

- Recap:
- Statistics
 - Z-Score
 - Use case of std
 - Normal distribution / Gaussian dis /
 - Empirical formula (68-95-99.7-1. Rule) Bell Curve

Agenda:

Hypothesis testing

Types of variable

Basics of Machine Learning

Theoretical part

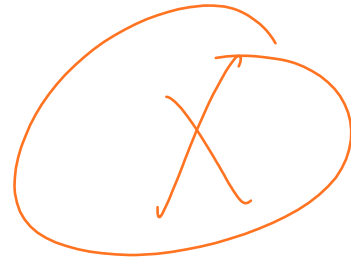
Hypothesis Testing

Here we evaluate two Mutual exclusive statements on a population data, using sample data. then we conclude that this population belong to a particular statement or not.

\Rightarrow Roll a dice

✓ E_1 = even number $[2, 4, 6]$

✓ E_2 = divisible by 3 $[3, 6]$



↑ Hypothesis \rightarrow Assumption

* Headache

✓ Medicine (A) \rightarrow 3 hrs to Relief

Medicine (B) \rightarrow 2 hrs to Relief

\Rightarrow Trials \rightarrow Sample data (50)

→ Sample data (1000)

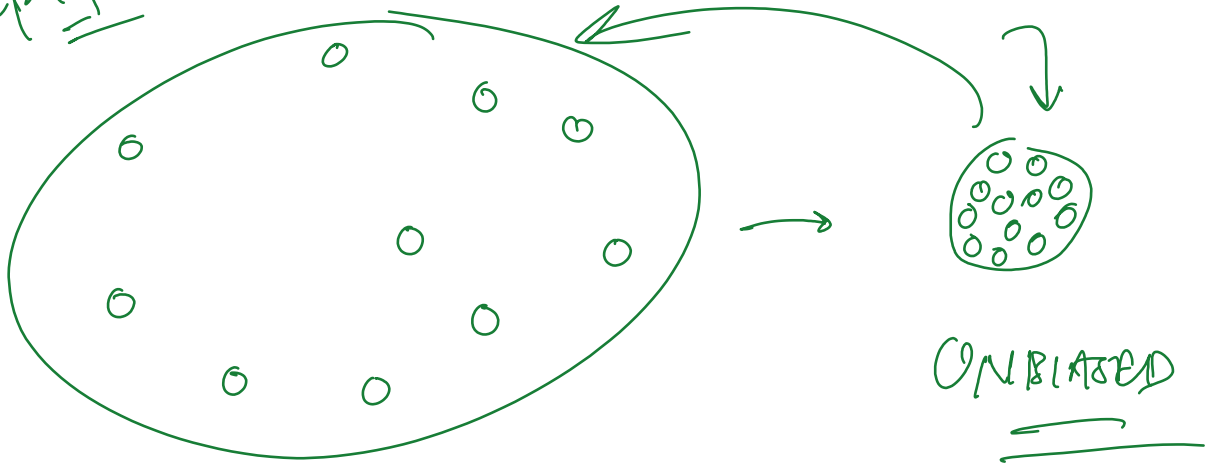
→ Sample data (100k) = failed

Rejected

(i) Null Hypothesis : Medicine A is Best

(ii) Alternate Hypothesis :- Medicine B is Best

Accepted



⇒

Steps

(1) Make Initial Assumption (Null Hypothesis)

(2) Gather Evidences

(3) Rejected or Accept the Null Hypothesis, Based on the Testing Results.

When we are testing Null hypothesis (H_0) against alternate hypothesis (H_a) , there are 4 cases

- (i) H_0 accepted when H_0 is true [Correct]
- (ii) H_0 rejected when H_0 is true [Error Type I]
- (iii) H_0 accepted when H_0 is false [Error Type II]
- (iv) H_0 rejected when H_0 is false [Correct]

* Type II error is more dangerous

P-Value (Probability value) :-

If P value for any Assumption (H_0) is more than 5% then we go and accept the Null Hypothesis.

Range of Probability [0-1]

If P value is ≥ 0.05 (5%)
then we accept our Claim (H_0),

Variables in Statistics

A variable is any characteristic, number, or quantity that can be measured or counted.

	total_bill	tip	sex	smoker	day	time	size
1	16.99	1.01	Female	No	Sun	Dinner	2
2	10.34	1.66	Male	No	Sun	Dinner	3
3	21.01	3.5	Male	No	Sun	Dinner	3
4	23.68	3.31	Male	No	Sun	Dinner	2
5	24.59	3.61	Female	No	Sun	Dinner	4
6	25.29	4.71	Male	No	Sun	Dinner	4
7	8.77	2	Male	No	Sun	Dinner	2
8	26.88	3.12	Male	No	Sun	Dinner	4
9	15.04	1.96	Male	No	Sun	Dinner	2
10	14.78	3.23	Male	No	Sun	Dinner	2

