Video 1: I have Summarize it before.

~~Samplyit~~

Video 2: Qualitative and Quantitative

[1] ~~Qualitative~~ Quantitave (Numbers)

↳ Numerical data (two types)

a- discrete data (Counting) (it can't be Float number)

b- Continuous (measurment) (it doesn't have to be integer number)

← اى حاجه بعد بيها تبقى discrete زى عربيات، مكان

← اى حاجه بتتقاس (زى شكل مسافه - سرعه - وزن)

[2] Qualitative:

↳ descreption data based on observation (words)

it involves 5 senses. — بستخدم كلمات عشان اوصف data معينة

(See - feel - Taste - hear - Smell)

Some examples:-

① 7 dogs : discrete quantitative.

(Seeing) ② Black : qualitative

(measuring height) ③ 6ft tall: continuous quantitative

④ ~~Rough~~ cat fur is soft: qualitative

Video 3: Scales of measurments:-

① Nominal: Qualitative (categorical)

Names _ Colors _ labels _ Gender

order doesn't Matter

→ We can use it in calculation ←

by doing a survery like we ask People about their Favourite colour we take the percentages and use it in calculation

الأقصى

لكن مثلا الالوان تقسمها مفرش أستخدمها في الحساب

② ordinal Scale Data.

↳ Ranking   1st _ 2nd.
↳ order Matters.
↳ differences cannot be measured.

يعني اى؟: اقدر احسب
مش شرط ان الفرق بين المركز الاول والثاني ~~يساوى الفرق بين المركز الثاني والثالث~~ او انى ممكن مقدرش احسب بينهم فرق اصلا !!

③ interval scale data.

↳ order matters.
↳ differences can be measured. (except ratio)
↳ No True "0" Starting point (you can have negative values)

Temp: 30 °C, 60 °C, 90 °C

مش لازم الصفر يكون هو البداية ممكن يبقى في ارقام اقل من الصفر عادى
معرفش اقول ان الحراره 60 هى اشد حرارة من 30 بالضعف $\frac{60}{30} = 2$

④ Ratio scale data:

↳ order matters
↳ differences can be measured (including ration)
↳ Contain (0) statring Point

هيتفضى رقم اقل من الصفر.

Grades:
70, 30, 56, 82, 90
30, 56, 70, 82, 90.

$\frac{90}{30} = 3$

اقدر اقول ان الدرجة 90 اكبر ٣ اضعاف من الدرجة 30

data	Nominal	ordinal	interval	Ratio
Labeled	✓	✓	✓	✓
order Matter	✗	✓	✓	✓
Measure difference	✗	✗	✓	✓
True Zero Starting Point	✗	✗	✗	✓

Video 4: HyPothesis Testing and the Null Hypothesis

We Make an experiment and Take results and Make our hypothesis: هى مشروط : الا فتراضات بتاعتى تبقى سليمه ممكن يحصل اى حاجه تغيرها عشان كده هنفيد ونعيد التجربه لحد ما نوصل لنتايج متقاربة تقدر تبني عليها ال hypothesis السليمه ممكن تقدر تاخذ average لانها هتبقى hypothesis اسلم.

→ We can Make First hypotheses and the other experment Prove that is wrong so we can reject it.

→ OR My experiements have data similar to My hypothese but not the same so we fail To reject the hypothesis.

لانى مبفترض اعتمد على تجربه اى واحده من التجارب (اعرف) لانهم كلهم قريبين اعمل اى ؟؟

→ if there is no differency (or small difference) be-tween things we choose to test (This mean null hypothesis)

↳ Alternative hypothesis is very important
اول حاجه هفترض null hypothesis و هعمل التجربا دى وهشبت انه صح او غلط

Video 5: Alternative hypothesis.

↳ Statistical test : We do it to know if we should reject or failed to reject ~~hypothetical~~ Null hypothesis but this need:

① needs data
② it needs null hypothesis or Primary (حاجه نقدر نوطها اوتر فهمها)
③ It needs Alternative hypothesis

↳ How to test null hypothesis :-

① Calculate distance between each observation and the mean.

