Name: Fan Chen
Class: Stat3330
Professor: Dr. Leung
Date: Sept. 12th, 03

Probability in Real Life

When I was in China, my second job was Quality Control Engineer whose responsibility is overseeing the supermarket's working process. I belong to the main office. At that time, there were 3 supermarkets in this company. Also, I needed to control the quality of goods which were selling in the market. I needed to use probability principles daily. For example, I needed to check the goods which were selling to make sure whether or not they had enough weight, good quality such as their introductions, even though they had already been gone through the IQC. I would analyzed which vendor's goods had problems frequently and which IQC did not control the goods very well. I would record them. I would set up some classes to teach the IQCs how to control the quality by following the standards after I found out some problems were appeared too often. Also, these records would affect the vendors if they could be our company's vendor next year or not. The IQC's records would affect his/her salary as well. I had to work on it very carefully and honestly. The following is one case which happened.

Case: March, 1999. In this month, there were 6 IQCs in market 1, 4 in market 2, and 5 in market3. The goods would be mixed after they were checked. 50% goods would be sold in market 1, 25% in market 2, and 25% in market 3. One day, I got one good which should not have been sold in the market. I would use the probability principles to find out which market this good came from and find out which IQC, so that it would save a lot of time. According my records, 98.5% goods which checked by market 1 were fine, 97.6% goods which checked by market 2 were fine, 99.8% goods which checked by market 3 were fine.

So, let events M1___ goods come from market 1
M2___ goods come from market 2
M3___ goods come from market 3
A___ goods which should not have been sold

$P(M1)=50\%$

$P(M2)=P(M3)=25\%$

$P(A|M1)=1-98.5\%=0.015$

$P(A|M2)=1-97.6\%=0.024$

$P(A|M3)=1-99.8\%=0.002$

$P(A)=PP(A|M1)+P(A|M2)+P(A|M3)=0.015+0.024+0.002=0.041$

$$P(M1|A)=\frac{P(A|M1)P(M1)}{P(A)}=\frac{0.015\times 0.5}{0.041}=0.183$$

$$P(M2|A)=\frac{P(A|M2)P(M2)}{P(A)}=\frac{0.024\times 0.25}{0.041}=0.146$$

$$P(M3|A)=\frac{P(A|M3)P(M3)}{P(A)}=\frac{0.002\times 0.25}{0.041}=0.183$$

Hence, it looked mostly the goods came from market 1.

So, I would look at the market 1 goods check list first. After I found out which market. I would work on finding the IQC by my records(these records show the staff's sense of responsibility by using probability). I would give the report to the market's manager after everything was done. And, I also reported to the president monthly.

Later on, our company has more and more markets. The main office set up on QC Engineer to each market. But, I still worked for three markets because I worked faster than the others. I felt happy that I knew how to use probability principles in my real life.

Essay written by Fernie Falcon for STAT 3330: Probability in real life

Probability is a discipline that is very useful in real life. It is especially helpful in making decisions involving uncertainty. A good example is that on the issue of whether or not one should play the lottery. If a state lottery is based on a person winning the jackpot if they match six numbers out of six in any order from a choice of fifty different numbers to choose from and none of the numbers repeating, should one play? To answer this question lets use probability to analyze further. We need to find out what the chances are of winning. If we use classical probability we can calculate our chances (the probability) of winning. By definition to calculate this probability we need to know the number of elements in the event and divide them by the number of elements in the sample space. We conduct a random experiment which in this case is playing the state lottery. Our event will be hitting the jackpot as mentioned earlier. The event will contain only one element since only
one combination of six numbers will win the jackpot. The sample space on the other hand will contain many elements because there are lots of different ways of combining six numbers. To find out exactly how many elements are in the sample space, we use a combination of choosing six numbers out of fifty since order is not important, opposed to a permutation in which case it would be. This calculation will show that there are 15,890,700 elements in the sample space. Therefore the probability of winning the jackpot would be one chance out of 15,890,700 (1/15,890,700). Since there is an extremely small chance of winning, we could play our entire life and never win. This information is enough to convince me not to play.

Maria L. Quintero

Probability in Real Life

In the field of psychology, statistics is used as a tool to help understand and learn more about psychological phenomena, processes, or events. Because performing statistics requires collecting, analyzing, and interpreting numerical data, having a notion of the probability of the occurrence of uncertain events is essential. For example, when studying a mental disorder like schizophrenia, a researcher might look at genetic factors that could explain why certain people have a higher probability of developing this disorder. For this reason, research has been performed on identical and fraternal twins to test this theory. As a result, studies have shown that if one identical twin develops schizophrenia, the other has a 48 percent chance of also developing it. On the other hand, if one fraternal twin develops schizophrenia, the other has a 17 percent chance of developing it (Comer, 2003).

References

Comer, R.J. (2003). Is An Identical Twin More Vulnerable than a Fraternal Twin? *Abnormal Psychology*, 5, 448-50. New York: Worth Publishers.

Cristina Torres
HW #3

Probability in Real Life

My family had an experience with probability over a year ago that shows why it is important to have even a small understanding of probability. My dad was supposed to go in for back surgery but the anesthesiologist said there seemed to be some problem with my dad's heart. The back surgery was postponed. After more investigation and more tests it was discovered that my dad had three blocked arteries. The doctor told us that we needed to hurry and have open heart surgery. It was frightening to think of triple bypass surgery, so my family looked into other options. We learned about angioplasty, a procedure that allowed a special stent to stretch and open the artery. Our doctor told us that he didn't like that option because there was a 20% chance that the stent would not work. To further convince us that the surgery was necessary, the doctor explained that with three blocked arteries and a 20% chance of the stent not working, there was now a 60% chance that the angioplasty would fail for my dad (20 x 3). Fortunately, my family and I knew better. We knew that it was still only 20% that one would not work, and that all three not working was a smaller percentage. The doctor's 60% did not scare us, but only made us question his knowledge. We got a second opinion and ended up getting the angioplasty. A year later my dad is still doing great and recent tests have shown his stents to be doing fine. We were lucky to know better, but we thought about the families who wouldn't catch errors like the 60% who were perhaps scared into a more dangerous and expensive surgery. Whenever I think of probability I am always reminded of that situation we faced.