Crown 85 Winter 2016

Visual Perception: A Window to Brain and Behavior

Lecture 7 Perception of Motion and Depth

OVERVIEW: In the final two lectures we will discuss how the visual system enriches perception by adding the dimensions of depth, motion, and color to the canvas of visual information. These lecture will bring more *psycho* in our treatment. Although we will not be able to be as definitive in assigning specific neural networks, we will connect perceptions to the kinds of information processing which neurons can accomplish. Artists are perhaps the most astute "viewers" of the visual world. In the second part of lecture 8 we will look a visual illusion and how artists recognize and take account of visual information processing in their works.

Reading: Joy of Perception and Joy of Perception
Eye, Brain, and Vision and Eye, Brain, and Vision

Looking: Biological Motion
Spiral Motion Adaptation (needs JAVA)

1. How might a simple neural network in the cortex signal direction of motion?

2. Know the following terms related to eye movements:
   a. vestibular-ocular eye movements
   b. conjugate eye movements
   c. vergence eye movements
   d. smooth pursuit eye movements
   e. saccades
   f. tremor
   g. saccadic suppression
   h. nystagmus

3. When the eye moves and an object is stationary the image of the object moves across the retina. When an object moves and the eye is stationary the image of the object moves across the retina. Understand the how both the inflow and outflow theories could provide sufficient information to distinguish between these two situations. What experiments show that the visual system actually employs the outflow (corollary discharge) information?

4. What is the explanation of spiral motion adaptation and the waterfall effect?

5. What is 'common fate' in regard to the visual system's ability to utilize motion to extract perceptual grouping?

6. What is 'biological motion' and how does it require the visual system to extract information about both form and motion? Which pathway, parietal or temporal, is implicated in the perception of biological motion?

7. What is the flicker-fusion rate?

8. In the real world what are clues which the brain uses to determine depth?
   a. monocular
   b. binocular

9. What are Julsez patterns and what do they show about depth perception?