Variables

Types

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Numerical

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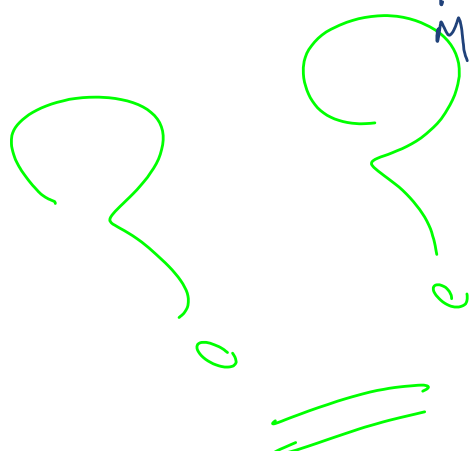
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Notes



Date Time Variables

date only → 18 June 2023

Time only → 4:27 PM IST

Date Time both → 18 June 2023, 4:27 PM

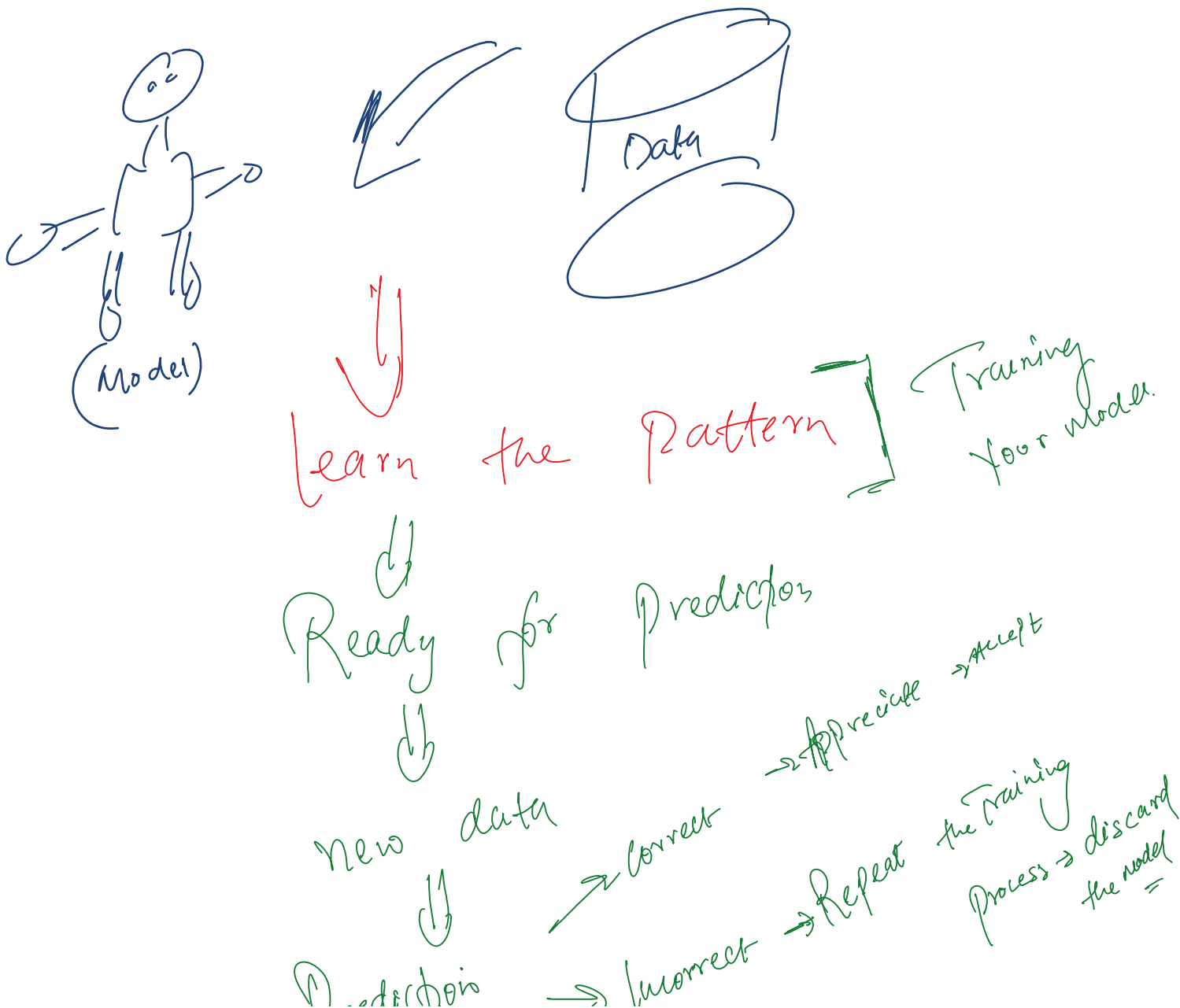
Mixed Variables

stu ID	Percentage (Performance)	
	A++	} mixed
23	85	
12	failed	
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Machine Learning

* It is a Subset of Artificial Intelligence.

* In machine learning we feed data to our models, and model derive patterns from data which they use to predict the future inputs.



Prediction → incorrect

Types of ML

