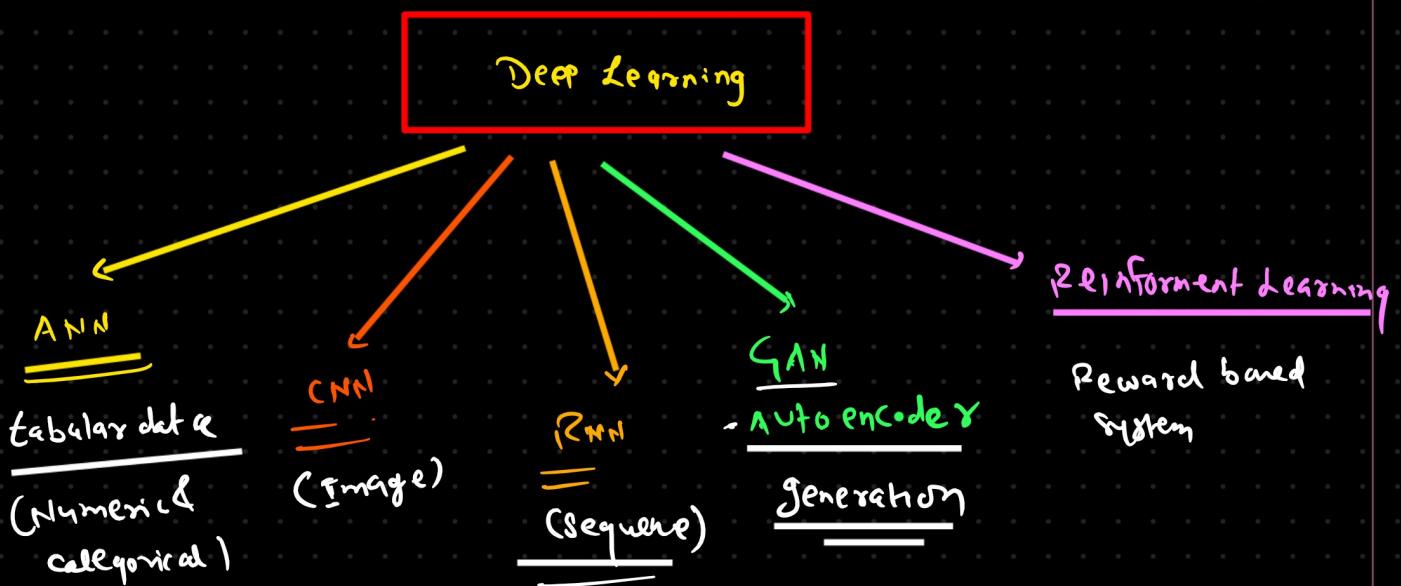
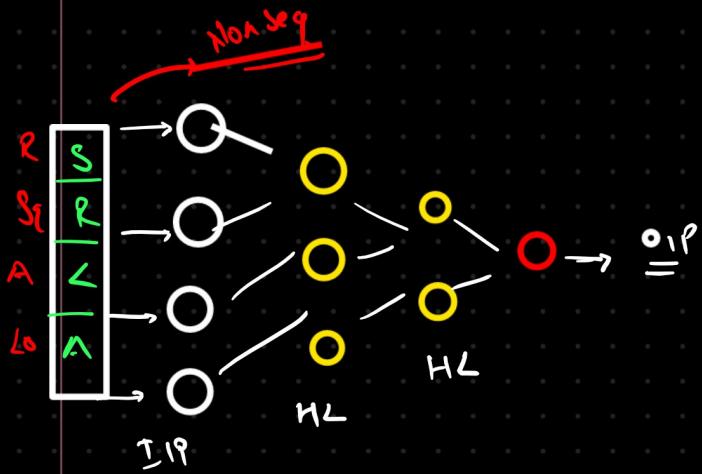


→ RAG, Agent



ANN



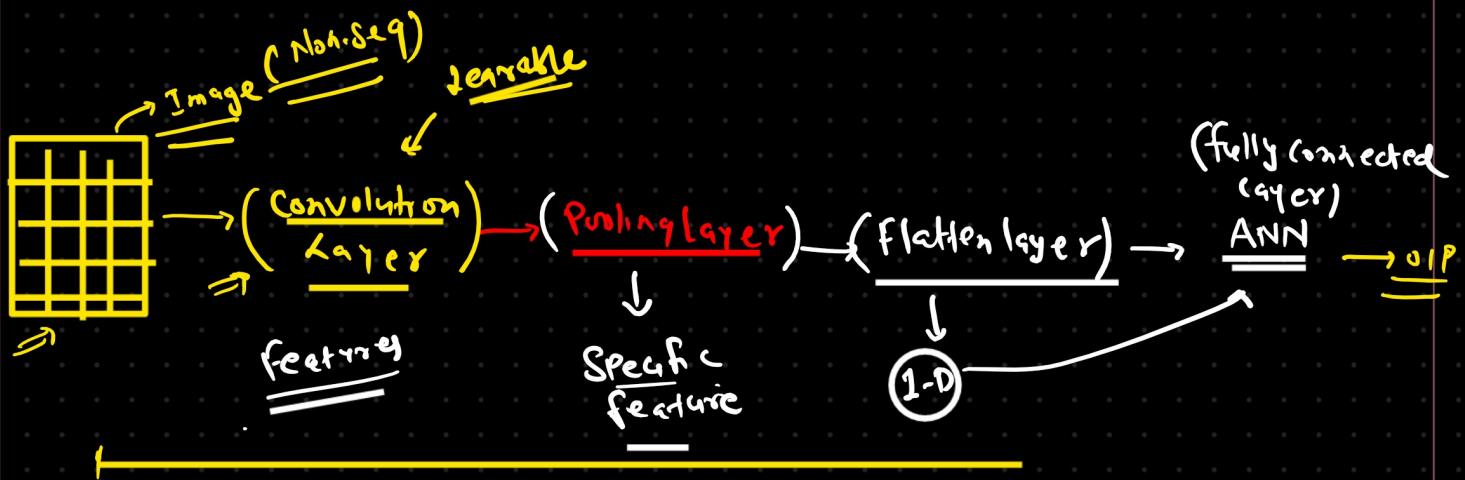
Numeral

Sq.Fsq.

House Price

<u>Sq.Fsq.</u>	<u>Rooms</u>	<u>Location</u>	<u>Avg</u>	<u>Price</u>

CNN (Image)



RNN

Sequence data

(Sequence)

RNN

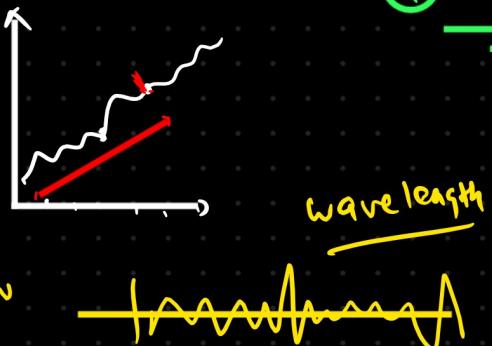
✓ My name is Sunny Savita

text data
context

✓ Sunny my name Savita is

- 1 Text
- 2 Time series
- 3 Speech.

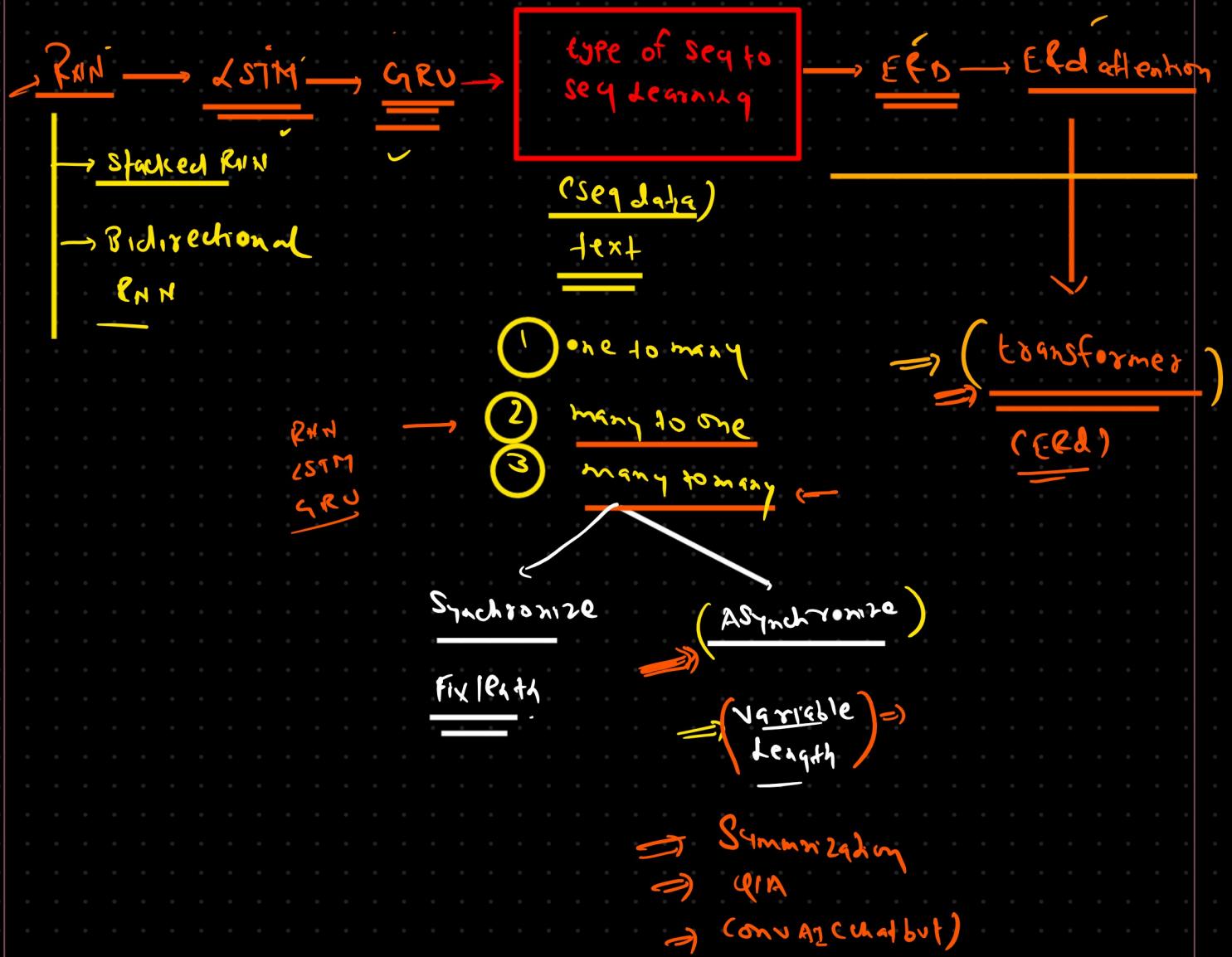
④ DNA Sequence



Mathematical Proof \Rightarrow DL

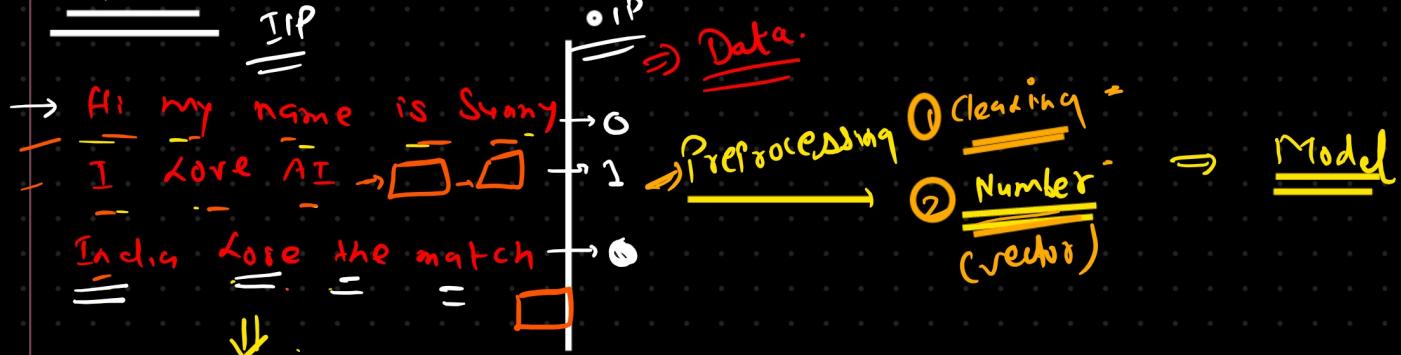
Conceptual things

Base



RNN

IIP



Vocab

↪ {12} ← unique
⇒ Basic encoding technique

ANN

(IIP)

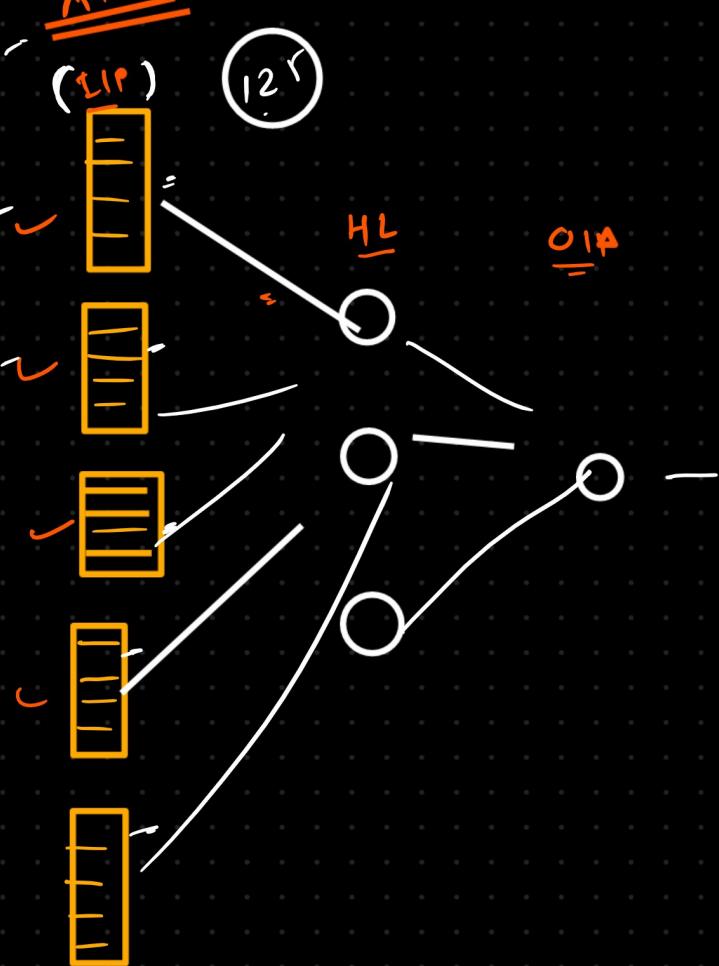
125

HL

OIP

[1, 0, 0, 0, 0, ...]
[0, 1, 0, 0, 0, ...]
[0, 0, 1, 0, ...]

