

Math 263, Section 5

Exam 1, Problem 4 Makeup Question

Those who missed question 4 on the first exam may do this problem to partially redeem the lost points. Solutions must be typed and contain no hand drawn graphs. Answers must be clear and be phrased as complete sentences. The grading on this assignment will be strict; sloppy work, unexplained numbers, and non-answers will not result in points. Students choosing to do this assignment should submit their write up along with their first exam.

A multimedia statistics learning system includes a test of skill in using the mouse. The software displays a circle at a random location on the computer screen. The subject tries to click in the circle with the mouse as quickly as possible. A new circle appears as soon as the subject clicks the old one. The table below gives data for one trials, 20 with each hand. Distance is the distance from the cursor location to the center of the new circle, in units whose actual size depends on the size of the screen. Time is the time required to click in the new circle, in milliseconds.

1. We suspect that time depends on distance. Make a scatterplot of time against distance, using separate symbols for each hand.
2. Describe the pattern. How can you tell that the subject is right-handed?
3. Find the regression line of time on distance separately for each hand. Draw these lines on your plot. Which regression does a better job of predicting time from distance? Give numerical measures that describe the success of the two regressions.
4. It is possible that the subject got better in later trials due to learning. It is also possible that he got worse due to fatigue. Plot the residuals from each regression against the time order of the trials (down the columns in the table). Is either of these systematic effects of time visible in the data?

Time	Distance	Hand	Time	Distance	Hand
115	190.70	right	240	190.70	left
96	138.52	right	190	138.52	left
110	165.08	right	170	165.08	left
100	126.19	right	125	126.19	left
111	163.19	right	315	163.19	left
101	305.66	right	240	305.66	left
111	176.15	right	141	176.15	left
106	162.78	right	210	162.78	left
96	147.87	right	200	147.87	left
96	271.46	right	401	271.46	left
95	40.25	right	320	40.25	left
96	24.76	right	113	24.76	left
96	104.80	right	176	104.80	left
106	136.80	right	211	136.80	left
100	308.60	right	238	308.60	left
113	279.80	right	316	279.80	left
123	125.51	right	176	125.51	left
111	329.80	right	173	329.80	left
95	51.66	right	210	51.66	left
108	201.95	right	170	201.95	left