Individual Assignment #5: KLM Study
Worth: up to 2% course grade extra credit
Due: March 30 by start of class; no late assignments accepted
Last modified: 27 March 2021

Overview and Learning Objectives

In this assignment, you will practice applying the user modeling techniques described in class. The specific learning objectives of this assignment are:

- to practice applying the KLM cognitive modeling technique;
- to compare the models' predictions against actual observations; and
- to reflect on how the model could be adjusted to better account for observations of human performance.

Steps

1. Consider the following word processing task:

   a. Type in "Is this a dagger that I see before me?"
   b. Replace "dagger" with "squirrel".
   c. Italicize "see".
   d. On a new line, type "I have thee not yet I see thee still."
   e. Replace all instances of "thee" with "you".
   f. Replace "me" with "my very eyes".
   g. Underline "squirrel".
   h. Save the document as "dagger.doc".

2. Launch your word processing program (I recommend Microsoft Word) and try the task yourself. Consider the following questions:
   a. In how many different ways might this task be done?
   b. Are some ways more efficient than others?
   c. How much more efficient?
   d. In general, how long can we expect Microsoft Word users to perform each individual step of this task?

3. Write down a **specific** step-by-step human procedure for performing the task. The example description provided in Step 1 wouldn't be sufficient, because it isn't specific enough. For example, there are several ways one might replace "dagger" with "squirrel." In your step-by-step procedure (which should be written on paper; you'll see why in step 5), be sure to articulate exactly how to do each step (e.g., "highlight dagger and type in squirrel").

4. Use the step-by-step human procedure you developed above to create a KLM model. In other words, for each task step, show the exact KLM operators that are needed to model the task step. Use a table in the following format to present your KLM model derivation (I have filled in a sample entry). Be sure to include the **total time prediction** in the last row, as illustrated.

#	Task Step Description	KLM Model Derivation	Time Prediction
1	Double click on “me”	2 * BB	0.4 sec
2	Type “Dagger”	H + 6K	2.08 sec
		Total:	<<Fill in total>>

See the lecture slides, and the KLM.pdf document in the Readings folder on OSBLE, for guidance on how to construct your KLM model.

5. **Recruit three friends to participate in a mini-empirical study.** Sit them down at your computer, give them the exact task instructions you wrote down in step 3, and have them complete the task as you time them. Have them take as many trials as they need to complete the task **without errors**. (Remember, KLM predicts practiced, error-free behavior.) Use the timing you obtained for their error-free performance and discard the rest. (**Bonus question**: What law could you test using *all* of your trial times? How would you perform the test?)

6. Prepare a **summary table** that reports your results in the following format:

Task step	P1 Time	P2 Time	P3 Time	Participant Average	KLM Prediction	% error

Add one row for each task step. Each row should include your observed timings, the average of those timings, the KLM prediction, and the percent error.

Note the formula for percent error:

$$percent\ error = \left(\frac{abs(observed\ time - predicted\ time)}{predicted\ time}\right) \times 100$$

In addition, your table should include a summary row that presents the overall percent error across the entire task.

7. In a paragraph or two, discuss your results. A percent error of 20 percent or less is considered good. How well did your model do? What did it get right? Where did your model go wrong? What parameters would you need to adjust to bring your model into accordance with your data.

8. Hand in your report consisting of the derivation table, summary table and discussion as a PDF document by the due date***. Note that you may be asked to present your results for discussion in front of the class.***