10 June 2024 12:01

-> Learning Mechanism (Pytorch)

-> Text Processing (Tensorflow)

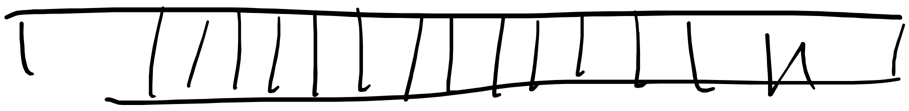
-> Transformer 2017 (Pytorch/HF)

-> BERT, RoBERTa, DistilNet (Hugging Face)

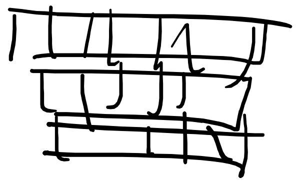
-> LLM

-> LangChain & RAG

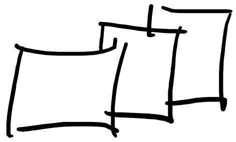
[ ] - Scalar



- Vector



} Matrix

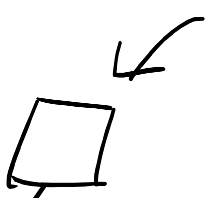


Tensor (High Dimensional Data)

-> Book

Professor

You



Q/A

Predicted Label (A you will write)

Truth labels (Answers)

(Question)

Q/A

$(1, 2, 3, 4) \rightarrow Q \sim X$

$(2, 4, 6, 8) \rightarrow A \sim y$

arbitrary

Weights = 0.0

Prediction where weight = 0.0 ≃ 2

$[1, 2, 3, 4] \times 0. \sim$ Loss

(Answers)

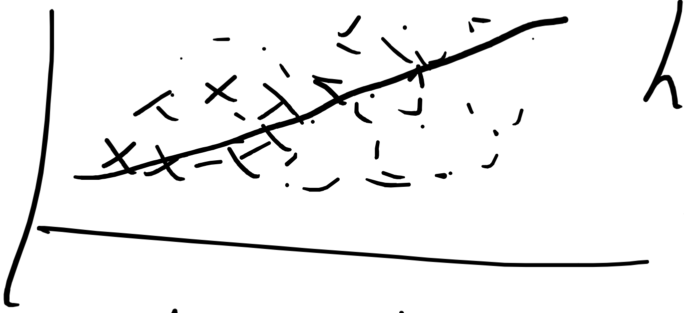
(Question)

Parameters

Errors ~ Loss

~ Backprop

Derivatives



Linear Regression

$$y = mx + c$$

$$\hat{y} = wx + b \sim \text{bias}$$

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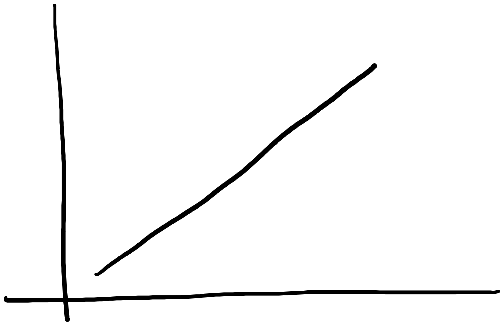


Linear Regression

$[0 - \cdots n]$ ~ Floating

Distinct Integer

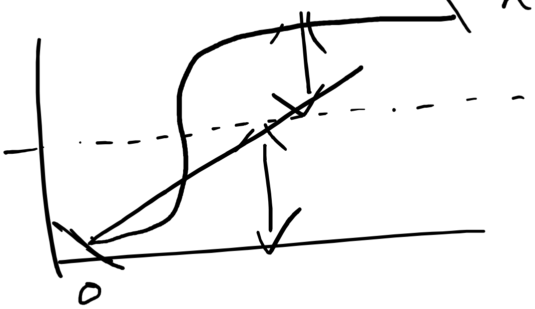
0,1,2,3,4 - Classification

$\left[\begin{array}{l} \text{Yes} - 1 \\ \text{No} - 0 \end{array}\right\}$

Be responsible for cancer

Sigmoid

(Activation Func)