1



text ⇒ ANN

① text input variability

② Context is not being preserved.

Vocab \Rightarrow S

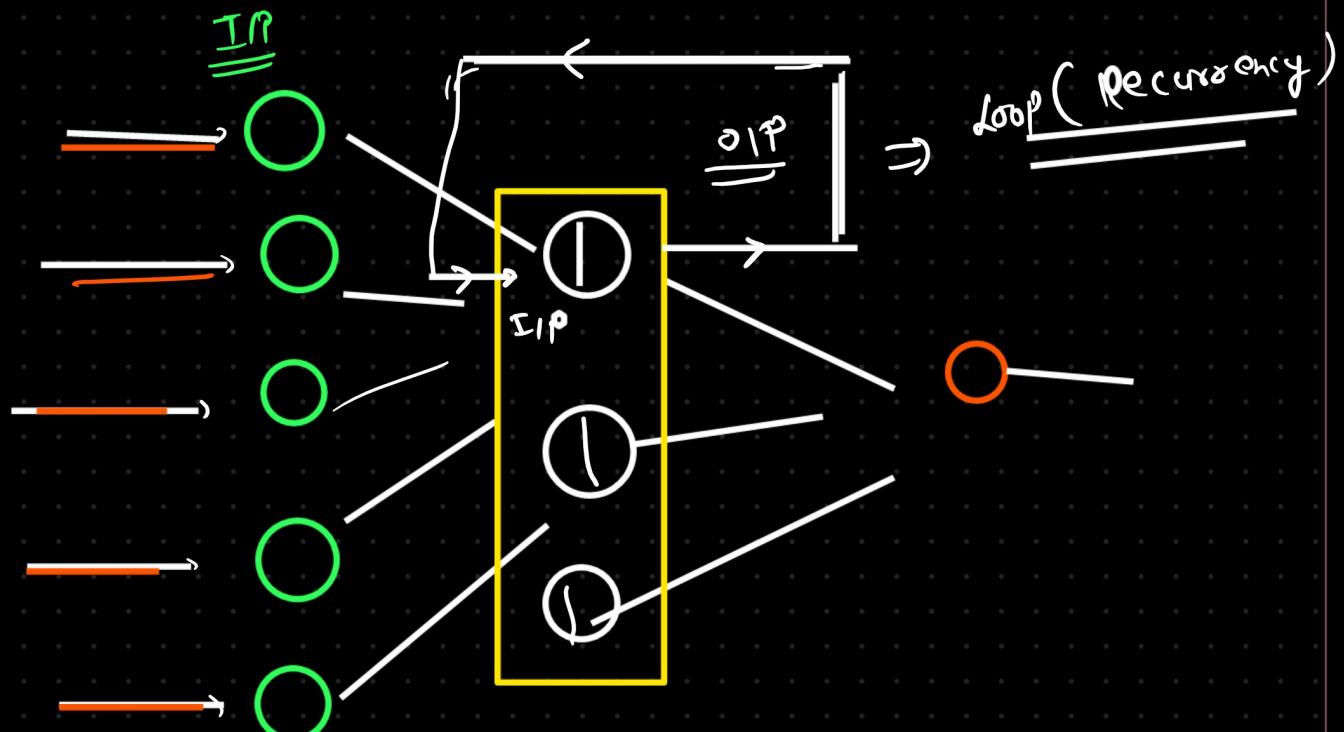
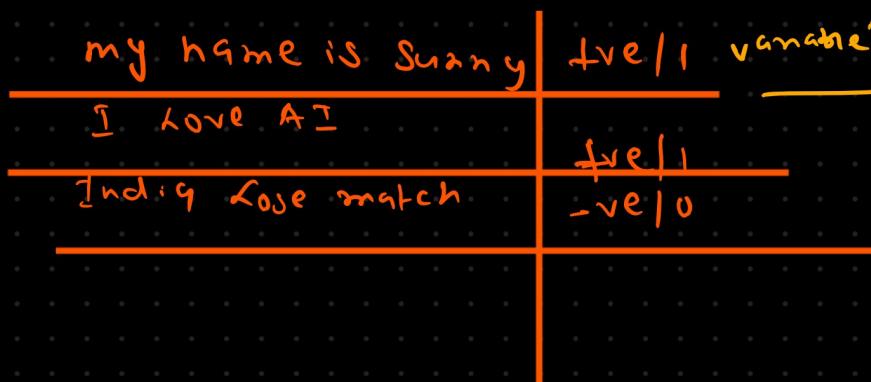
$$50 \times 1000 = 50000$$

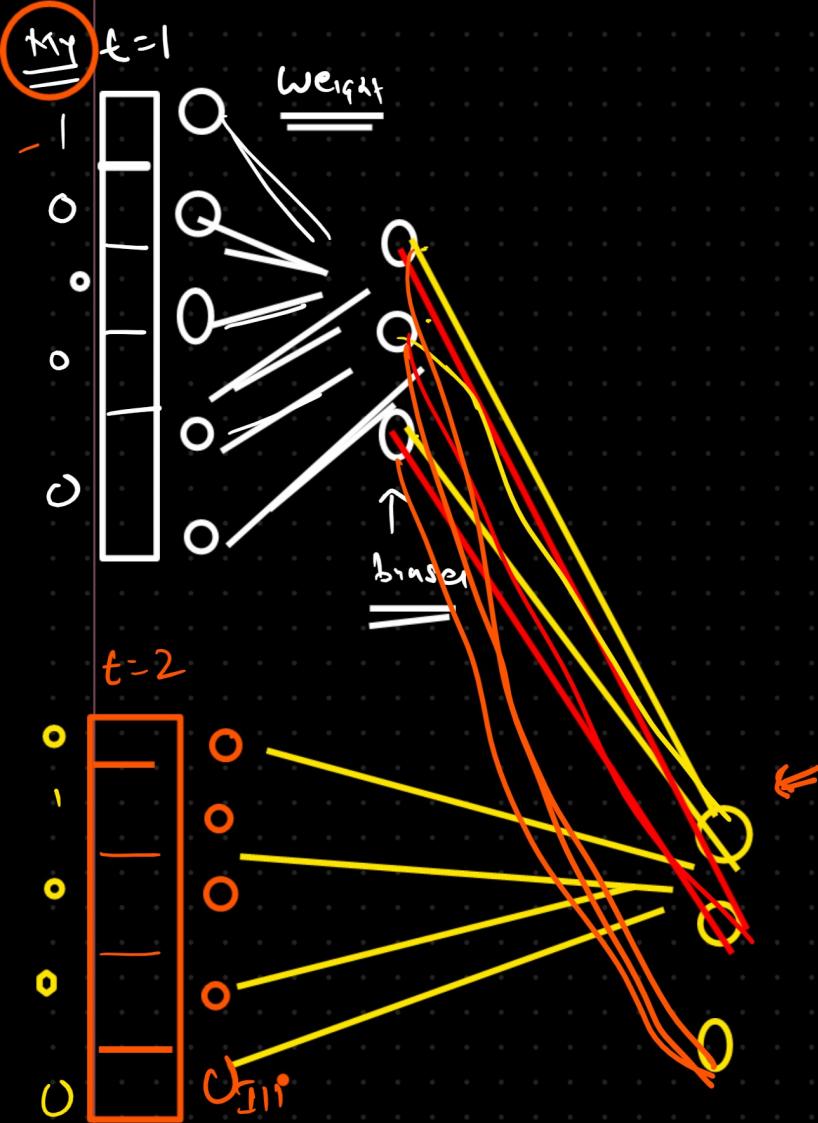
vocab \Rightarrow 1000
longest \Rightarrow S⁰
smallest = S⁻¹ and
is zero

Computational

200

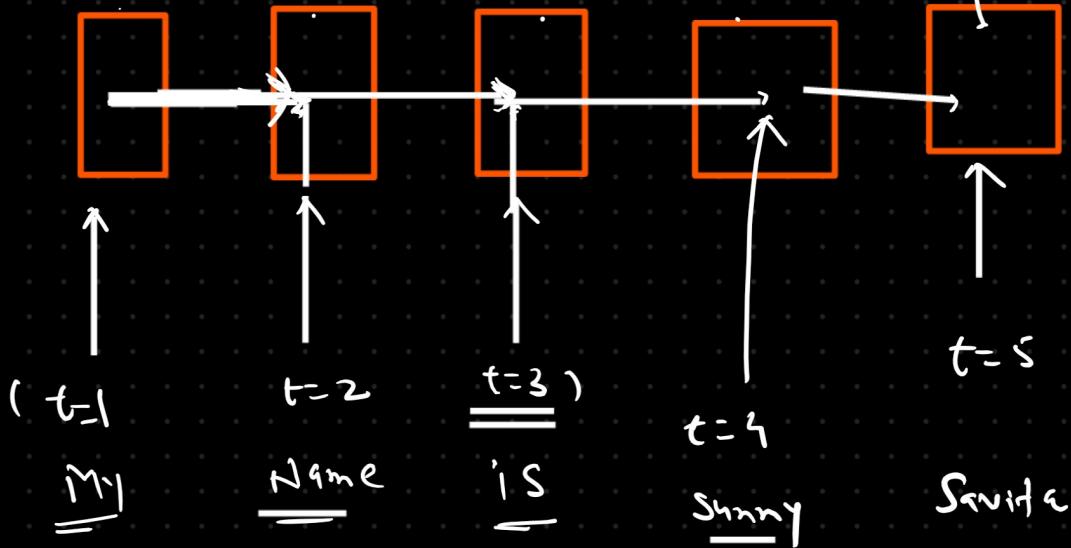
RNN



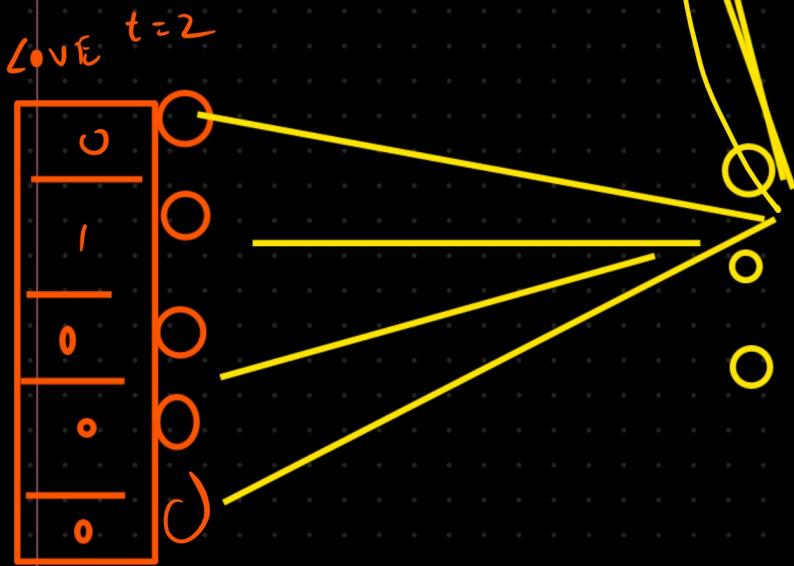
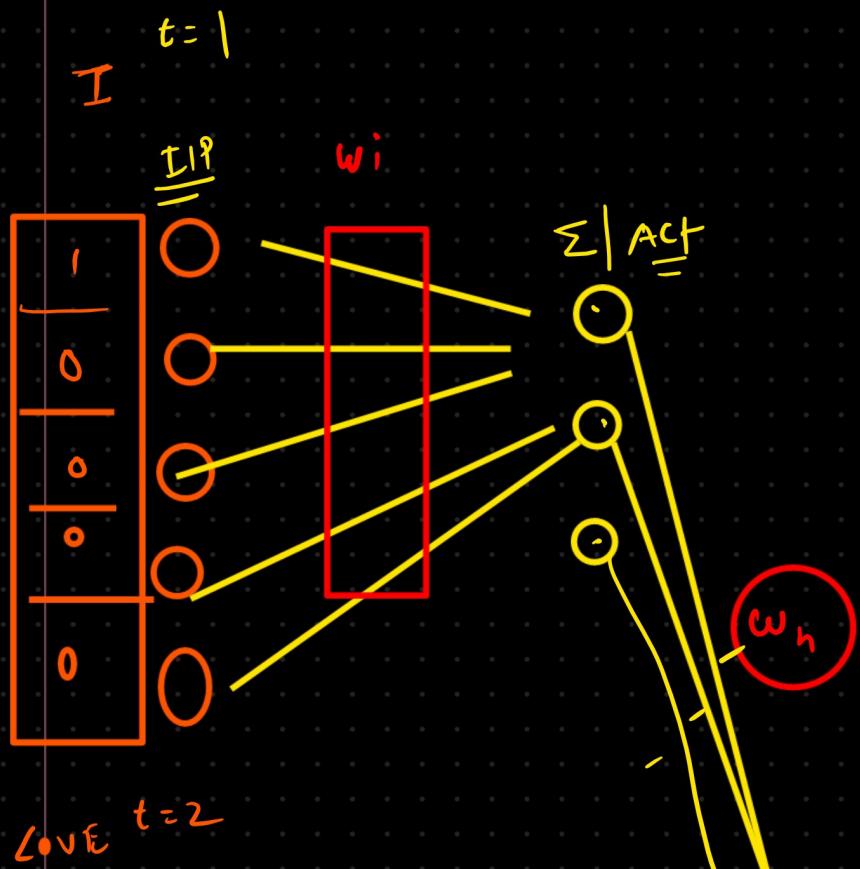
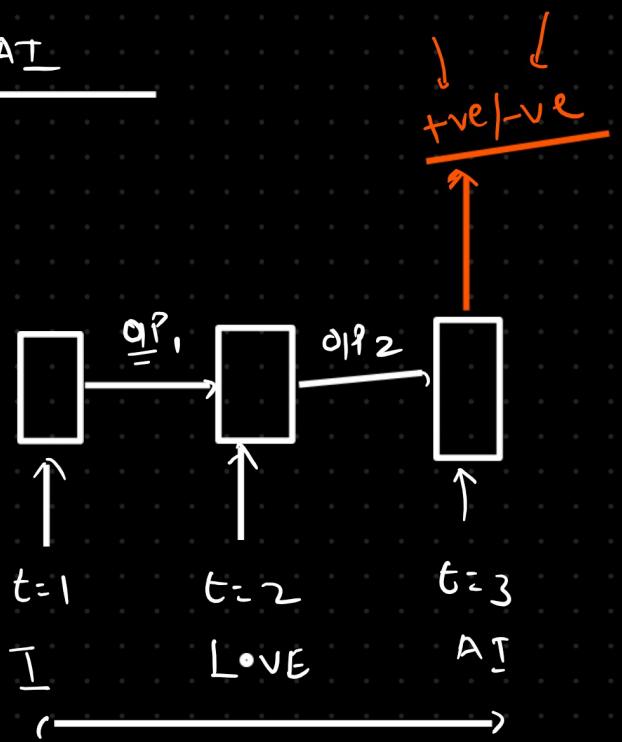


