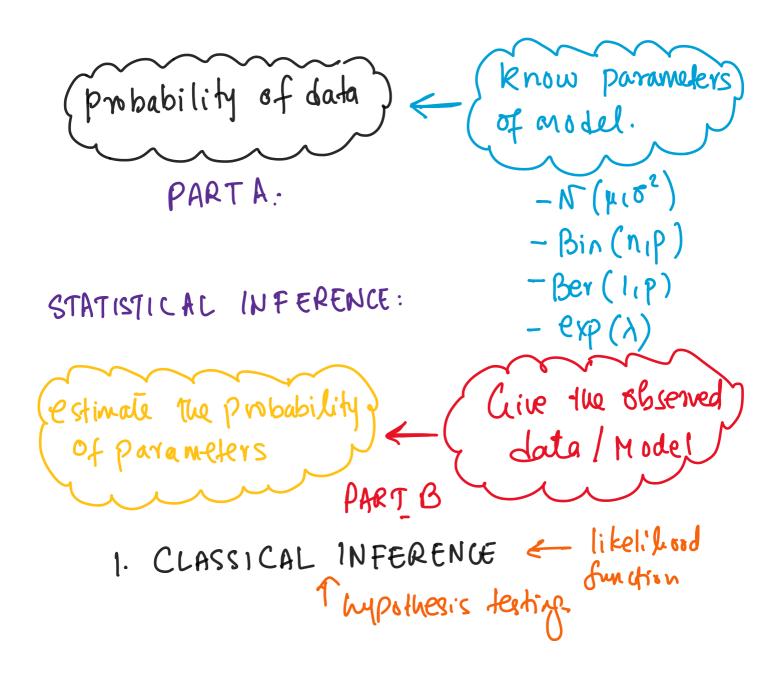
OneNote 14.03.22, 13:13

## Statistical inference

Monday, 14 March 2022 11:50



2. Bayesian Inference. 

Likelihod

Function +

Boyes theorem.



Estimation.

testing of hypothems.

- Pavamestric\_ infer en cer Methods
- Regression analysis.
- Goodnen offit.
- Non-parametric Clanification Mélhods.
- Semi-Parametric inference Melhods
- 1) Point Estimation:
  - . Puisson distribution -> estimale 1
  - . data is drown from a normal distribution you want to compute "p' and "to"
- 2) likelihood Meihods

one of the most popular Methods of Point estination is Called the Maximum likelihood estimation. (NLE).

probability -> future events. like thood -> refers to the past events with Known rutumes.

- 3) Confidence Interval: - Fisher Matrix

24) Resampling Method:

\_ understanding. the variability of a point estimation

- Construct hypothetical Populations from the Observations.
- Bootstrap Melwods
- Resampling the original data proserved whatever structures are truly present in the underlying population.
- 5) Testing of hypothesis
  - 6) Bayesian Inference: Modern. :

## MAXIMUM LIKELIHOOD ESTIMATION:

Question:

"For which parameter value does the observed data have the biggest probability?"

Example: A coin is flipped 100 times. Given that there are 55 hears, find the MLE for the probability p of hears on a single toss:

You know your model is Binomial distribution. XNB(n,p) N=100, Pis unknown.

$$P(55 \text{ heads}) = (100) P^{55}(1-P)^{45} \leftarrow (55 \text{ heads}) = (100) P^{55}(1-P)^{45} = P(55 \text{ heads})$$

$$P(55 \text{ heads} | P) = (100) P^{55}(1-P)^{45} = P(55 \text{ heads})$$

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"The probability of 55 heads given p"

"the probability of 55 heads given that the probability of heads on assingle toes is?"

OneNote

## Standard Term:

- 1. Experiment: flip the coin loo times and court the Number of heads-
- 2. Data: the data is the reput of the experiment. In this case 55 hede
- 3. Parameters: unknown parameter p.
- 4. likelihood function: P(datalp)

P(55 heads | P) = (100) P55 (1-P) 45.

Maximize the likelihood

 $\frac{d}{dp} P(data|P) = {100}{55} 55 p^{54} (1-p)^{45} - 45 p^{55} (1-p)^{44}$ 

22 = 100b. 22(1-b) = 112b.  $22b_{2d}(1-b)_{d2} = 12b_{22}(1-b)_{dd}$ 

MLE is p = 0.55.

- log likelihood function:



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