

- ① Foundations
- Prompt
 - APIs
 - LLMs

② NLP & RAG

③

AI Agents & Multi Agent Systems

④

Deployment

⑤

⑥

NN + Transformers
Finetuning LLM

Foundation of Gen AI

AI Intelligent
Artificial

Chat GPT

Vikram is a _____ student.
good ← Human
 ↖ computer

Dhruandhar

spy movies.
Hindi movies

which movie
next?

AI

10 photos → Navika
②

AI :
Rule based systems.

temp > 100°C

⇒ Fever

ticket

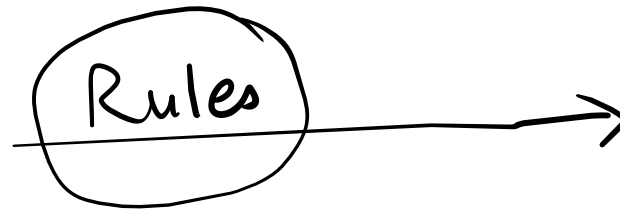
or no ticket

?

IF
then
then
that.

Rules based systems

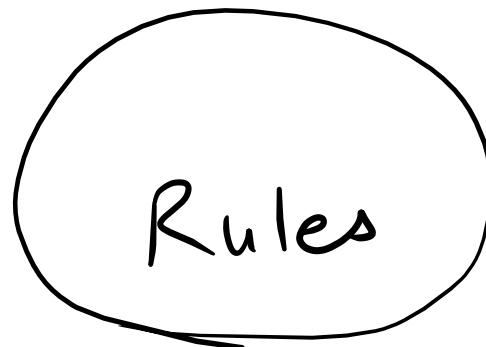
Inputs



Outputs

Machine learning

Input

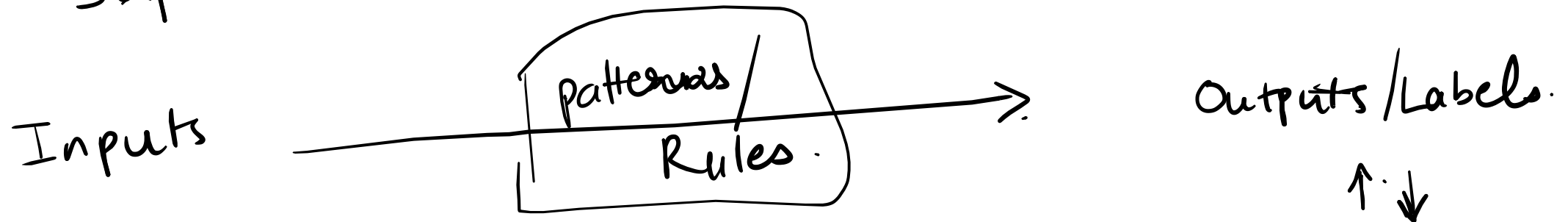


Outputs

Youtube??

ML

① Supervised.



↑↓

① Regression

Price of a house / stock.