Logistic Regression

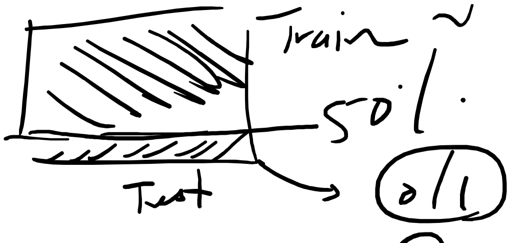
$y = mx+b$

$\hat{y} = w.x+b$

Probability 0 to 1

45.35% ≃ 0

Sigmoid



45321.98

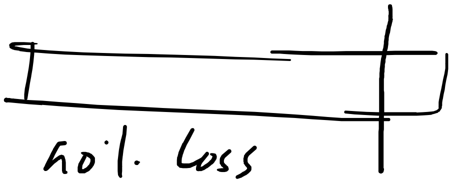
[0 & 1]

-> Process of learning

Comparison / Grade

Loss

60%



40% Loss

50 questions — Test

5 questions] 5 answers

45 Questions] 45 answers

Training

Optimal

5 Questions / own ans

Prediction

-> Assessment ~ Loss fn (Cost fn)

0/1 ~ T/F ~ Y/N

Binary Cross Entropy Loss (Logarithmic Loss)

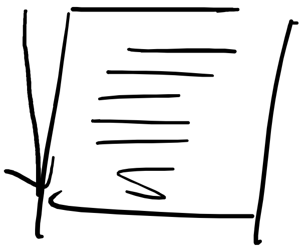
Trained model

Ans	
0 - 0	✓
1	X

[0, 1, 1, 0, 1, 1, - -]

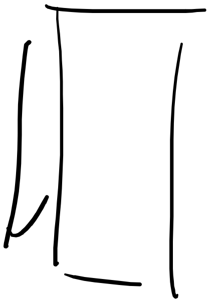
[[- - - -]
[- - - -]] [[0] [1]]

-> C programming (Functional)

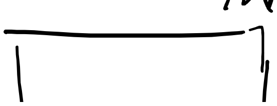


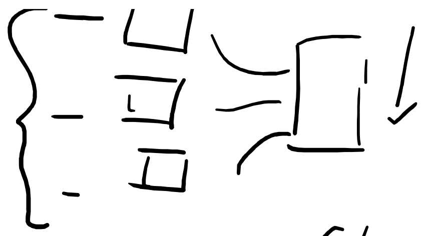
Complexity

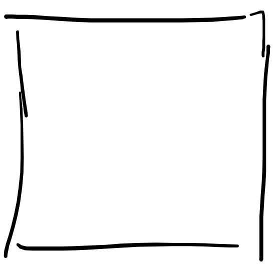
Object Oriented Programming



Gov. Class







Tata
Tesla
Mer

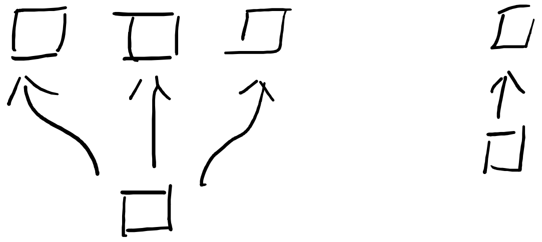
Class - Blueprint
Object - Instance

-> Loss - Information loss while learning

Accuracy - Performance of model (How well it has trained)

sum(Count)
~~float (rows)~~

-> Logistic Reg



-> Multiple Patterns

-> Cycling : Dexterity to operate brakes
: Vision to observe road for anamolies/obstacles
: Balancing the 2-wheeler
: Hearing / Listening

Grammatical Expression

-> What is your name?

Como se llama?

Semantic understanding

-> I have green shirt

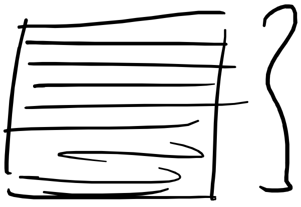
-> Yo tengo camisa verde

-> Pattern based

→ Pattern based Learning (Non-Parametric Method) → Yo tengo camisa verde

→ $\hat{y} = W \cdot x + b$

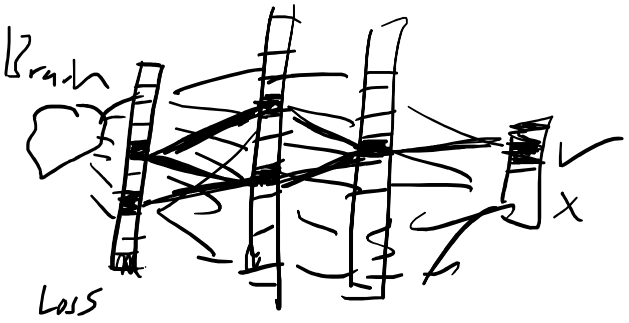
$$\left[\begin{array}{lcl} W & : & \bar{y} - b \cdot \bar{x} \\ b & : & \dfrac{\Sigma(x_i - \bar{x})(y_i - \bar{y})}{(x_i - \bar{x})^2} \end{array}\right]$$



