

22/2/20

Frequentist - does thought experiments  
Bayesian - thinks of priors.

classmate

Date

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22<sup>nd</sup> February - 3<sup>rd</sup> class.

What is the probability?

→ Probability →  $\frac{\text{No. of favourable events}}{\text{all possible events}}$

$$P(1) = \frac{1}{2}$$

$$P(2) = \frac{1}{6}$$

If the coin is biased or dice is biased, the outcome is not equal compared to fair coin.

\* Two paradigms of probability

What is the probability of a two on the die if it was Shakuni?

→ depends on what Shakuni wants?

If he wants a two or he doesn't want a two  
huma - yes -  $\frac{1}{2}$  or no -  $\frac{1}{2}$ .

Probability is not same in Bayesian model, it depends on prior knowledge.

1) Does Sun rise in the east - what is the probability

Frequentist approach

- does thought experiments, his approach will be

- no. of probable events

Sun rises in east + sun rises in west + "in north" + "in south"

$$= \frac{1}{(yes + no) + (yes + no) + (yes + no) + (yes + no)} = \frac{1}{8}$$



Bayesian approach  
- thinks of the prior events and based on that knowledge come up with conclusion.

His approach will be based on the his prior knowledge or experience / knowledge of others.

- \* Bayesian approach - calculates prior
- \* Frequentist - get sample, long frequency distribution, parameters are fixed.

Probability of two on a die?

A) Frequentist - Try throwing die 10K times, count distribution. Say it's close to  $1/6$

B) Bayesian - Wait, this guy has previously cheated with die. Hence I would like to assess prior for this die.  
So ask the guy for past history & create a distribution

Bayesian approach always considers prior data before determining probability. Here parameters are not constant  
Parameters like probability keeps changing

Frequentist approach keeps parameters fixed and vary data points. Do thought experiments

For AI, ML both are needed.