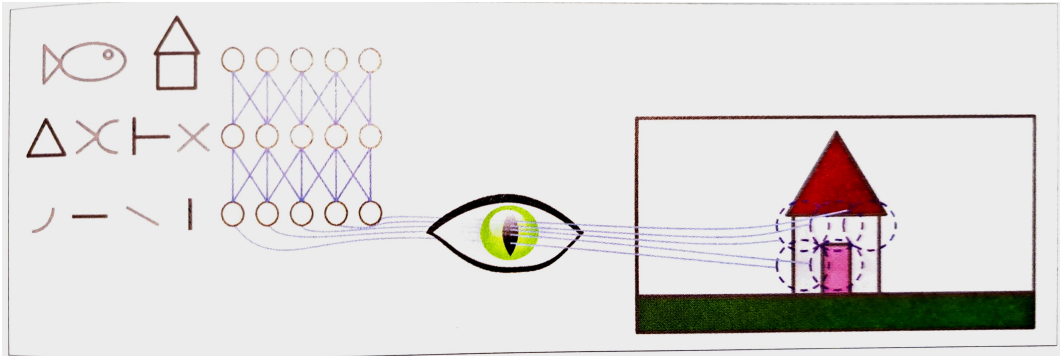
(That's all.)

Figure 14-1. Biological neurons in the visual cortex respond to specific patterns in small regions of the visual field called receptive fields; as the visual signal makes its way through consecutive brain modules, neurons respond to more complex patterns in larger receptive fields.
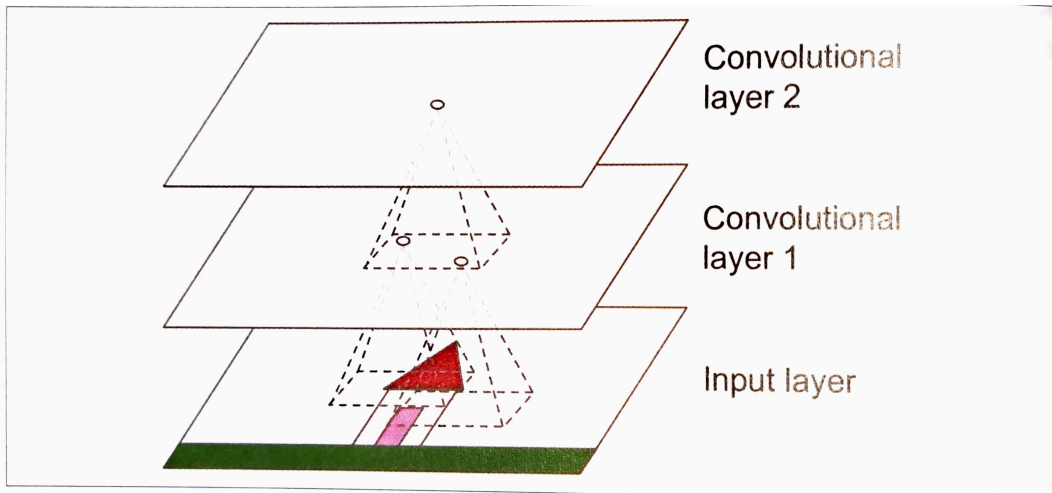
Geron, pg 447

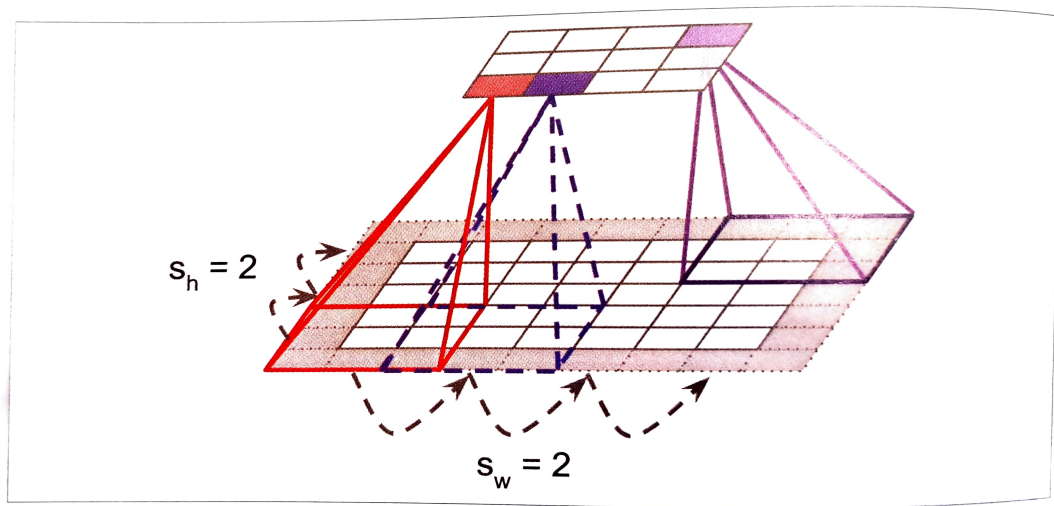*Figure 14-2. CNN layers with rectangular local receptive fields*