② Compare those to distances calculated from individual Means

if we have two groups of data. the Alternative Hypothesis is super obvious because it just opposte of Null hypothesis

but if we have More groups we have options of the Alternative hypothesis and depending on which one we choose it we can reject or faild to reject the hypothesis

Video 6: P_values

P_values : numbers between 0 and 1 it helps me to quantify how confident we should be ~~From~~ that some thing better than other

the closer P value to Zero the more confidance that things in expeiemat are different

what is the thereshold can we use to Make sure we ~~take~~ Make a good deSeCion. ((0.05))

Pvalues less than .05 → false positive

→ P values helps us to reject or faild to reject Null hypothesis.

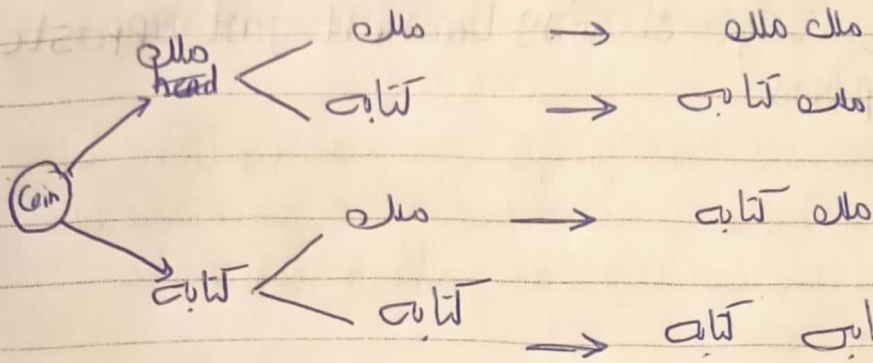
→ Small P value Tells Me if things are different but didn't tell Me How different they are (tiny or huge)

السنبه القليله من Pvalue حتى معناها ان الفرق كبير او الفرق صغير

Video 7: How to Calculate P values

Types of P-value: → one sided: rarely used.
↳ two sided: Used alot

"P value determined by adding up Probabilities."



Probability of getting (head head) = $\frac{1}{4}$ = .25

" " " (head tail / tail head) = $\frac{2}{4}$ = 0.5

" " " (tail tail) = $\frac{1}{4}$ = .25

→ Calculate of P-value for getting (head head)

P value Composed of three parts

1) Probability of random chance would result in the observatio (.25)

2) Probability of observing something else is equally rar (.25) (tail tail)

3) Probability of observing something rarer or more ex (حالتا بوشن)

P value = .25 + .25 + 0 = 0.5

0.5 > .05 So we faild to convince That our coin is Special.

what about getting four heads and 1 Tail

H H H H H
T H H H H
H T H H H
H H T H H
H H H T H
H H H H T

→ 5 ways to get 4H and 1T
→ 10 ways to get 2H and 3T
→ 10 ways to get 3H and 2T
→ 5 ways to get 1 H and 4T
→ 1 way to get 5 He.
→ 1 way to get 5T

PValue = Probability of getting 4H and 1T (5/32) + Probability of getting 4T and 1H (5/32) + (Probability of 5H + Probability 5T) (1/32 + 1/32)

in two sided no other distribution gives better result

$\frac{5}{32} + \frac{5}{32} + \frac{2}{32} = 0.375$ My Coin in not special.

↳ one sided Pvalue:- (dangerous)
in some condition it cannot tell that My drug doing Something unnormal.

Video 8: Confidence intervals

Ex: we want to know the mean weight of female mice

① we choose random 12 Female Mice to weight, ① Choose Random 12 weights
② Calculate mean of the random sample.
③ Repeat ① and ② until we Calculated alot of Random means

95% Confidence of interval:- معناها انه يعني 95% من جميع means الي اخذتها

Why they are useful:- confidence of interval = 95% لو بشكل قولت ان
معناها ان 5% بس اللي ممكن متكونين يعني اذا Pvalue < 0.05 معناها ان 95% خارج

Video 9:- Regression analysis

technique that helps to analyse relationships between variables to understand the world.

regression Line : هو خط برسم بيمر بعض نقط من
الى طلعوا عشان اكون علاقة اقدر اشتغل عليها

we can include More ~~independent~~ independent variables.