② Classification

present / absent
spam / Not spam

② Unsupervised

clustering

Input

Categories

Sci Fi, Rom Coms, thrillers

Dishes

North Indian

South Indian

Italian

Deserts

Ingredients

taste

style

lighting

1000

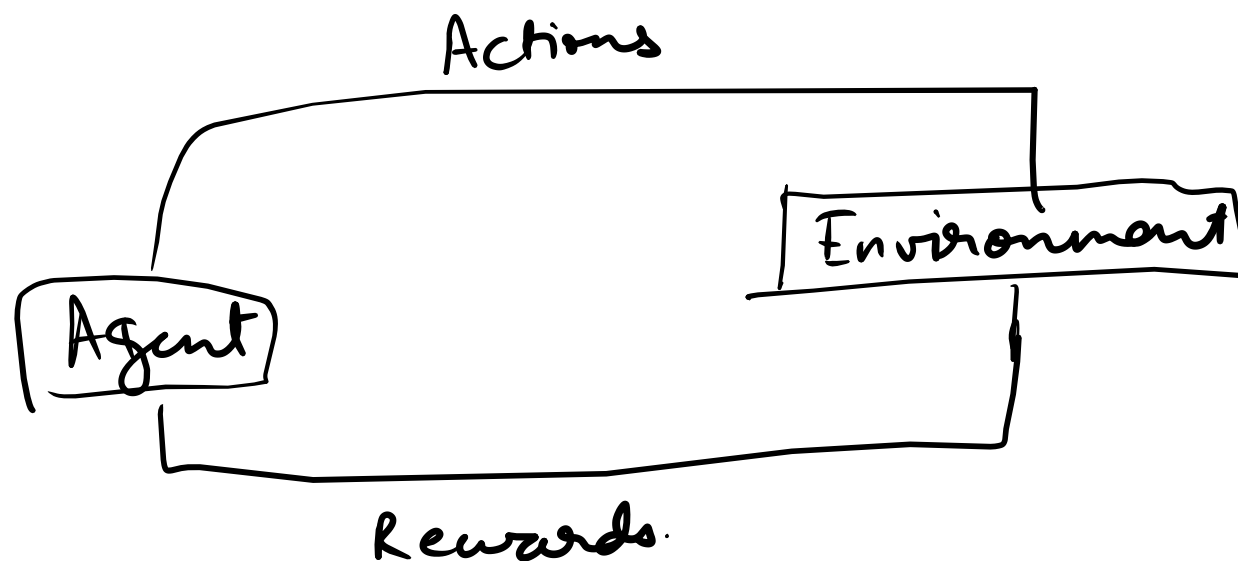
3/4

③ Reinforcement learning. → trial & error.

Dog → action Sit → reward. treat
→ lick.
→ bite

Agents

Try → Get feedback → Improve → Repeat.



- ① left
 - ② Right
 - ③ Jump
 - ④ Duck.
 - ⑤ Tilt
 - ⑥ Do nothing
- ⑤ Model free
- ④ Model based RL
Points = Rewards

Life cycle of ML

Prediction

Training

Parameter
Tuning

Collecting
Data

Location
sq. ft.
of bedrooms 1000

300 training
200 test

Preparation
Data

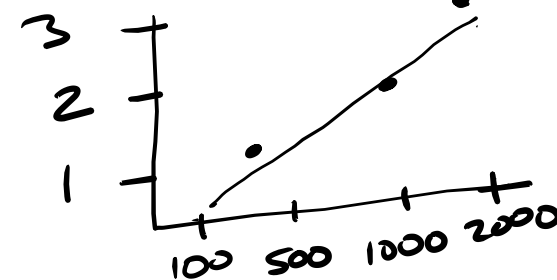
③ three |||
missing data.

Normalize

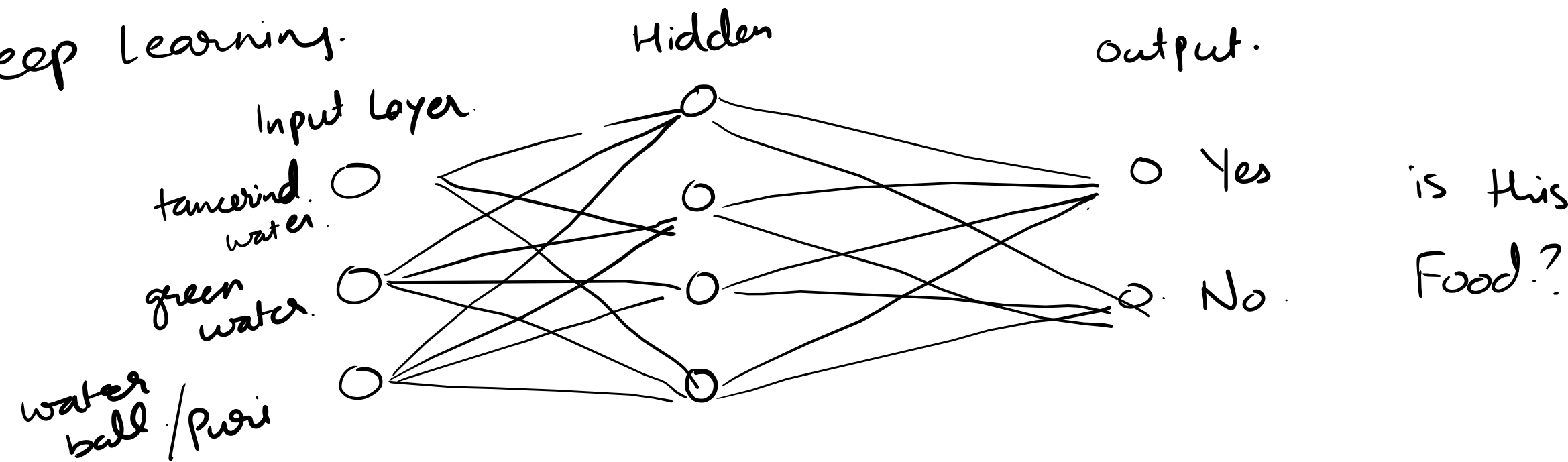
Choosing a model.

Evaluate
the model

Regression
Linear
Regressing



Deep Learning.