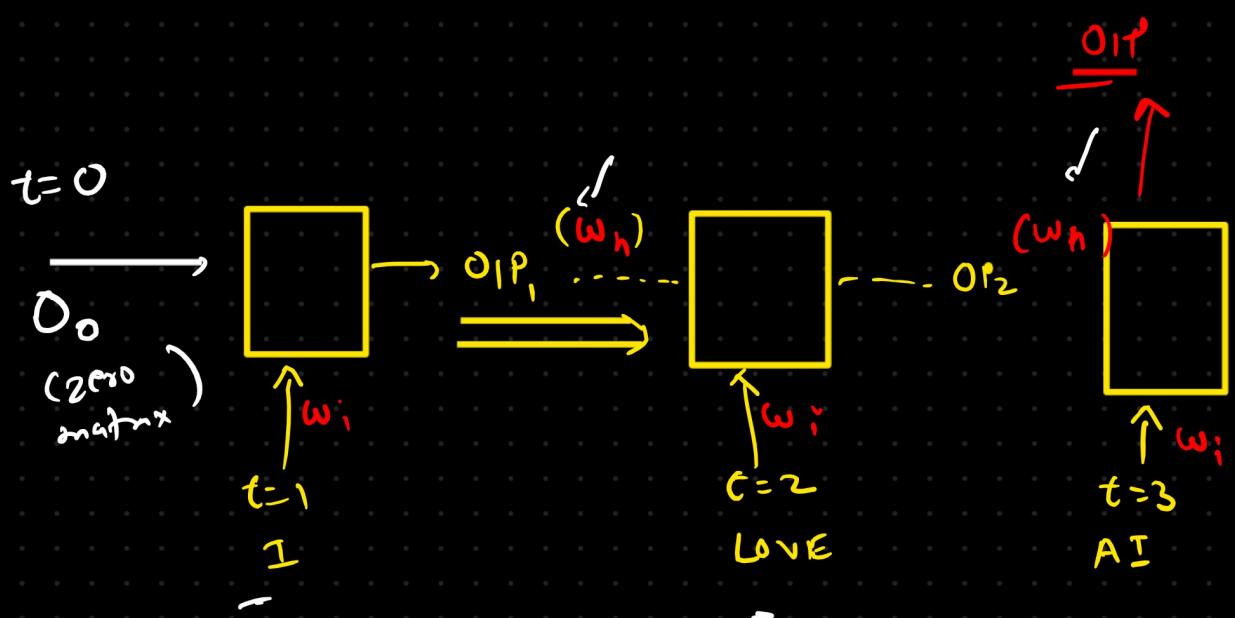
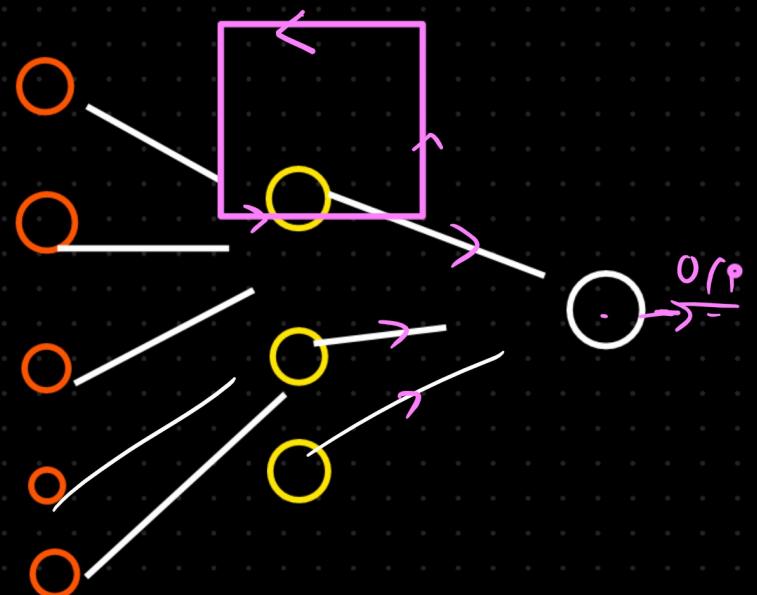
many to one
 $\overbrace{I}^{\text{seq}}$ $\overbrace{o}^{\text{op}}$
seq non-seq

five /-ve



I LOVE AT





Seyt to Seq

① many to one \Rightarrow Text classification

IIP
seq

OIP
Nonseq

Text classification
 \hookrightarrow Sentiment analysis

\hookrightarrow spam / ham

\hookrightarrow Rating pred

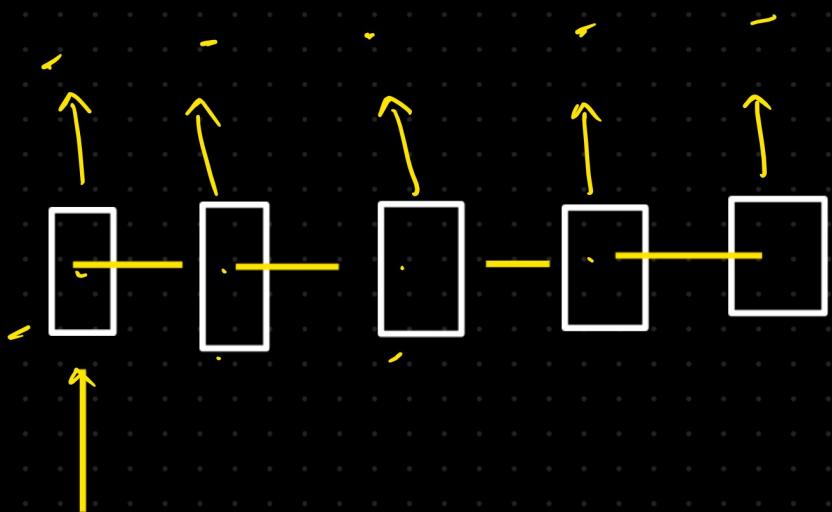
② one to many

IIP
seq

\uparrow (OIP)
seq

Image captioning

(Seq)



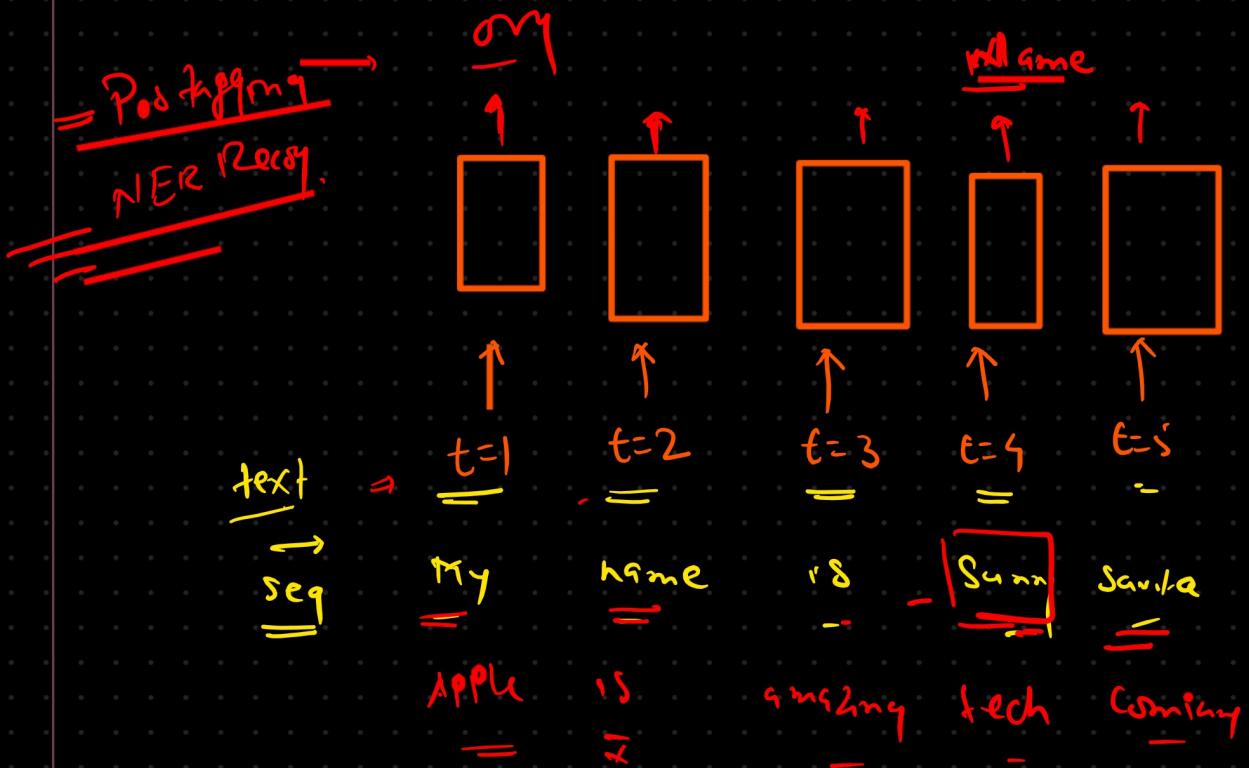
IIP
(Image) (CNN)
Extract

③ Seq to Seq

(many to many)

⇒ if Seq) (seq) ⇒ Future (then A.T.)

⇒ ① FixLength =



NER.

