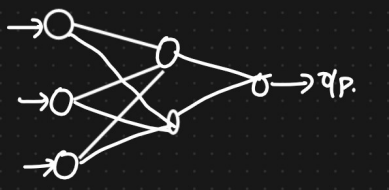
NLP In Deep Learning

① ANN → ARTIFICIAL NEURAL N/W → Tabular Data.

House size No.of Rooms Price



Sequential Data (↑ Order is Important) vs Non Sequential Data

② CNN → Images → Image classification, Object Detection

③ i) RNN ⇒ Sequential Data. [NLP] [Time Series]
ii) LSTM RNN
iii) GRU RNN
iv) Encoder Decoders
v) Attention is all you need

(⇈ Sequence of Data Is Important)

Eg: Chat bot App → Q & A

Language Translation → Eng → French

Text Generation → A Sentence → Completion of Sentences

Auto Suggestion → LinkedIn, Gmail

Time Series → Sales Data Future Prediction.

① Can we Solve With ANN?

Eg:

Text	O/P
The food is good	1
The food is bad	0
The food is not good	0.

① Words → Vectors (↑ out of vocabulary)

(↓ Sequential Info.)

BoW, TF-IDF [Context Is Missing].

	Word 1	Word 2	Word 3	–	–
Sent 1	0.	1	0	0	0
Sent 2	1	1	0	0	0
Sent 3	0	0	1	0	0

{good The food is} → Meaning may change

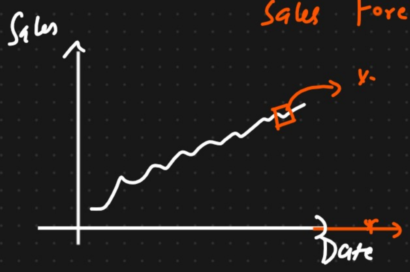
③ Language Translation → English | French

→ - - - - →- - - - - - -

④ Auto Suggestion → LinkedIn, GMAIL → Autosuggestion

⑤ Sales Data → DateTime

Sales Forecasting



Can we use ANN to solve this Problem? → Sequential Data

↓

NLP In Deep Learning [Generative AI → LLM, MultiModel]

① Simple RNN → LSTM / GRU RNN → Bidirectional RNN → Encoder Decoder

↓

← Transformers ← Self Attention

Can we Solve With ANN → Sequential Data

Dataset {Sentiment Analysis}

ANN

Text	O/P
The food is good	1
The food is bad	0
The food is not good	0

Text Preprocessing → Text → Vectors

Vocabulary Size → 4

RNN

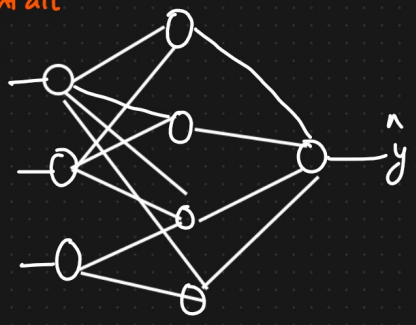
① Timestamps

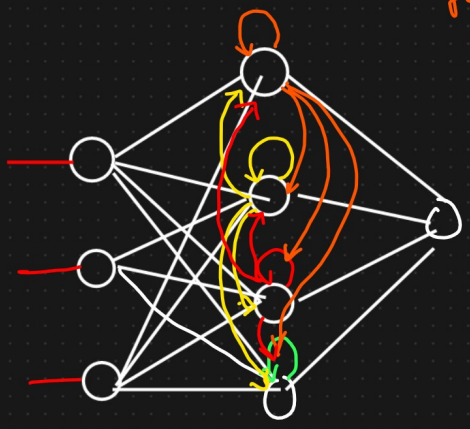
② Inp Text.