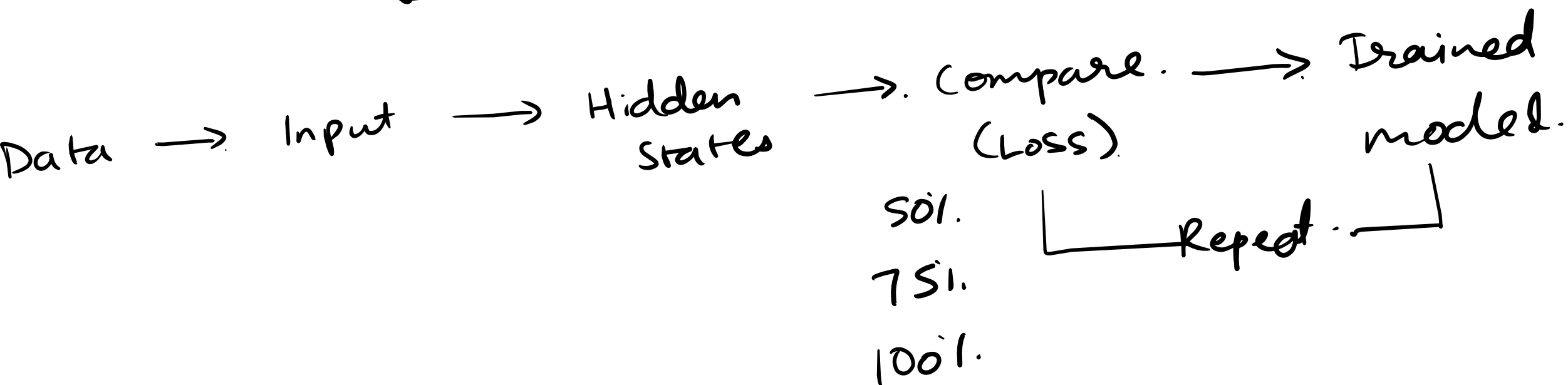


Dishes.