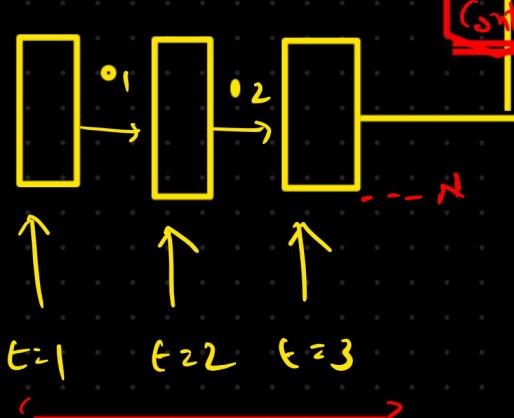
pos

many to many (variable length)

(many to many)
IIP → seq OIP → seq

→ Decoder Part

Encoder



- 1 Translation -
- 2 summarization -
- = 3 QA -



$$IIP = 10$$

{ my name is sunny ; teach & love }
I Love AI

if

summarization

my name sunny ; teach & love & I ⇒ ⑧

8NN (seq)

seq to seq

many to many

fixed length
variable length

(1997-98) (2014)

LSTM → GRU

1

longer
sentence

(Short term dependency)

(long term dependency)

Short term dep

my name is sunny.

bunny is at easy

he teach DS as well

RNN \Rightarrow

t = 15, 20

Bangalore is a coolest city in India here many people are liking the weather here food are also great.
In this city people speak Kannada.

long term
short term

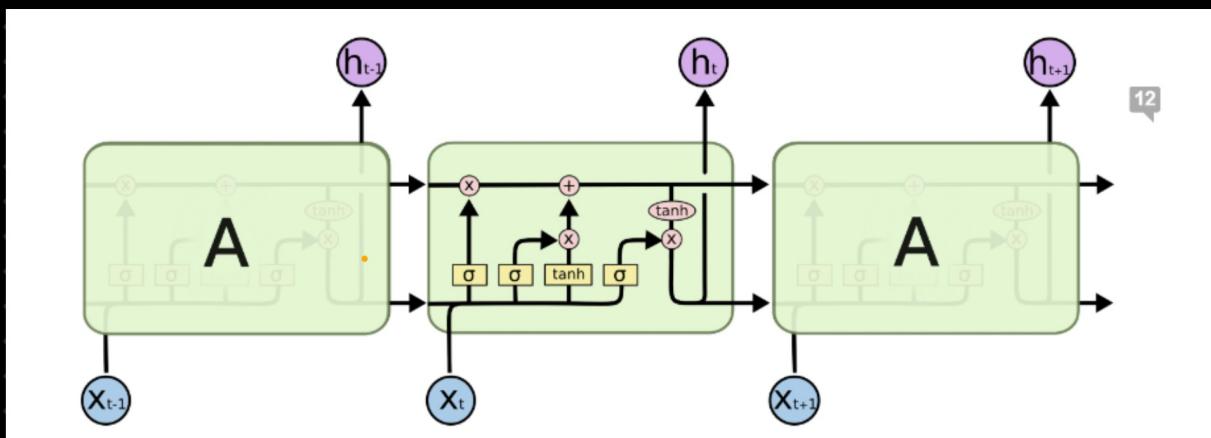
RNA → Protein

long term dependency

→ Rebuilt arch ⇒ LSTM GRU

~~RNN~~ → (Long term dependency) calculation

→ { vanishing gradient \Rightarrow small } \uparrow
 → { exploding gradient \Rightarrow large } \uparrow
 \Rightarrow CNN



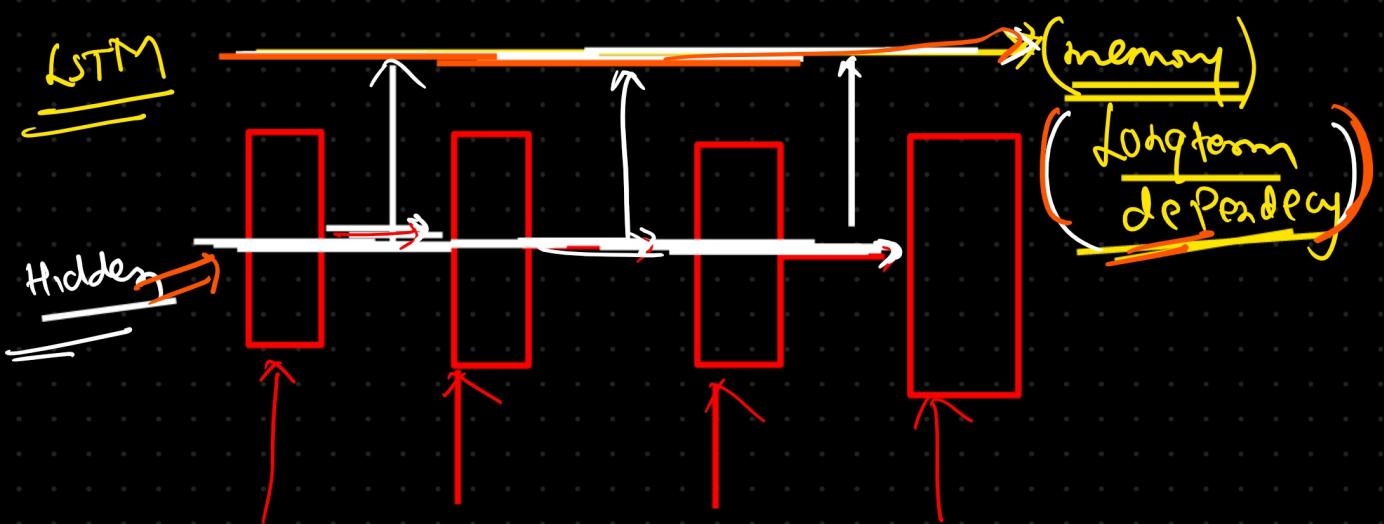
* There was a king Vikram very strong and powerful
 * There was an enemy king kaali
 * Both had a war and kaali killed Vikram
 * Vikram had a son Vikram Jr who grew up he to become very strong just like his father
 * He also attacked Kaali But got killed
 * Vikram Jr too had a son called Vikram super Jr and when he grew up he also fought kaali
 * And he killed kaali and took revenge of his father and grand father

Context

LSTM

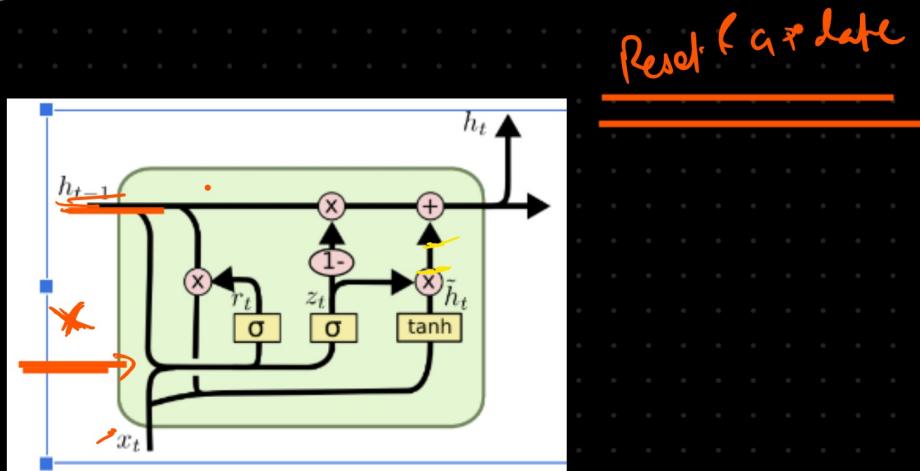
hero → (Short) → Vikram → (long term) → Vikram super Jr → Vikram Jr → Forsel → IIP → (Vikram super Jr)

Revenge



LSTM \Rightarrow

- ① Forget -
- ② Input -
- ③ Output -



① Seq & non seq.

② RNN

③ LSTM

④ GRU

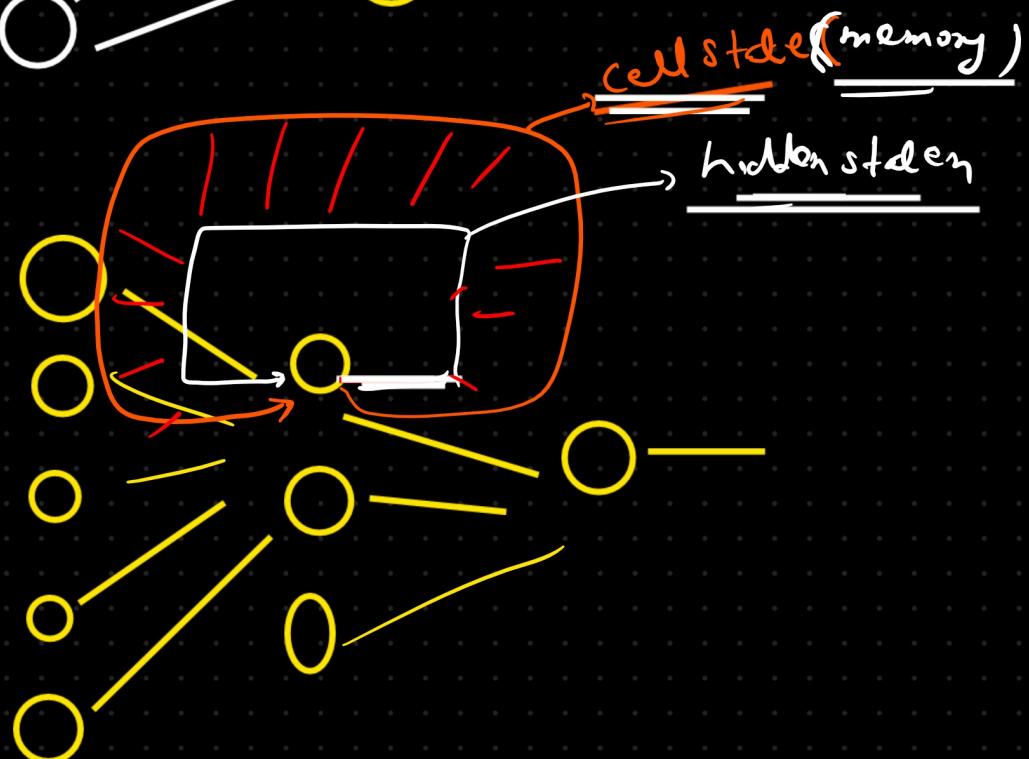
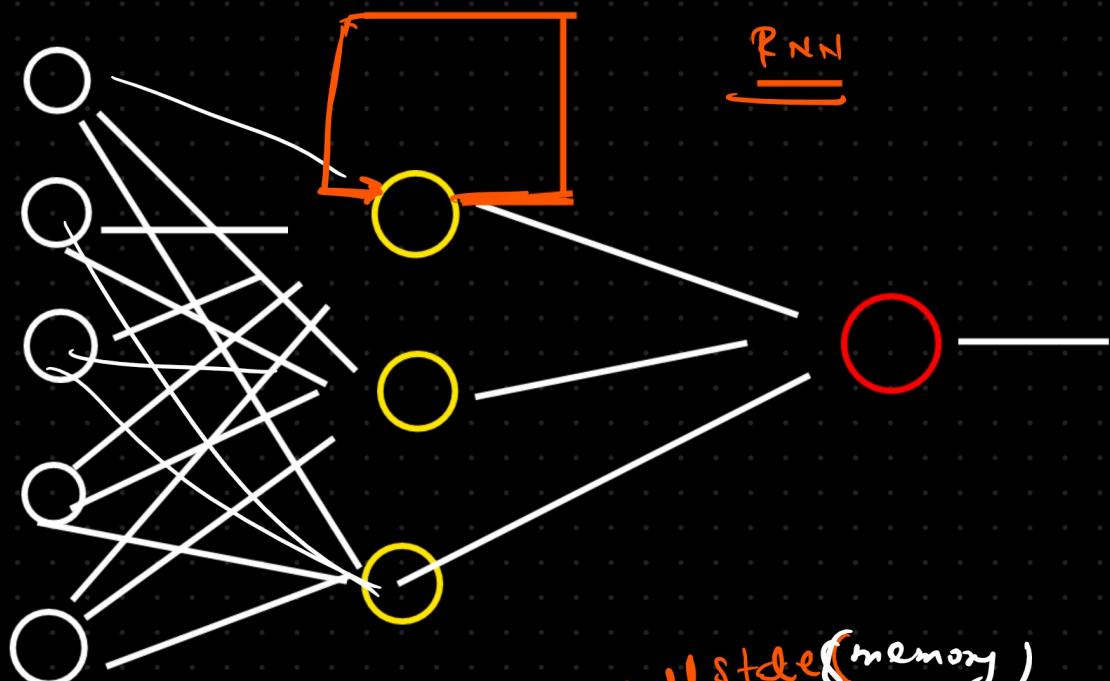
classical

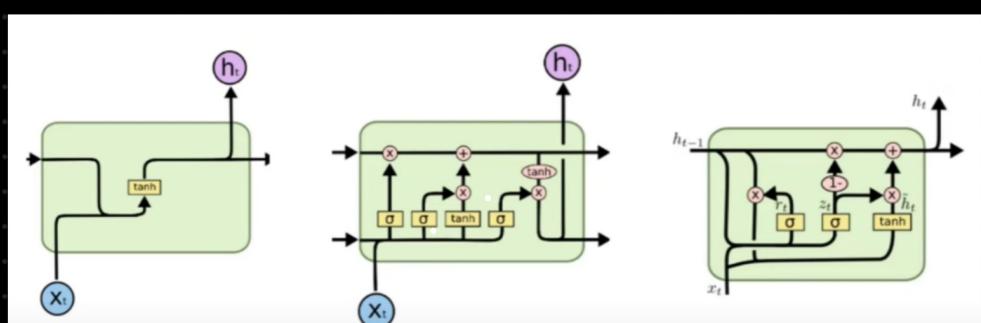
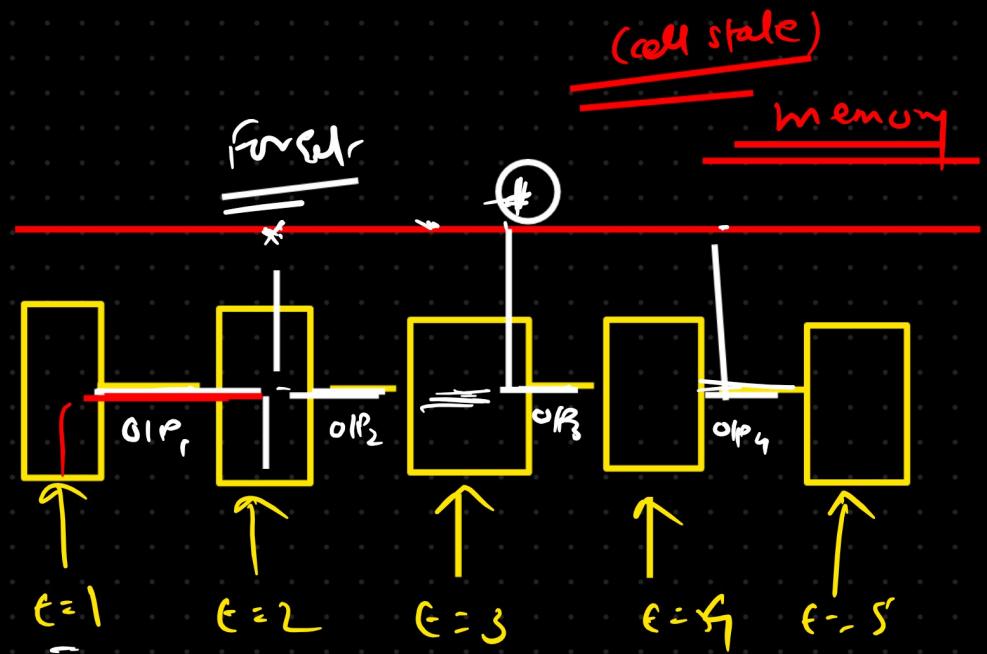
(LSTM)

