HW 1: Human Haptic Sensing

Due: Thursday 2/20 at beginning of class

Please type narrative responses.

1. (10 pts.) Active and passive touch:
   a. What is the focus of active touch? Passive touch?

   b. Describe two advantages and two disadvantages of (a) active touch and
      (b) passive touch for a haptic simulation in a virtual environment. (Think
      about the ease of creating a haptic simulation as well as the “fidelity” of the
      simulation for the user.)

2. (10 pts.) From the list of haptic exploratory procedures presented in lecture,
   choose two and explain which mechanoreceptors might be relevant to that
   exploratory procedure and why.

3. (30 pts.) Perform the psychophysical experiment called a two-point discrimination
   test. Use five volunteer "subjects". Choose two locations on the body (e.g., palm, tip
   of index finger, back) and determine the distance at which each subject can no
   longer discriminate between two point contacts. (In other words, when do the
   subjects think there is a single point contact, rather than two?) Use the same two
   contact locations for each subject. For your point contacts, use something with a
   small blunt tip, such as a paper clip. Attempt to push with a constant, light force for
   every subject.

   a. Present the data for each subject and describe in detail how you
      performed the experiment. What contact locations did you select and why
      were they interesting to you? What psychophysical method did you use?
      What was/were the starting distance(s)? Are you changing the distances
      monotonically with respect to time? Linearly? Randomly? Why?

   b. What is your subject population? Ages, genders, health? Protect your
      subjects’ identities; assign them numbers.

   c. Present a table of the acquired data. You do not need to process the data;
      this will be addressed in a future lecture on the statistics of perceptual
      experiments

   d. What improvements would you make to your experimental procedure,
      given infinite time and money?

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