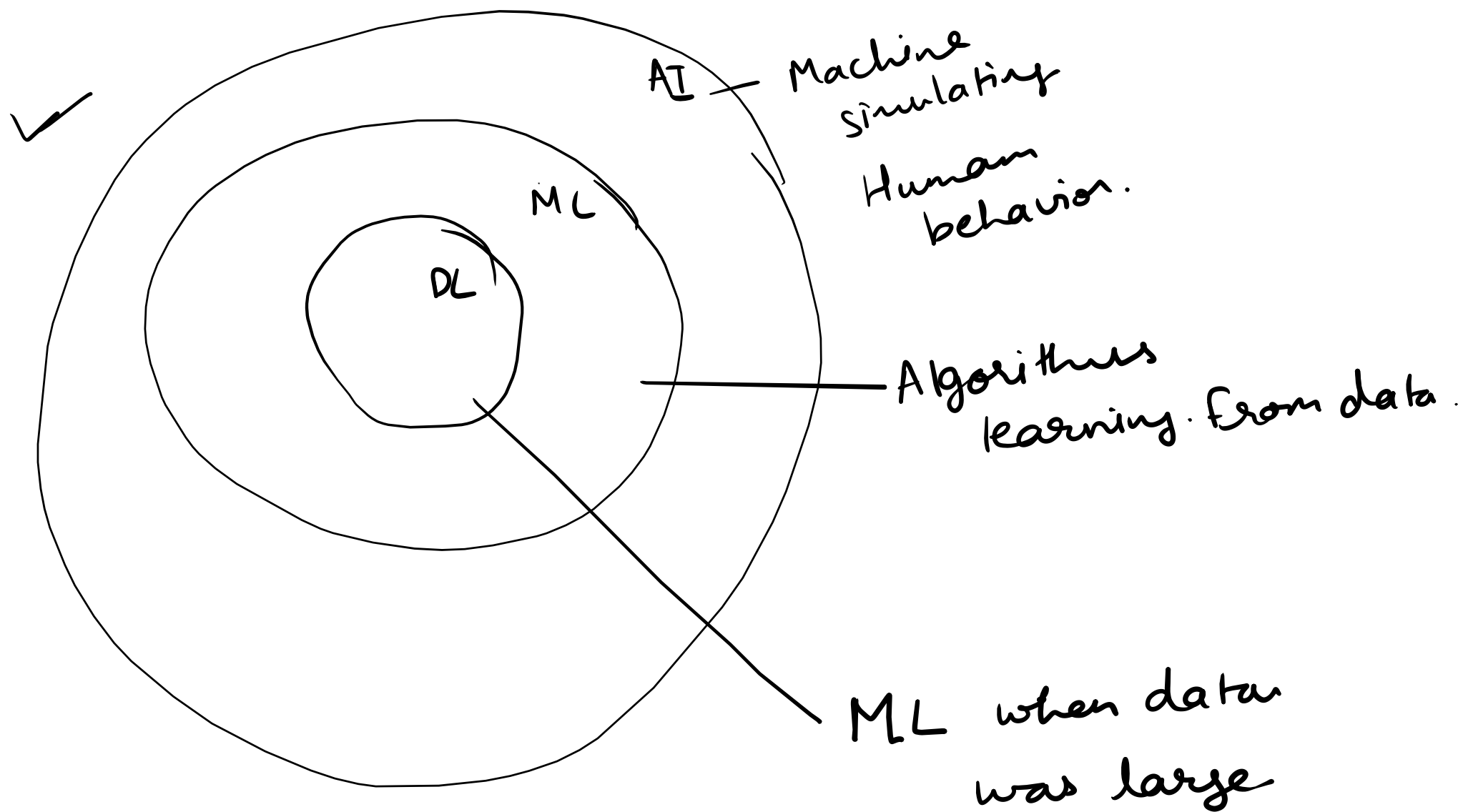
See

Smell

taste



X AI → ML → DL



Generative AI

AI → we were trying to learn systems / Rules.

GenAI → created. new content.

Phase 1

1950-70s

1950

Turing
Test

1966

MIT ELIZA

1970

Markov
chain

1 Rule

Phase 2.

1980-90s

NN

Boltzman
machine.

Random

Phase 3 2000s

RNNs

memory.

Phase 4 2014-15

Auto encoders

GANs.

generation/
imagination

Phase 5 2017-2019

Attention is
all you
need.

understanding

① Temperature

② Sampling.

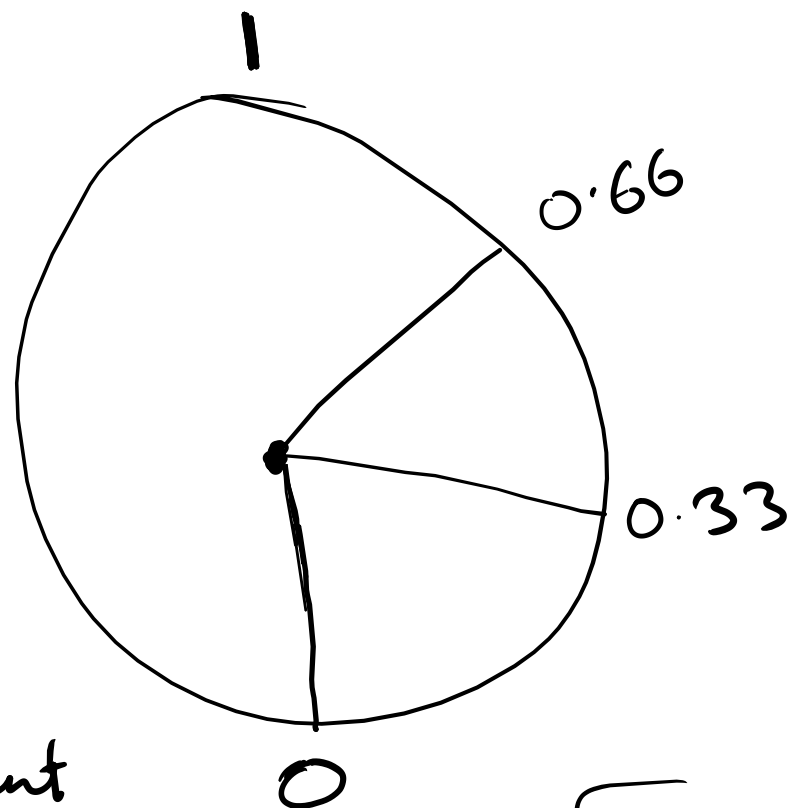
①

Temperature.



Randomness

0



Nitesh is an _____ student

[
good
hard working.
bright.
Smart
excellent.
]

[
boy¹
Italian
0.33 Indian
0.66 Funky.
]

② Sampling.

Vijay is a _____
good. boy
bad. student
excellent person
bright
boy

[bedsheet
traffic signal.

① Top k.

② Top p / Nucleus.

What is the capital of France?
top k ($k=5$) top p

Paris.

London

Berlin

Frankfurt

Delhi

Madrid.

Washington

This | is | how | they | work.

We | go | to | work | by | train

how | much | work | world | this | course | need

People | work | from | home.

high prob.

$p \geq 0.5$

k.

<u>work</u>	home.	0.1
<u>work</u>	style	0.3
<u>work</u>	place.	0.4
<u>work</u>	responsibilities	0.1
<u>work</u>	done	0.6
	atmosphere	0.2

less prob.

<u>work</u>	zebra
<u>work</u>	dove.
<u>work</u>	done

model.

GPT

Gemini