Parametric (Different change)

$\underbrace{\text{Images, Text, Audio}}$ Non-Parametric

Artificial Neural Networks
(Deep Learning)



→ Biology

→ Neuromuscular Reacquisition

Activation layers - Trigger Pathways

MNIST : Handwritten Digits [0 - 9]

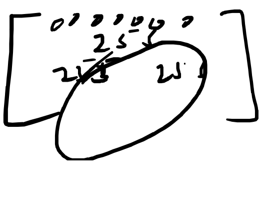
70k

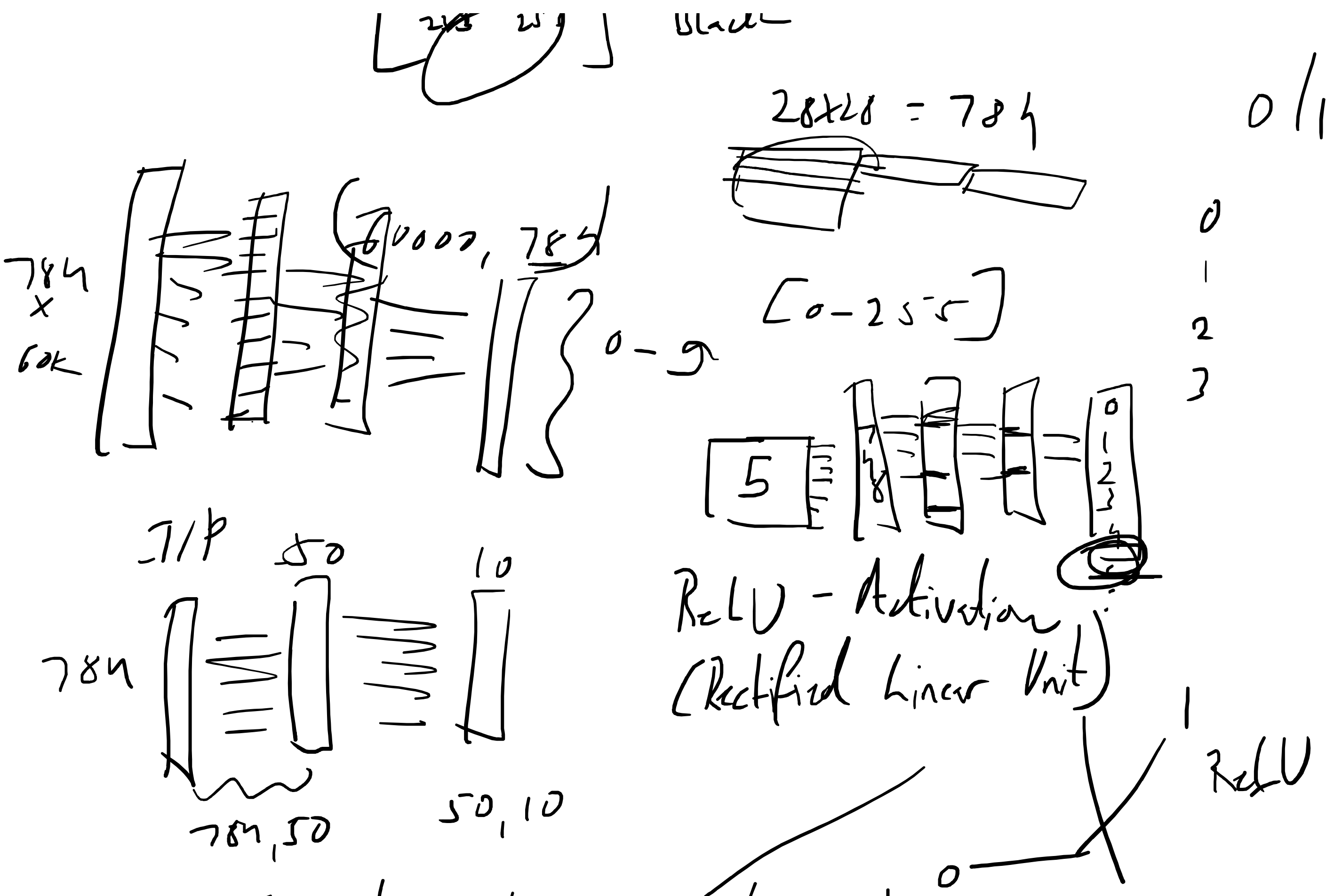
0
1
3
9
7

28×28
0
28×28
2

Grayscale

[0 - 255]
Black ↲ ↳ White





ReLU - Activation (Rectified Linear Unit)

-> NN - Converting the image to numbers

-> Convolutional Neural Network.

