PSTAT 126

Regression Analysis

Fall 2017

Homework #3 – Due in Section Oct 25-27, 2017

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1. Fill in the blanks:  
   Compared to a 95% confidence interval, a 99% confidence interval yields a (narrower/wider) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ interval and gives us (more/less) \_\_\_\_\_\_\_\_\_\_ confidence that it contains the actual value of the population parameter, but is also (more/less) \_\_\_\_\_\_\_\_\_\_ precise.
2. Name and describe the four kinds of confidence/prediction intervals we have learned in class.
3. A corporate executive wants to know if increasing the hours of employee training is related to an increase in work productivity (number of units produced).
   1. Does the executive expect a positive or negative slope for predicting units produced from training hours?
   2. The executive will only implement the increased training if productivity goes up. Should the executive perform a one-tailed or two-tailed hypothesis test for the regression slope? Justify your answer.
   3. A university researcher who is assisting the executive believes that increasing training hours could increase productivity as the executive expects, or could reduce productivity due to the reduction in actual hours worked. Should the researcher perform a one-tailed or two-tailed hypothesis test for the regression slope? Justify your answer.
4. Write out the equation for the Normal Errors Regression Model
5. For the regression between **age** (X) and **glucose** (Y) in the **pima** dataset, calculate each of the following (Note: you will need to remove zero values before completing the analysis):
   1. A 99% confidence interval for the slope. Interpret this interval in words.
   2. What **glucose** would you predict the someone who is 35 years old? Interpret this value in words.
   3. Predict the **glucose** value for an individual with **age** = 42. Calculate a 90% prediction interval around this prediction. Interpret the predicted value, and the prediction interval, in words.
   4. Predict the mean **glucose** for all individuals with **age** = 42. Calculate a 90% confidence interval around this prediction. Interpret the predicted value, and the confidence interval, in words. Contrast the results with those obtained in part c.