Seq to seq



Seq manner =) word by word



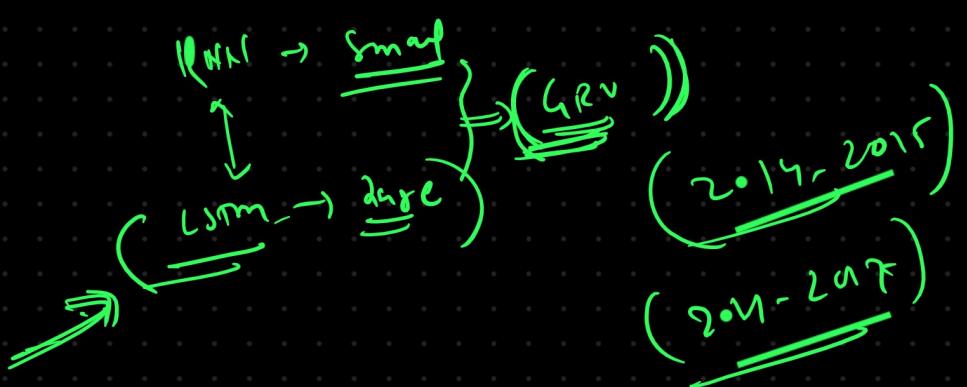


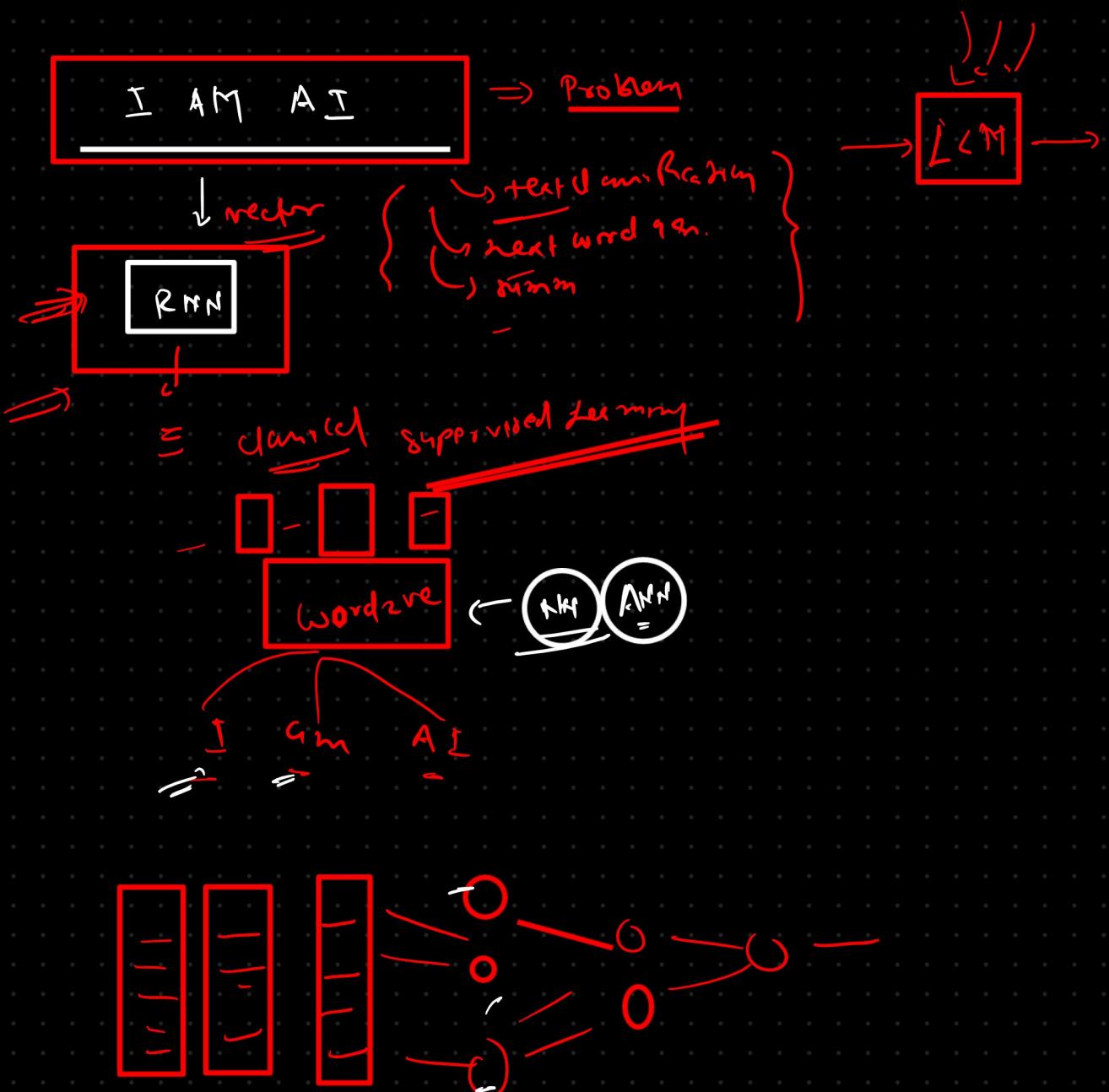
Apple is a no1 company \Rightarrow IIP

Pos tagging

(NER) [N V A =]

Organization, summarization, Q/A

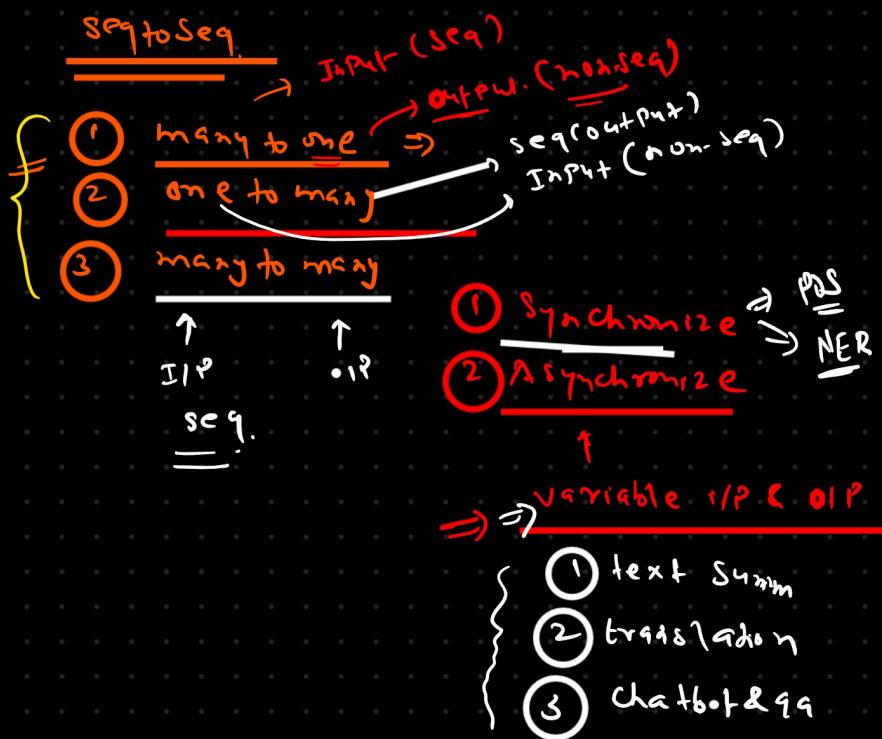




- ① GenAI
- ② text cleaning
- ③ encoding & embedding → word → seq → (RAG)
- ④ Model.

No n-Seq Seq

RNN → LSTM → GRU } classical

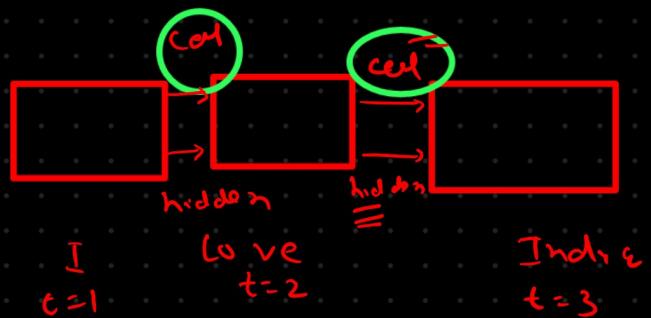
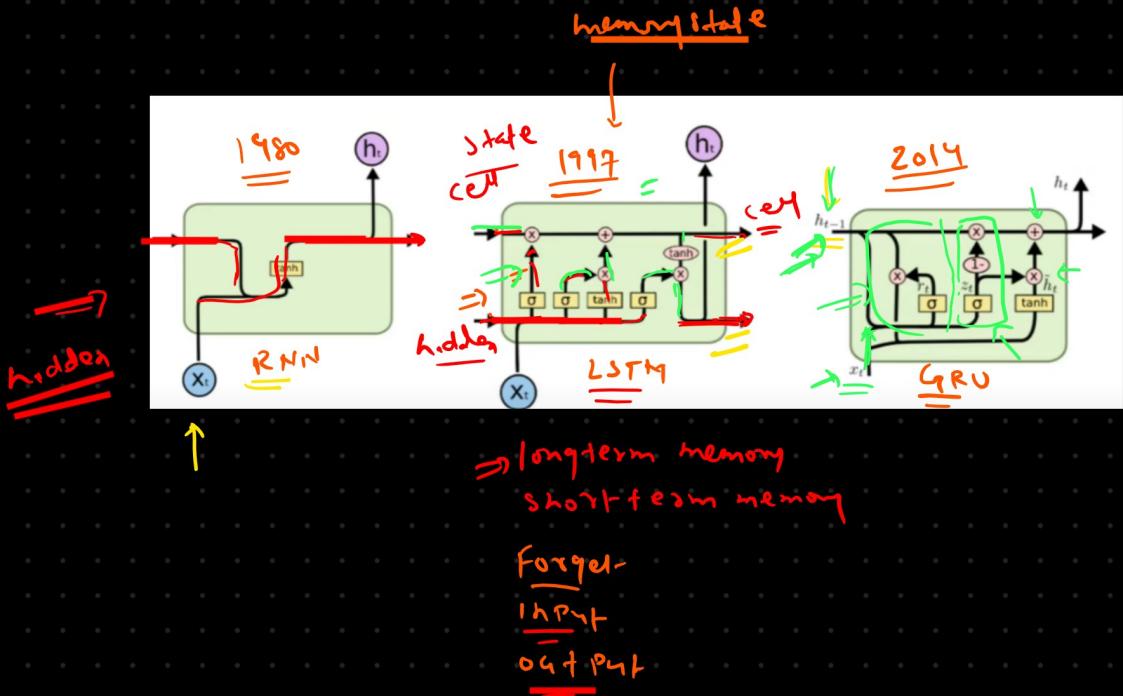


(overview) concept

- ④ Encoder & decoder
 - ⑤ Encoder & decoder with attention
 - ⑥ Transformer (attention all you need)
- Self attention Seq to Seq
many to many
- Seq to Seq
(many to many)

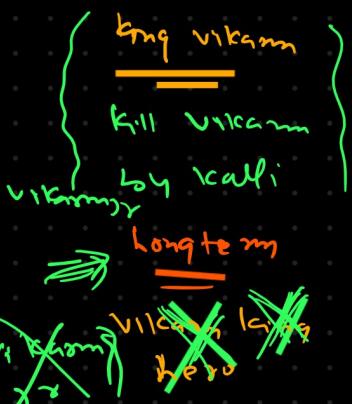


{ Language modelling }



- There was a king Vikram very strong and powerful
- There was an enemy king kaali
- Both had a war and kaali killed Vikram
- Vikram had a son Vikram Jr who grew up he to become very strong just like his father
- He also attacked Kaali But got killed
- Vikram Jr too had a son called Vikram super Jr and when he grew up he also fought kaali
- And he killed kaali and took revenge of his father and grand father