Text	O/P
The food is good	1
The food is bad	0
The food is not good	0

RNN Architecture

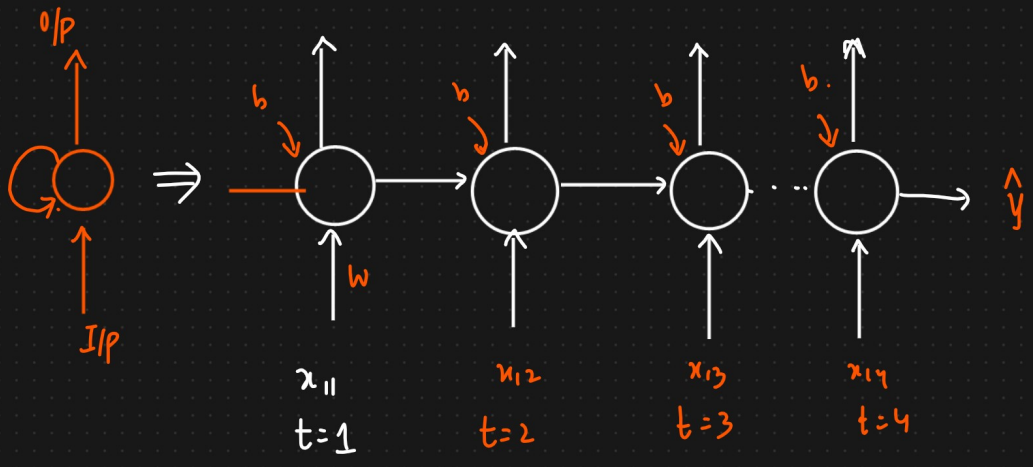
I/p is sent all at once

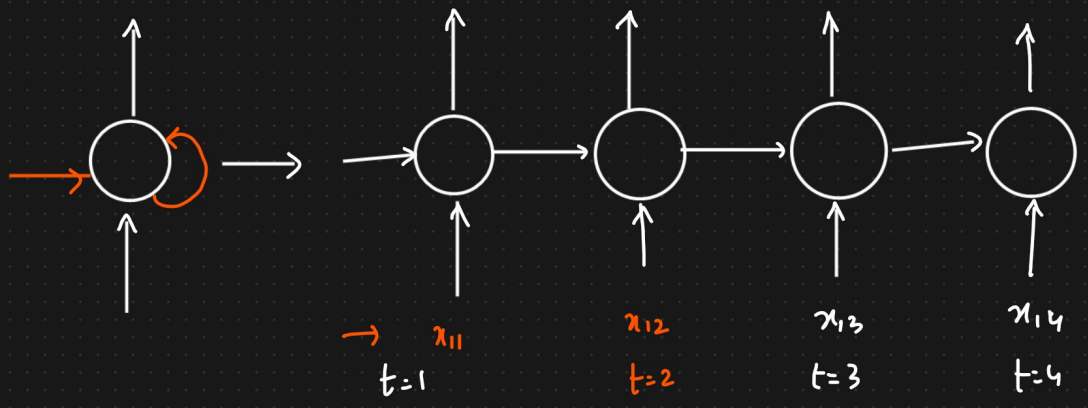




x_{11} x_{12} x_{13} x_{14}

