University of Washington
Computer Science and Engineering
Winter 2007

CSE 490 I: Design in Neurobotics

Problem Set 4 Due: 10:30am on 2/1/2007

Read Chapter 35 and 40 of "PRINCIPLES OF NEURAL SCIENCE" by Eric Kandel, James Schwartz, Thomas Jessell.

The purpose of reading these chapters is to provide understanding for systems level properties of human neural control of movement (i.e. what happens for a given input? How does the output look like? Why do some abnormal movements occur?) Don't worry too much about the detailed anatomical terms that you have never seen (though if you cannot understand the meaning of the sentences, do use the web to find out the definitions of them).

1. For Chapter 35, identify 3 key "systems level" knowledge provided.
    a. List these items using your own words.
    b. For each of these items, talk about its relationship/implication you can draw for Brain-Machine Interface (BMI).

2. Figure 35-1 is slightly different from the way the same figure was drawn in the lecture on 1/23/07. Reshuffle the box diagram from the lecture so that (1) while it still has all the same boxes from the lecture slides, (2) the structure (arrow directions, etc) look the same as Figure 35-1 B. (3) Write in delays (approximate length) at appropriate locations so that you can trace it with your fingers through different loops and identify the total delay.

3. For Chapter 40, identify 3 key "systems level" knowledge provided.
    a. List these items using your own words.
    b. For each of these items, talk about its relationship/implication for Brain-Machine Interface (BMI).

4. Chapter 40 introduces several interesting experiments with figures. For the following figures, describe them to the point that convinces the graders that you truly understood the experiment and results beyond simply repeating the caption or the sentences in the text. For example (but not limited to this), you can copy and paste the figure itself in your solutions, summarize the point of the figure and point to specific details relevant to Neurobotics and discuss about them (beyond what is in the text).
    a. Figure 40-6
    b. Figure 40-8
    c. Figure 40-11
    d. Figure 40-16