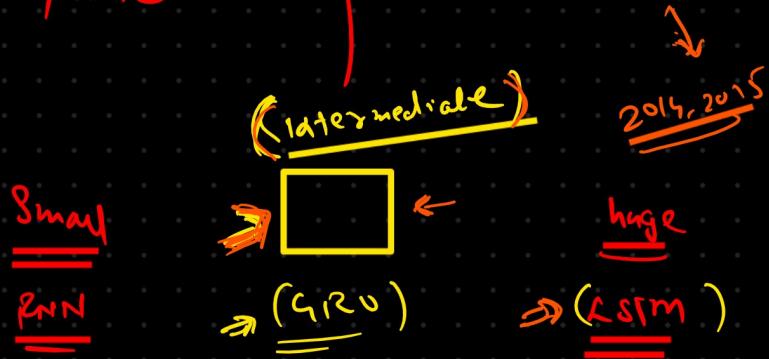
LSTM → Short term



- ① Complex
- ② Lots of Params
- ③ training time high

GRU

- GRU was simple than LSTM
- Less Params
- less training time



① Number gates

LSTM - 3
GRU - 2

② Memory

LSTM \Rightarrow Cell state, hidden state

GRU \Rightarrow hidden state

③ Param count

LSTM \Rightarrow more

GRU \Rightarrow less

④ Computational

LSTM \Rightarrow high

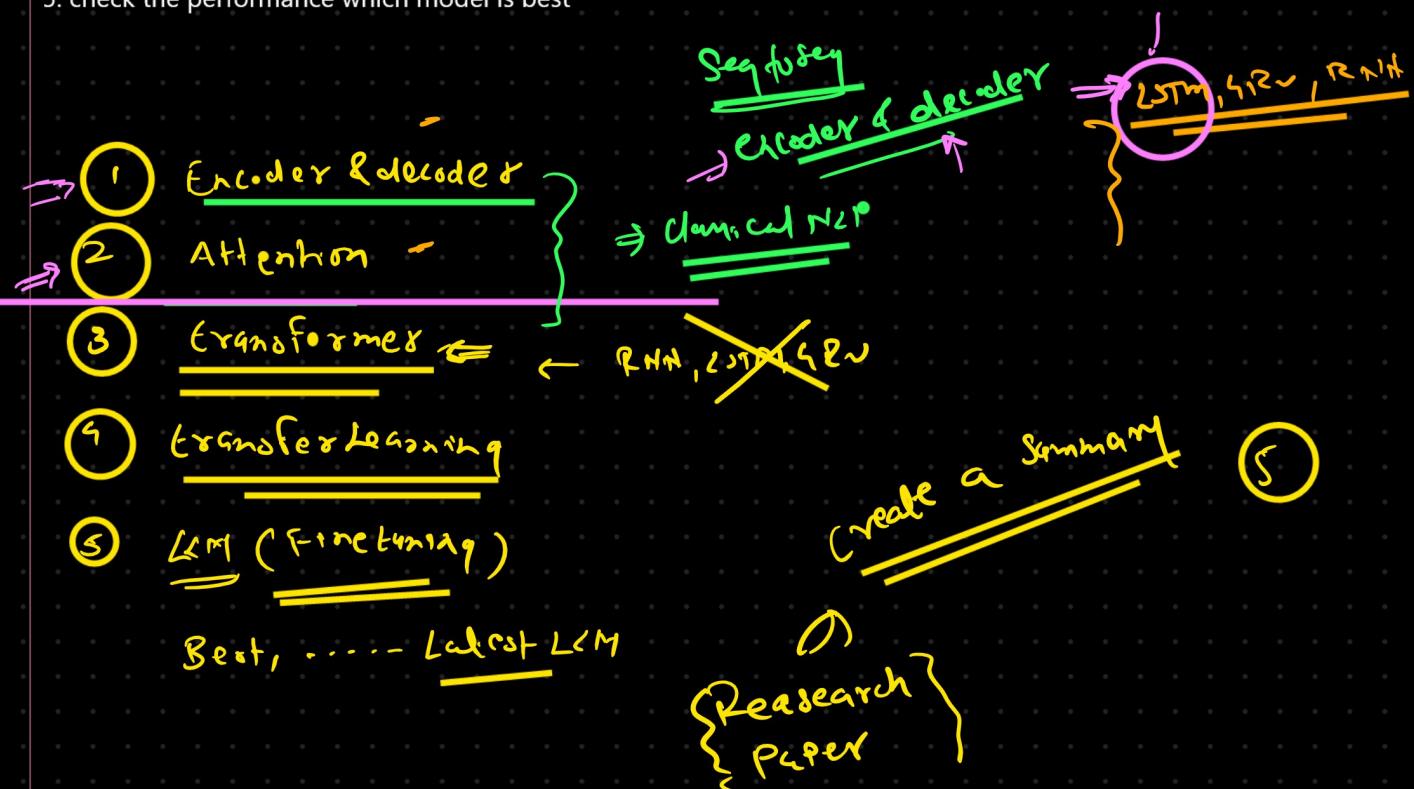
GRU \Rightarrow low

⑤ Performance

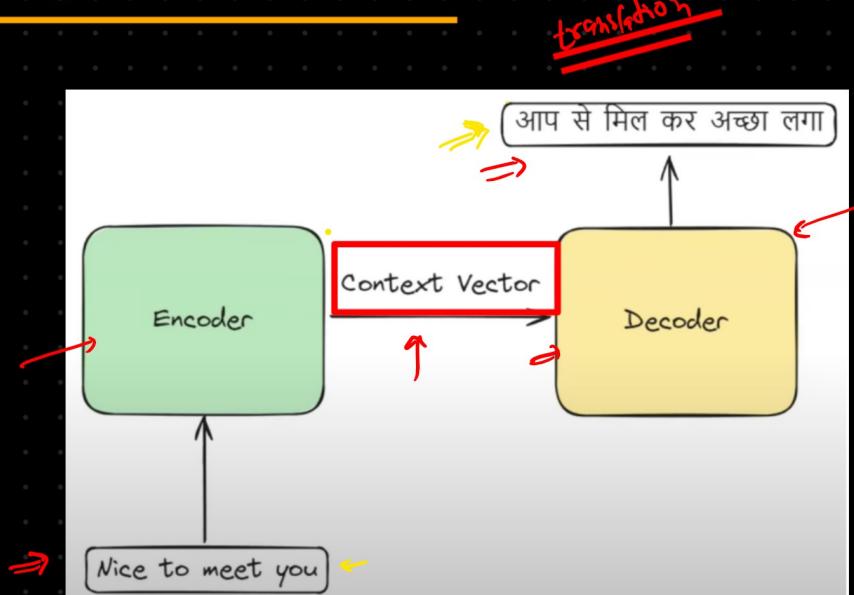


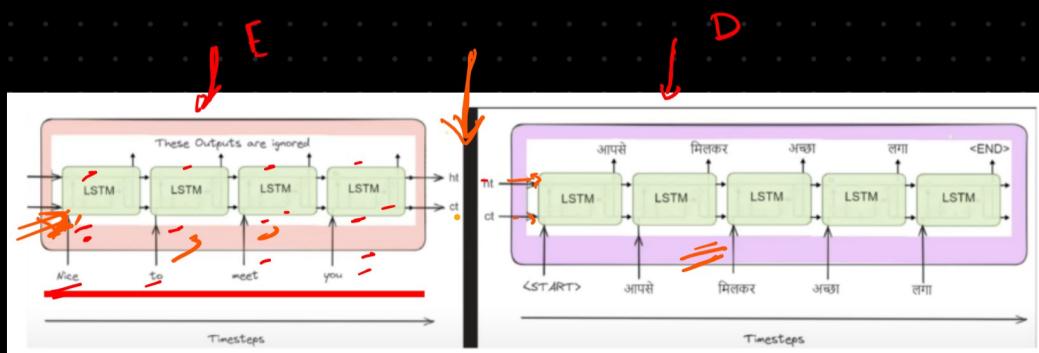
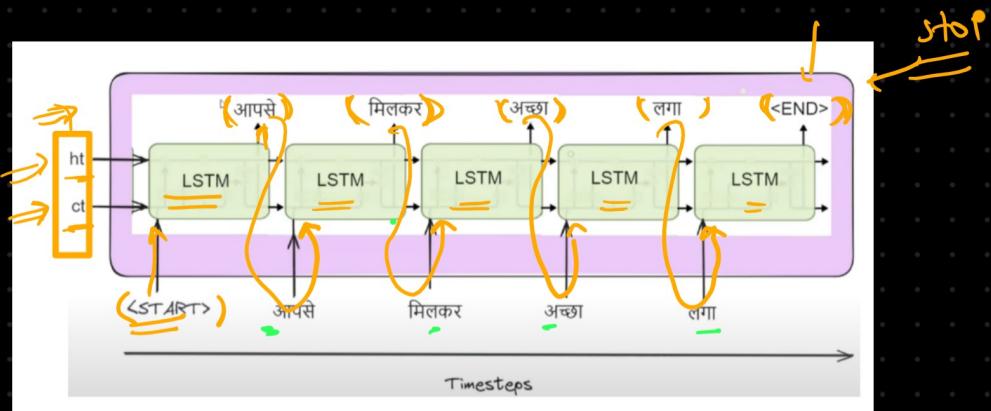
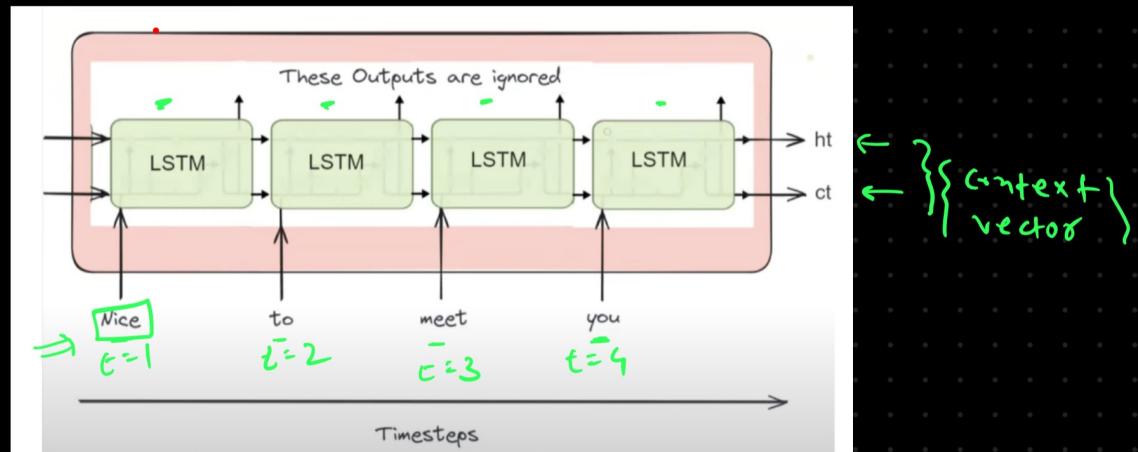


1. download the IMDB review dataset
2. perform necessary preprocessing
3. convert data into vector (OHE, word2vec, BOW)
4. create a model (RNN, LSTM, GRU) use keras library if comfortable with pytorch use pytorch
5. check the performance which model is best



1 Encoder & decoder





training

① Supervised data.

(IIPR 019)

IIP
eng

IIP
hindi

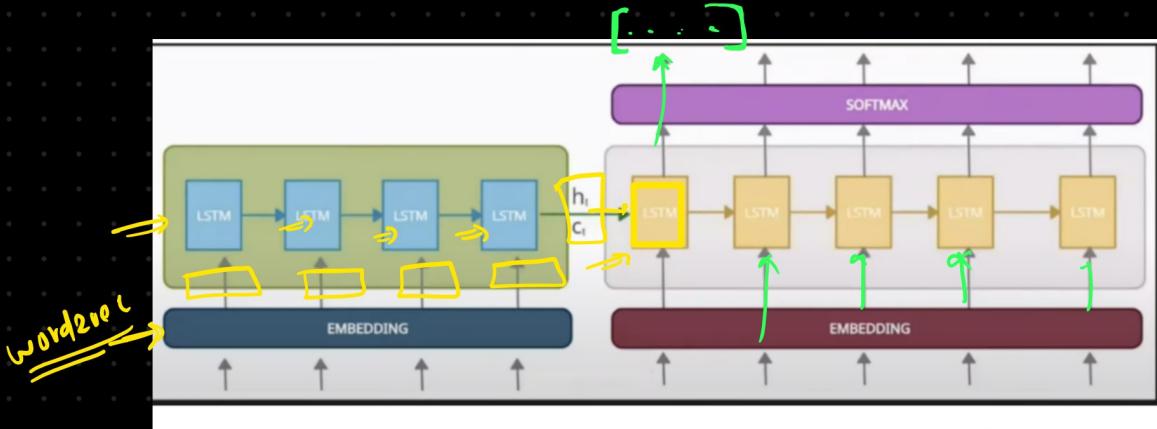
Nice to meet you

नीस टो मीट यू

acr

training

- ② forward propagation
- ③ output (Predicted)
- ④ loss (actual - pred)
- ⑤ backpropagation
- ⑥ optimizer
- ⑦ update weight, <R>



nice to meet you

1 translation (ERD)