→ The food is good





Working Of Simple RNN With Forward Propogation

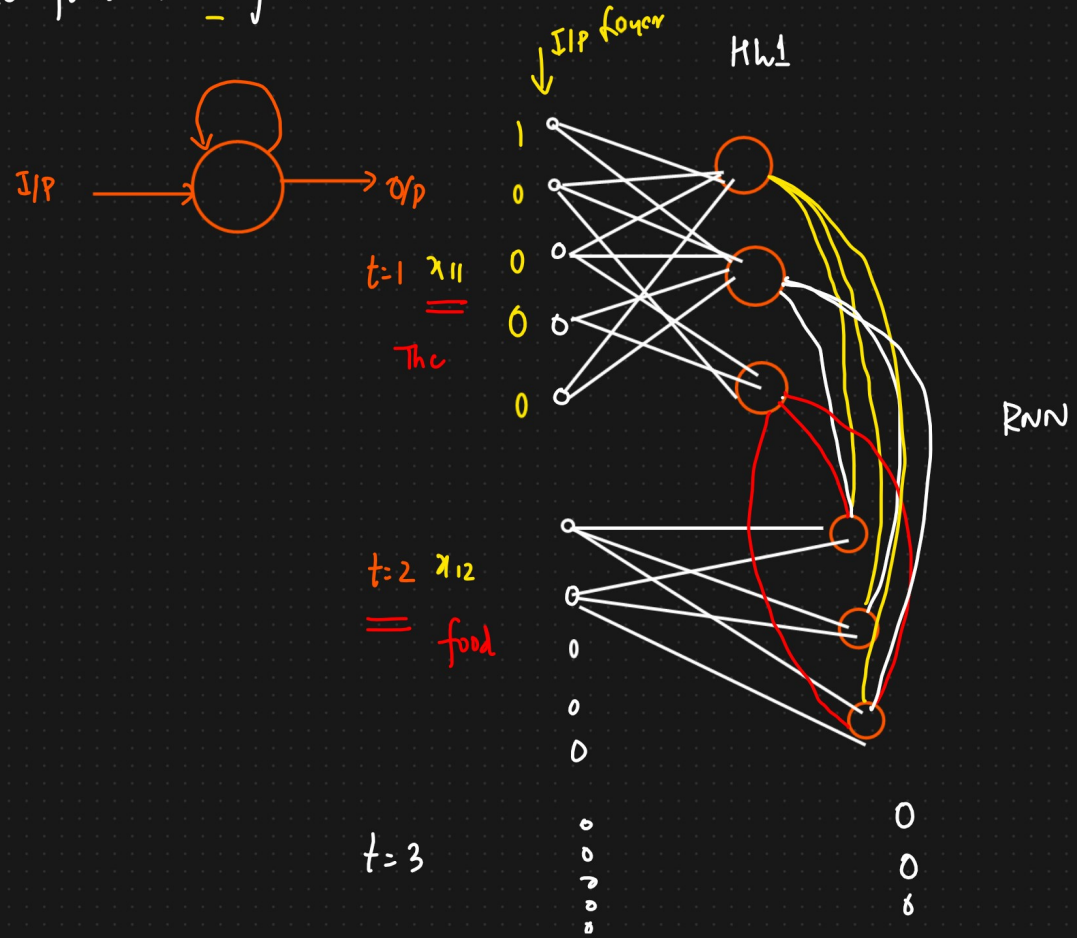
Dataset

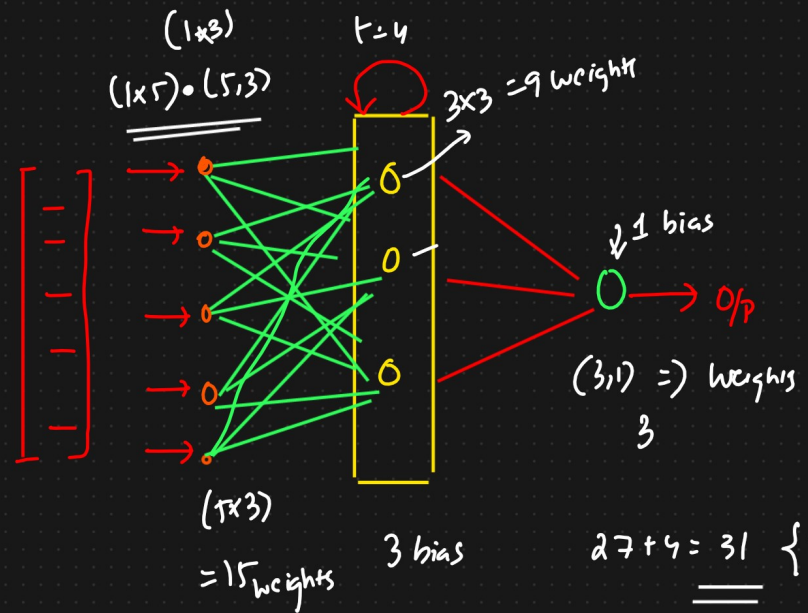
Text	O/P
The food is good	1
The food is bad	0
The food is not good	0

