**Mark Eatough**

**CSIS 2430 9:00 Class**

**Programming Project 7**

**Bayes Theorem Program**

**Assignment objective:**

Implement a generalized Bayes Theorem method.  It should be generic enough to handle French guy, disease, and economy videos.

**What Worked?:**

I created probability variables which I then called to my Bayes Theorem method. I set up my Bayes Theorem method to return the probability of A given B by calculating probability A \* probability B /probability of B given A. This seemed to work pretty well as I seem to have found the right answers using the method.

**What did not work?:**

I originally tried to create probability objects which the Bayes Theorem method would then call, prompt the user to enter what they were looking for, and then based on that take the necessary inputs from the object, and output the desired answer. While this may have been what the assignment really called for, I was unable to implement the theorem in such a way.

**Comments:**

I really enjoyed learning about conditional probabilities, and how drastically probabilities can change given that some other scenario has occurred. After watching the videos I thought this would be my favorite assignment to code. However failing to implement the theorem how I had originally intended(see what did not work) forced me to do a much lamer implementation of Bayes Theorem which I found to be quite disappointing.

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 \* Discrete Structures  
 \* Bayes Theorem Program  
 \* Programmer: Mark Eatough  
 \* Course: CSIS 2430   
 \* Created October 13, 2013  
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'''  
  
#Disease statistics  
diseased=.01  
diseasedNot = 1-diseased  
truePositive = .9  
falsePositive = .15  
falseNegative = 1-truePositive  
trueNegative = 1-falsePositive  
   
#stock vs economy statistics  
g = .7  
s = .3  
uGIVENg = .8  
dGIVENg = 1-uGIVENg  
uGIVENs = .3  
dGIVENs = 1-uGIVENs  
   
def dependantProbability(probA, probBgivenA, probC, probDgivenC):  
 return float((probA\*probBgivenA)+(probC\*probDgivenC))  
  
#French student statistics  
france = 2  
uK = 3  
canada = 4  
b = 1  
   
def pCountry(country):  
 return float(country)/9  
   
def pBoyCountry(boyCountry, country):  
 return float(boyCountry)/country  
   
def bayesTheorem(probA, probB, probBgivenA):  
 return (probA\*probB)/probBgivenA  
   
def percent(dec):  
 dec \*= 100  
 print round(dec,2), "%"  
   
  
#Probabliltiy that someone who tests positive for disease has disease  
print "The probability that someone who test positive for the desease has the disease is: "  
percent(bayesTheorem(diseased, truePositive, dependantProbability(diseased,truePositive,diseasedNot,falsePositive)))   
#probablility that economy goes up given stock goes up  
print "\n\n\nThe probability that the economy goes up given that our stock goes up is: "  
percent(bayesTheorem(uGIVENg, g, dependantProbability(uGIVENg, g, s, uGIVENs)))  
  
#probablitity that student is from france given that he is a box  
print "\n\n\nThe probability that a student is from france if we know he is a boy is: "  
percent(bayesTheorem(pCountry(france), pBoyCountry(b, france),   
 pCountry(france)\*pBoyCountry(b,france)+pCountry(uK)\*pBoyCountry(b, uK)+pCountry(canada)\*pBoyCountry(b, canada)))