English to French

2 Special end to sentence symbol.

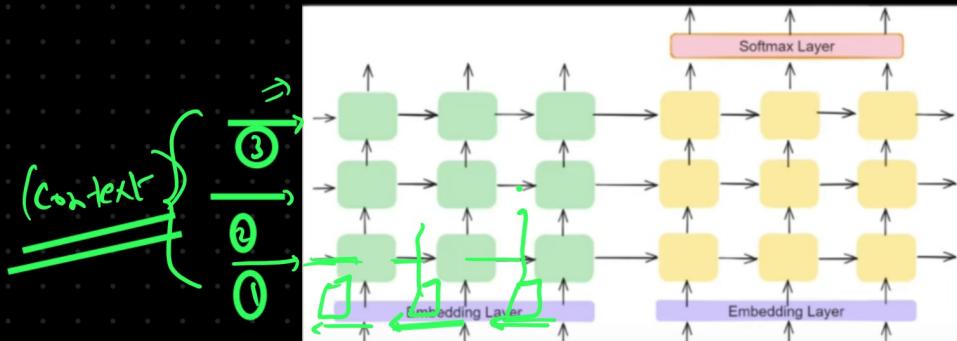
<Start> <end>
→ ←

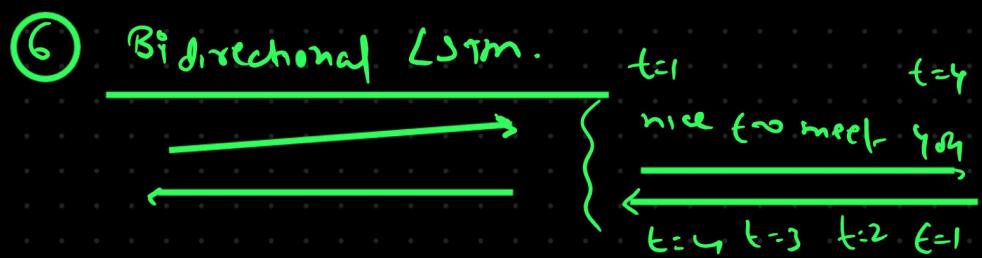
3 Datasets 12 million

348M word French
304M word English

4 Vocab → 206000

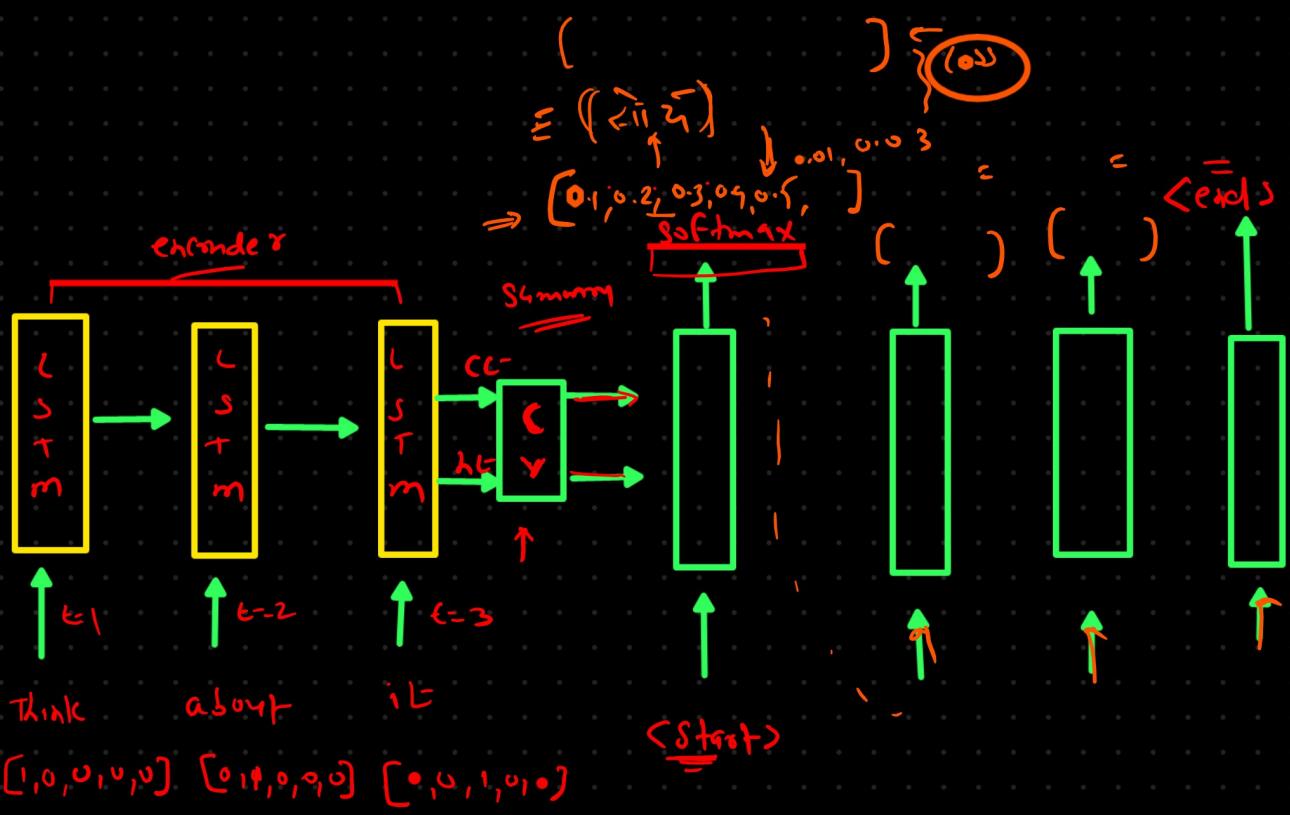
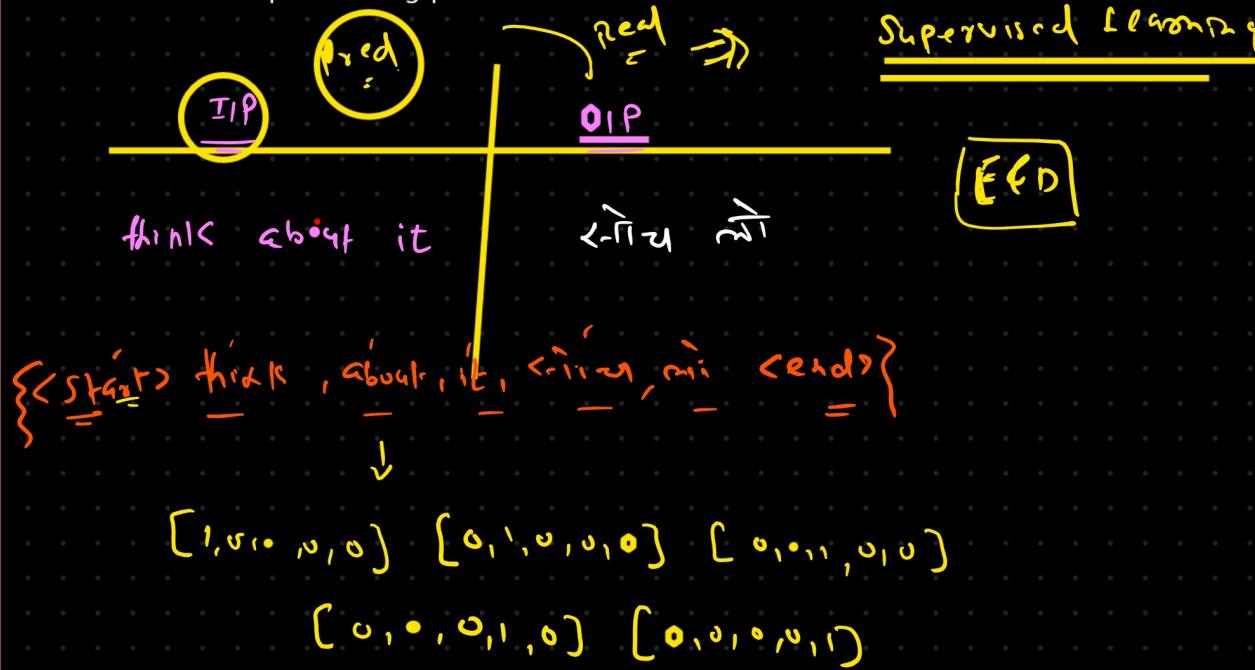
5 Stack LSTM (3 hidden layers)



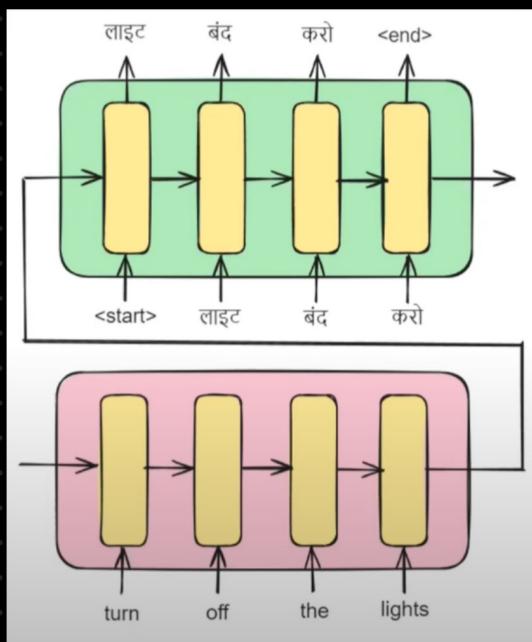


Embedding

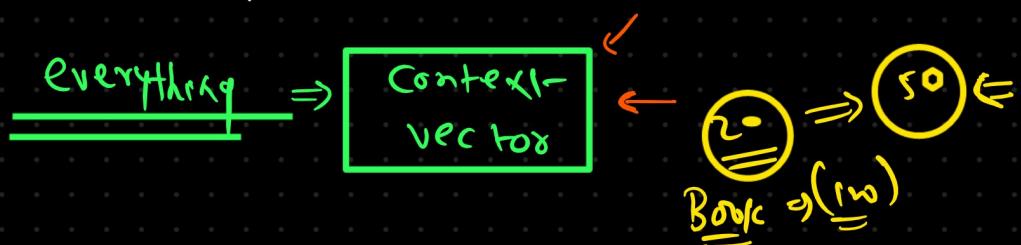
encoder decoder: <https://arxiv.org/pdf/1409.3215v3.pdf>



Attention



Disadvantage



Once upon a time in a small Indian village, a mischievous monkey stole a turban from a sleeping barber, wore it to a wedding, danced with the bewildered guests, accidentally got crowned the 'Banana King' by the local kids, and ended up leading a vibrant, impromptu parade of laughing villagers, cows, and street dogs, all while balancing a stack of mangoes on its head, creating a hilariously unforgettable spectacle and an amusing legend that the village still chuckles about every monsoon season.

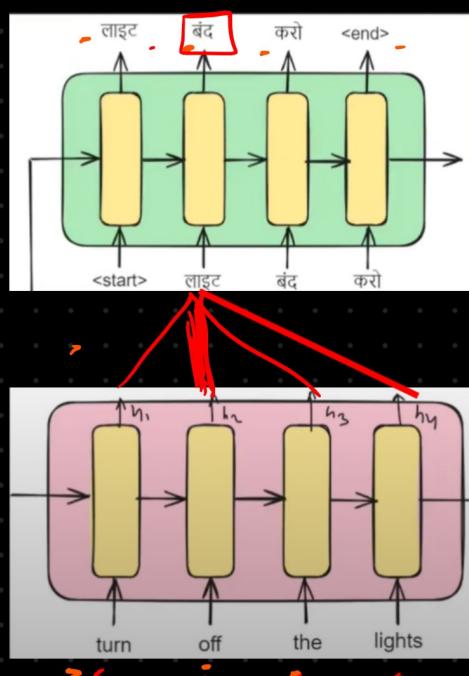
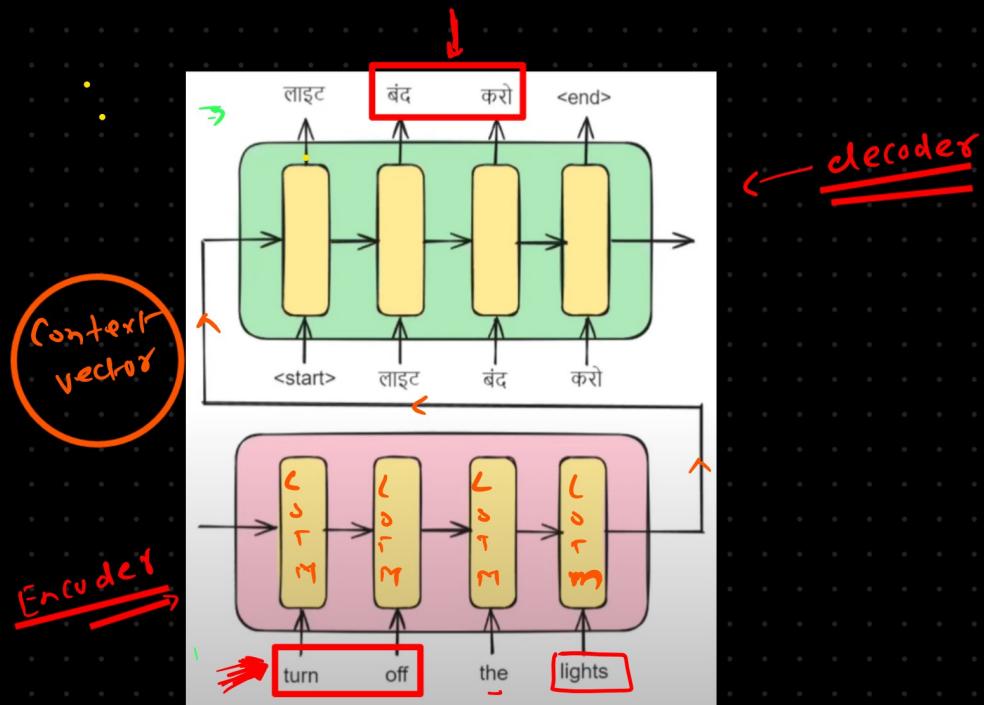
in 30 words \Rightarrow (After 30 words)
 X failing

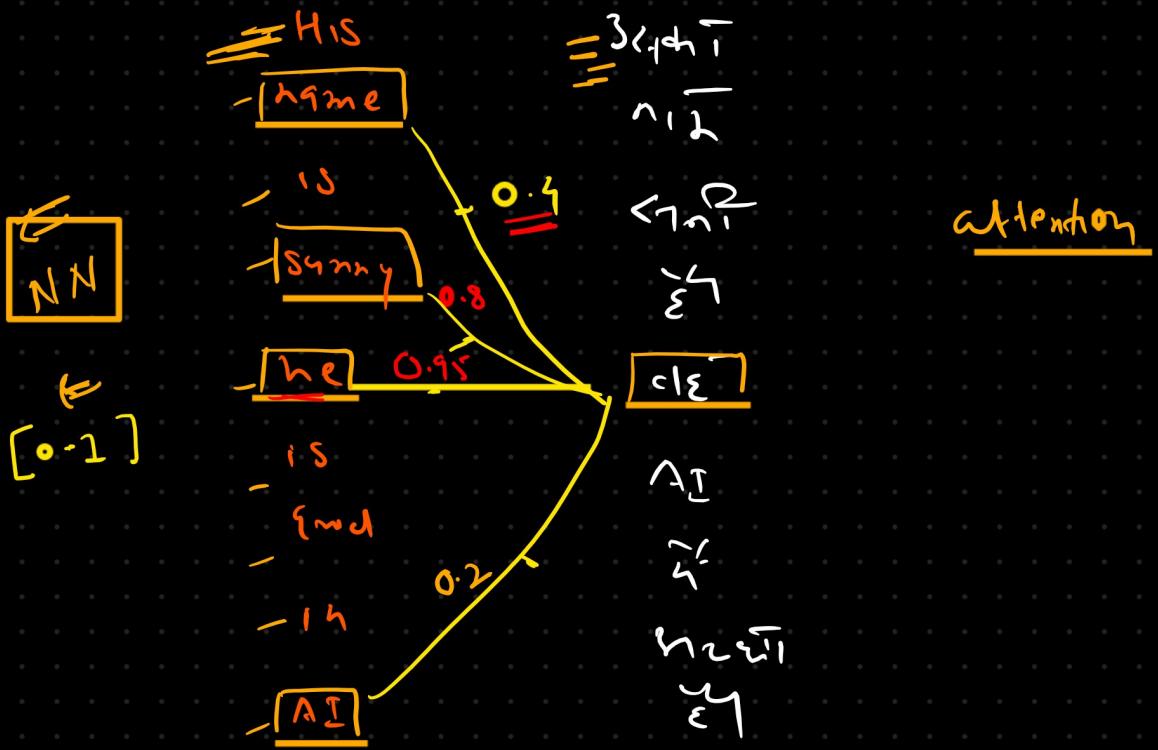
Sadly mistaken, he realized that the job offer was actually an incredible opportunity that would lead to significant personal and professional growth.