Words → Vectors

OHE → One hot Encoding

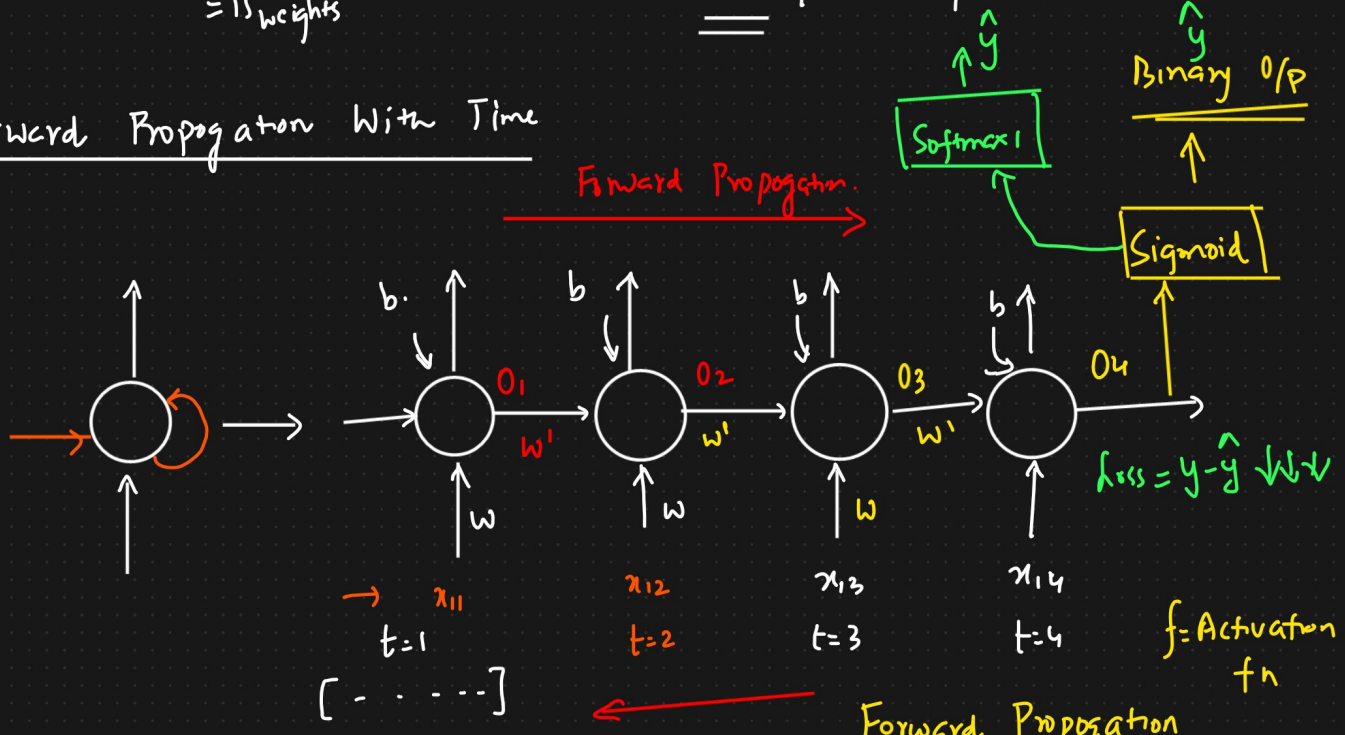
[[1 0 0 0 0] [0 1 0 0 0] [0 0 1 0 0]
[0 0 0 1 0] [0 0 0 0 1]]





27 + 4 = 31 {Trainable param}.

Forward Propogation With Time



Forward Propogation

$O_1 = f(x_{11} \cdot w + b_1)$

$O_2 = f(x_{12} * w + O_1 * w' + b_1)$

$O_3 = f(x_{13} * w + O_2 * w' + b_1)$.

Dataset

The	food	is	good
x_{11}	x_{12}	x_{13}	x_{14}.

O/p

1