STT 200 – Lecture 1, section 2,4 Recitation 4 (9/25/2012)

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Class meet on Tuesday:
3:00 – 3:50PM A122 WH, Section ***02***
12:40 – 1:30PM A322 WH, Section ***04***

Overview

- We will discuss following problems:
  - Chapter 6 "*The standard deviation as a rule and the normal model*" (Page 148): #16, 20, 28, 44, 46, 48

- All recitation PowerPoint slides available at here

- Chapter 6 (Page 148): #16:

  Exam 1: Mean=80, Stdev=4, Reginald: 80 Sara: 88

  Exam 2: Mean=70, Stdev=15, Reginald: 85 Sara: 65

  - Explain Sara's point of view of deserving higher grade than Reginald.
  - *Z scores: Reginald: 0, and 1, with total 1*

    Sara: 2.0 and -0.33, with total 1.67

    Sara has higher total Z-scores.

- Chapter 6 (Page 149): #20:

  Mean=23.84, Stdev=3.56, speed limit=20 (mph)

  - Speed limit 20 is how many Stdev from the mean?

    (23.84 - 20)/3.56

  - Which observation is more unusual, 34 or 10?

    34 – 23.84 < 23.84 – 10. So 10 is more distant from the mean 23.84 and hence more unusual.

- Chapter 6 (Page 149): #28:

  Mean=100, Stdev=16

  - Draw the normal model with 68-95-99.7 rule.
    - *We did in class.*
  - Central 95% interval *(mean-2stdev, mean+2stdev)*
  - % above 116 *(116=mean+1stdev, so (100-68)/2 %)*
  - % between 68 and 84 ***(95-68)/2 %,*** *why?*
  - % above 132 *(100-95)/2 %*

- Chapter 6 (Page 151): #44:

  N(100, 16)

  - % over 80 *calculator: normcdf(80,100000,100,16)*
  - % under 90 *calculator: normcdf(-100000, 90,100,16)*
  - % between 112 and 132
    - *calculator: normcdf(112,132,100,16)*
    - *Note: use negative sign (-) instead of subtraction - !*

      Otherwise you will get syntax error.

- Chapter 6 (Page 151): #46:

  N(100, 16) , find cut-off value bound for

  - the highest 5%
    - *calculator: invNorm(**0.95**, 100,16)*
  - the lowest 30%
    - *calculator: invNorm(0.3, 100,16)*
  - the middle 80%
    - *calculator: invNorm(0.1, 100,16)*
    - *calculator: invNorm(0.9, 100,16)*

- Chapter 6 (Page 152): #48:

  All IQ's follows N(100, 16) ,

  - what IQ represents the 15th percentile?
    - *calculator: invNorm(0.15, 100,16)*
  - what IQ represents the 98th percentile?
    - *calculator: invNorm(0.98, 100,16)*
  - the IQR?
    - *invNorm(0.75, 100,16) - invNorm(0.25, 100,16)*

- Summary
  - *Z-score follows standard normal distribution (mean=0, stdev=1). To compare over multiple normal distributions, we can standardize the data and use the Z-score.*
  - *Learn 68-95-99.7 rule and the fact that Normal distribution is symmetric!*
  - *Given quantile, find percentile: normcdf(lower bound, upper bound, mean, stdev)*
  - *Given percentile, find quantile: invNorm(percentile, mean, stdev)*
  - *Percentile is defined in left-tail (or lower tail)*
  - *Percentile is a number from 0 to 1(or 0% to 100%). Quantile can be any number, usually of same order of magnitude as the normal mean.*