CV \rightarrow failing

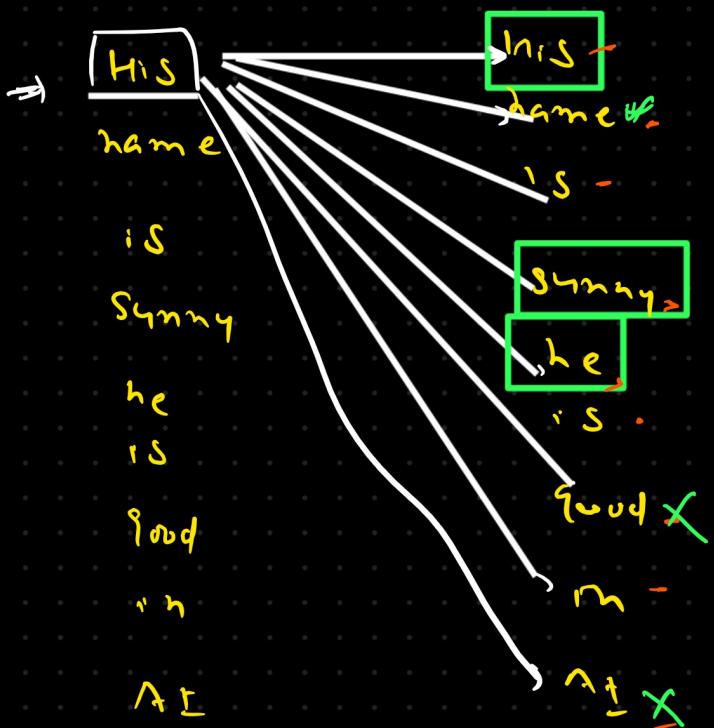


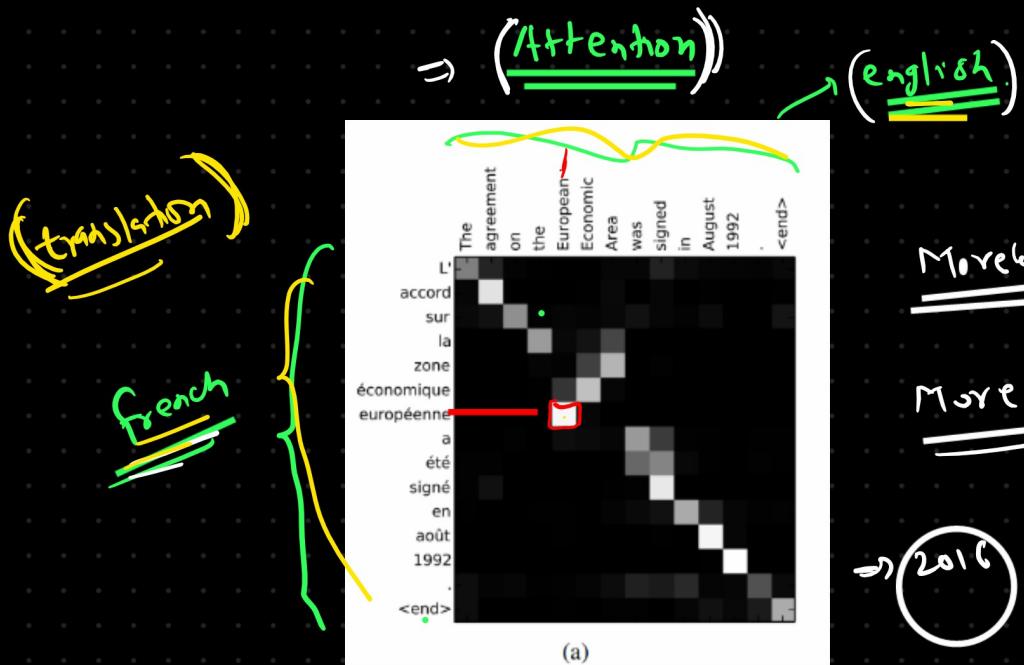
<https://arxiv.org/pdf/1409.0473>





Self attention



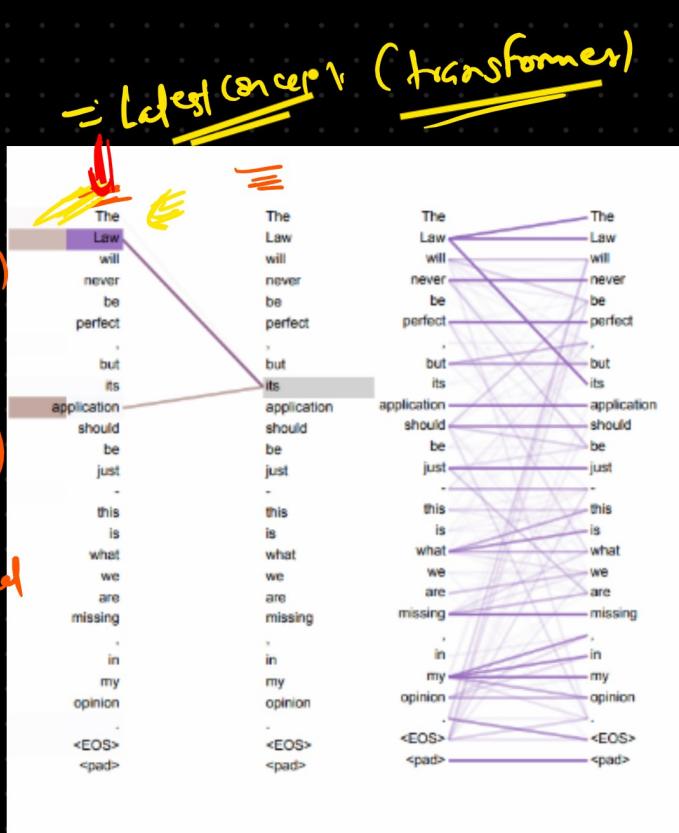


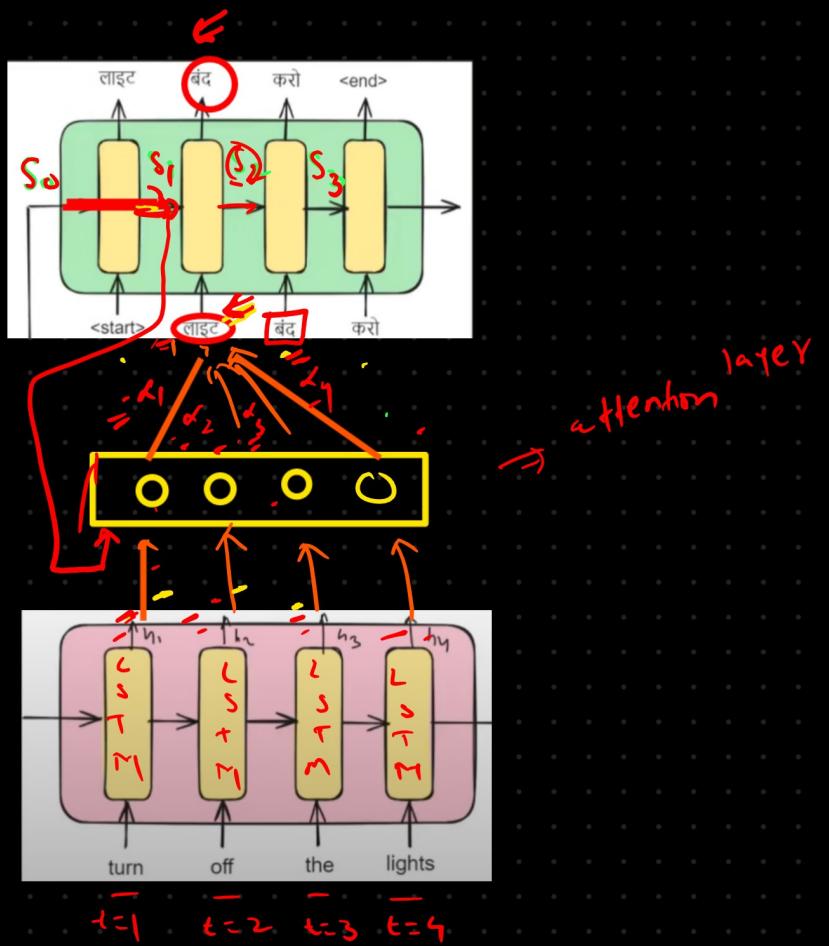
More white ⇒ more attention

More black ⇒ less attention

→ 2016

→ 2017

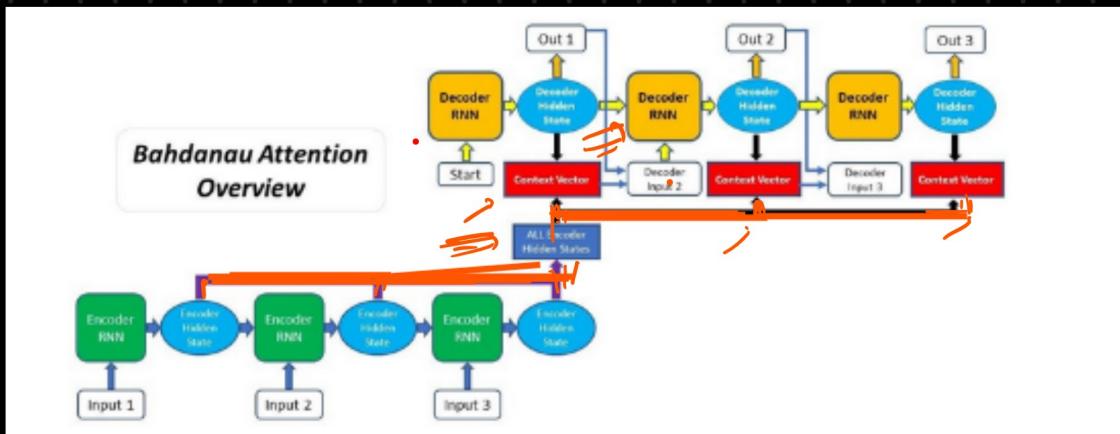




{ to NN for calculating weight we pass s_i & all the hidden state from encoder }

{ till s_1 , whatever transition happened and according to that- which hidden state is more suitable for that- word we determine it- after passing s_1 (previous hidden of decoder) & all the hidden

Table of encoder}



① GenAI (Quick intro)

② text preprocessing

③ encoding & embedding

word seal

④ Model

RNN | LSTM | GRU

Seq to Seq (LSTM & GRU)

① LSTM

② GRU

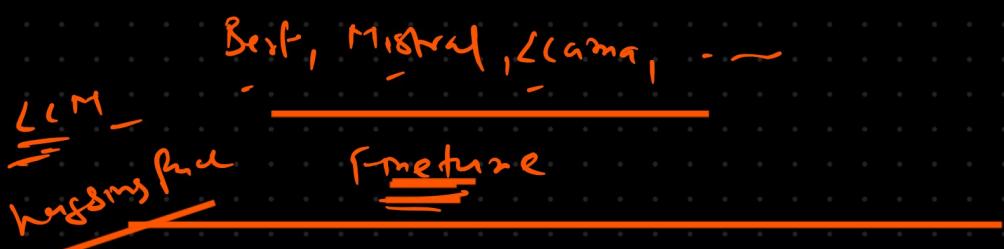
③ Transformer

$$\left\{ \begin{array}{l} \text{Seq to Seq} \\ \text{Seq2Seq} \end{array} \right\}$$

Encoder & decoder → 2014
Encoder & decoder with attention

$$\stackrel{\text{NN}}{=} (\stackrel{\text{Encoder}}{=}) (\stackrel{\text{Weight}}{=}) \}$$

$$= \left\{ \begin{array}{l} \text{Transformer} \\ \text{U2MFIT} \end{array} \right\} \left\{ \begin{array}{l} \text{1 Practical} \\ \text{by much -} \\ \text{GPT} \Rightarrow \left(\begin{array}{l} \text{unsupervised} \\ \text{Pretrained} \end{array} \right) \end{array} \right\}$$



$$\left\{ \begin{array}{l} \text{Com} \rightarrow \text{Seq} \\ \text{agent} \end{array} \right\} \left\{ \begin{array}{l} \text{Language} \\ \text{VITS} \end{array} \right\} \left\{ \begin{array}{l} \text{Language} \\ \text{VITS} \end{array} \right\}$$

end to end