-> Data : Text

-> Text Classification (Sentiment Analysis)

-> Machine Translation

-> NER (Named Entity Recognition)

-> Text Summarization

-> DATA X -> Hate Speech
- Gender
- Race
- Caste/Religion

-> My name is Raunak

Sequence Learning

-> My name is Raunak

Mi nombre es Raunak

Sequence Learning

-> The clothes store

-> La tienda de ropa

-> NER

ABC buys aromatic coffee after one month .

NOUN VERB ADJ

-> Text Summarization

5000 words

50 words

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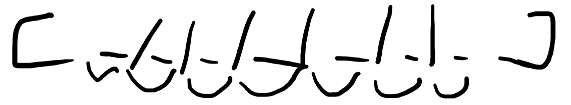
-> NLP where **Embeddings**

-> Prereq: Processing the text data.

[______________] ~ Non-numeric Data

-> Math model ~ Numeric Data.

-> Tokenization : [CORPUS ~ 1000 lines]

 ~ **Parameters**

-> Preprocessing : STOPWORDS

[-> The propensity of action has consequences.]

Semantic ~ propensity action consequences

Connecting sentence grammatically.

-> TF-IDF does not have correlation index of words

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 1.2 \\ 22.3 & 0 & 0 & 4.5 & \\ \cdot & - & -- & & \end{bmatrix}$$

~ Sparsity (Sparse)

[Very big & has multiple zeroes]

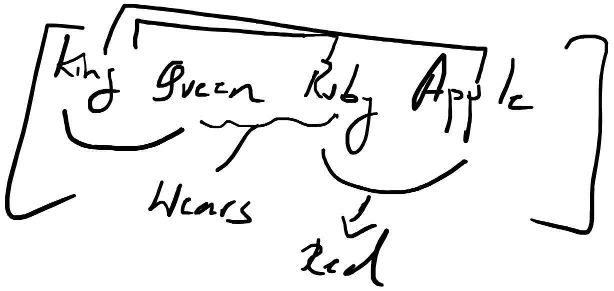
(5572, 8800)

16 to 32 dimensions

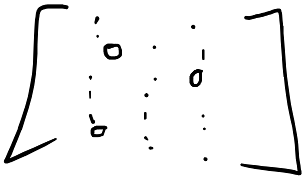
Density of words

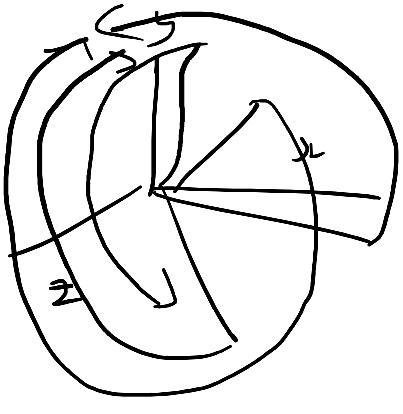
Density of words

-> Word Embeddings (Deep Learning)



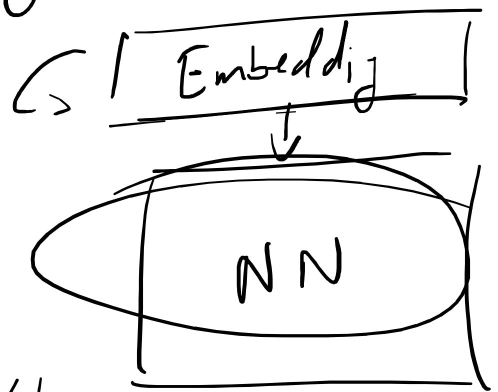
Probabilities





-> Train Embedding

↳ Embedding



~ Training overhead (System)

~ Transfer learning

Word2Vec

[GloVe]

500 words vocab / 32 dimension

tokens

6 billion tokens

500

~ [6 0 0 0 0 0 0 0 0 0]

100 / 200 / 300 dimensions