Good morning everyone. Toady I will talk about Philosophy of Probability again. In this chapter. It discussed what probability is and show several different interpretations of probability. But like all problems in Philosophy. We can not get a standard answer in this chapter. Each interpretation have it defect. It seem nor of these interpretations can perfect describe what probability is.

So in the debate of what probability is. We can roughly separate them into two camps: objectivists and subjectivists.

objectivists maintain that statements about probability refer to facts in the external world.
Example 1:

for example, If you tossed a coin. The probability of head up is one half if the coin is fair. This is a Natural law or we can say it refer to a property of the external world. It will not charge by human's mind.

For subjectivists, they deny that statements about probability can be understood as claims about the external world.

Example 2:

In the textbook, it gives a example about what is the probability that your suitor will ask you to marry him? All of us can not give an accurate probability about this thing. Even though you say maybe 50 percent, what you means is I'm not sure for this thing. It is based on what your suitor think and how much do you know about your suitor.

Example 3:
Another example which is interesting that some probability statements seem to be neither objective nor subjective. Imagine a scientist who claims that the probability that the law of nature N is true is one half given the evidence currently available. To make it clearer I will say this example like this, scientist claim that the probability for wild panda extincted is one half because they searched half of the world and didn't find wild panda. It is not a random event in nature because wild panda can only extincted or not. It is also not a statement about a particular scientist's subjective degree of belief, because half of the world did not find wild panda. The probability is based on real evidence.

7.1 The classical interpretation

The definition of The classical interpretation is Probability = Number of favourable cases divided by Number of possible cases.The presupposes of this interpretation is all possible outcomes are equally likely.

Example 4:

For example , if I roll a fair dice, the Probability of getting an odd number is one half. Because the Number of favourable cases is 3 and the total number of possible cases is 6.

The first defect of this interpretation is circularity definition. They use equally possible of all outcomes in definition. Even though they use so-called ‘principle of indifference’ to explain. Some Opponents still think it is circularity definition.

Second defect is It is hard to make sure all outcomes are equally possible.

Example 5:

If I roll a biased dice, the outcomes are not equally possible. So we can not use the Above formula to calculate.

The book shows that the classical interpretation can deal this problem but I’m not clear about this part . Based on the describe on textbook, I assume that the Probability of six is 2/7, and the Probability of other number is 1/7. Textbook say İt is equally possible that you will get a one in the first or in the second roll, as that you will roll a six in just one roll. But I think the Probability of get a one in the first or in the second roll should be 1- 1/7*1/7 =13/49 but Probability roll a six in just one roll should be 2/7

But for some more complex thing it is hard to say equally possible. what about the possibility that I might ask my partner for a divorce? Of course ‘divorce’ and ‘no divorce’ are not equally possible cases.

Another defect is in some case the the total number of cases is infinite.

Example 6:

If you can random pick a real number from 0 to 100. What is the Probability of this real number smaller than 50. The total number of cases is infinite. So the formula can not be used. We can use probability density function to solve this problem, but The classical interpretation can not solve it.

7.2 The frequency interpretation

The definition of The frequency interpretation is Probability = Total number of positive instances divided by Total number of trials.

Example 7:

suppose I toss the coin 1,000 times and it lands heads up 517 times. The probability is 0.517 because the total number of trials is 1000, and the positive instances are 517 so we use 517 divided by 1000 which equal to 0.517.

One of the issues about The frequency interpretation is it can not explain the probability change without The physical constitution change.

Example 8:

For example, if I toss the same coins another 1,000 times,and that it lands heads up on 486 times. It looks like the probability changed to 0.486 without any physical constitution changed. And if I added both series of tosses together. We will get (517+486)/2000 =0.502. The frequency interpretation can not explain why the probability changed.

Example 9:

Another defect is the frequency interpretation can not deal unique events. For example The US presidential election in 2000 George W. Bush won. I'm not very Familiar with that but looks like he had very small Advantage.

So if the number of trials is too small the Probability will become very Inaccurate. Like presidential elections. I found another example we always use frequency interpretation is on football games. We always consider the history record before a game to predict the result. But actually the status of players might be more important than history records. Like one of a very important player injured before the game.

In this case, people develop a more sophisticated versions of the frequency interpretation. They said this interpretation makes sense only if the reference class is taken to be infinitely large. The Probability will Approach to a limit number.

But The US presidential election in 2000 can not happen infinitely times. And even if it can happen infinitely times. I think bush can win all the elections if every thing didnt change.

So. This is related to determinism, I want to talk about determinism because I thought it is really interesting when I read materials about this chapter. determinism is the philosophical position that for every event there exist conditions that could cause no other event. It means everything is doomed.

One of very famous Assumption about determinism is Laplace's demon. According to determinism, if someone (the Demon) knows the precise location

and momentum of every atom in the universe, The future will be predict by the demon and in his eyes there is no different between future and past.

For now, we can use computer to predict something like weather. If we have a super computer can simulate every atom in our universe. It will be another Parallel universe which is totally same with our world.

Or in some science fiction. We all in a computer program and we are just some code.but we don't know that.

But determinism seems be proved wrong on Quantum mechanics. Like Electron distribution,Radioactive element, Molecular thermal motion

7.3 The propensity interpretation

The propensity interpretation shows that the Probability is a property of a object called propensity, which is Like Quality, inertia.

Example 10:

For example, symmetrical coins typically have a propensity to land heads up about every second time they are tossed, which means that their probability of doing so is about one in two.

Example 11:

This interpretation works very well on Quantum physics like radon, with a half-life of 3.92 seconds. That means half of the radon will decay to hydrogen. But for one radon atom, it can decay to hydrogen any time but the except time is 3.92 seconds.

Example 12:

the most well-known objection to the propensity interpretation is Humphreys ' paradox.the probability that the train departed on time given that it arrived on time, it makes no sense to speak of the corresponding inverted propensity. No one would admit that the on-time arrival of the train has a propensity to make it depart on time a few hours earlier. So In this case. propensity more like causality. Which have a temporal direction If A has a propensity to give rise to B, then Acannot occur after B. But we know probabilities lack this temporal direction. SO, it seems that it would be a mistake to identify probabilities with propensities.

7.4 Logical and epistemic interpretations

Logical interpretations says that probability is a logical relation between a hypothesis and the evidence supporting it. The example we talk about at begining of class ... Is Logical interpretations.

Example：

if an unhappy housewife claims that the probability that her marriage will end in a divorce is 0.9, this means that the evidence she has at hand (no romantic dinners, etc.). So she thought she will divorce based on these evidence.

Coin tossing can be analysed in the same lines. The past trials make we guess the probability of heads up is one half.

SO Logical interpretations is between objectivists and subjectivists. The evidence are about objectivists and what we guess the probability is subjectivists.

Last classsI we already know what is logical interpretations, it describe the degree of how evidences support the hypothesis. But some times we will just guess without any evidence like if you ask me the probability of whether tomorrow will rain or not. I just guess 0.3 without any evidence. This expression often occurs in our lives.and we can use probability calculus on it. Like if I say the probability of tomorrow rain is 0.3. It means I think the probability of tomorrow not rain is 0.7. But logical interpretations can not explain this case.

To solve this, they said probability have different types. If probability statement is about the relationship between evidences and hypothesis they call it Epistemic probability. They also accept the coexist of objective probability and subjective probability.