Geron, pg 448

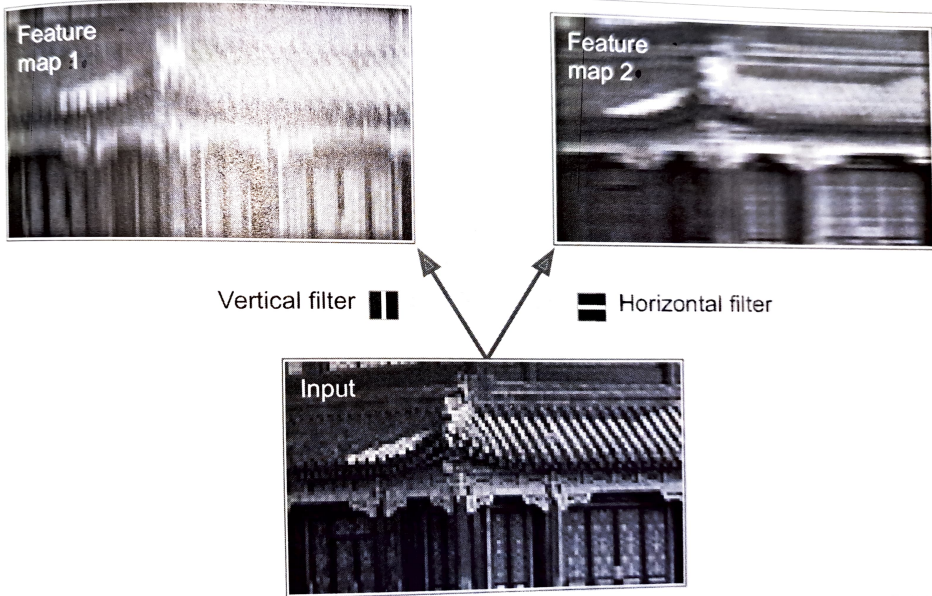*Figure 14-4. Reducing dimensionality using a stride of 2*

Geron, pg 450

Feature map 1

Feature map 2

Vertical filter ▮▮   ▬ Horizontal filter

Input

Figure 14-5. Applying two different filters to get two feature maps
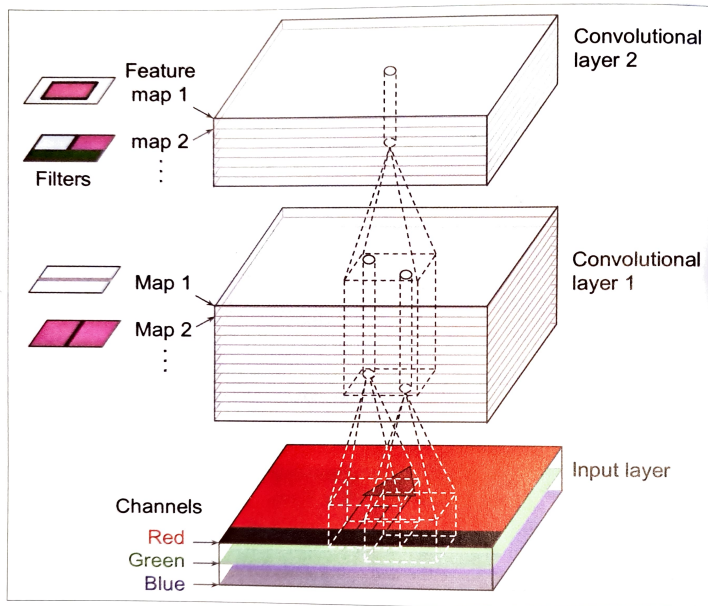
filter =

Geron, pg 451

Figure 14-6. Convolutional layers with multiple feature maps, and images with three color channels

Geron, pg 452