Sept. 27th Dec 2023

NLP Live Class by mentor Dr Pyara Dasadh

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Recap: ① Wordvec (Theory + Practical)
② Relationship b/w words → Ques

Topic → Practical implementation (genism)
Sequence to Sequence (RNN)

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Standardization / Normalization

why is it mandatory? Feature Scaling

id	BMR	AR	Age	F_1	F_2
	m = 100	80-110	18-35	50-100	1-10
1	12	83	19	500	2
2	19	90	67	6233	5.1
3	25	110	35	1000	
4	54	103	18	1237	
5					
	0-100	0-100	0-100	0-100	

Dimensionality
nD

10 - 10,000
↓
0 - 100

6233 ↔ 5.2

14

R_1 → Mercen
R_2 → 2 Km
R_3 → Lightyear
} units

min-max scaler → Normalization (0,1)

10 - 10,000
↓
a - b
0 - 100
0 - 1
X_{min} = a
X_{max} = b

$$X \Rightarrow \frac{X - X_{min}}{(X_{max} - X_{min})} = X'$$

$$\frac{X - 0}{100 - 0} = X'$$

μ, σ
mean std

Hyper-parameter
↳ Tune

Text | Label
Poor | 0
Rich | 1

Learning parameter
↑
model →

$\alpha_1 = 0.1$, w_1 , early
$\alpha_2 = 0.01$, w_2 , occur
$\alpha_3 = 1.0$, w_3 , ✓
$\alpha_4 = 10.0$, w_4 , ✓

Data

$\alpha = [0.001 \quad -0.01 + 0.1 - 1.0 + 10.0]$
$\alpha_1 \quad \alpha_2 \quad \alpha_3 \quad \alpha_4$

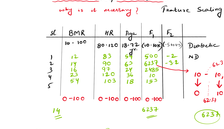
end-to-end

text → [ ] → model → predict → performance matrix
no

hyper-parameter

Prince

King - man + woman = [Queen]



BOW, TF-IDF, Word2Vec

[0 | 0.8 | 0 | 0.9] [ ]

missing ?? Sequence Info
WordVec

Context X
BOW TF IDF

context relationship ✓
Semantic

I was born in France. ------ I can speak French fluently

t_1 t_2 t_3 NLP

Sequence

Alexa
Apple Siri

Tell me a joke
t_1 t_2 t_3 t_4

text → [ ]

I am doing good
good
fine

I am doing ------

→ synonyms

Sequence - to - Sequence

I love NLP. I am working on developing chatbot
t_1 t_2 t_3 t_4 t_5 t_6 t_7 t_8
different time stamps } Sequence information

Stock

→ time-Series Data

ARIMA
SARIMA

S2S modelling mostly → NLP

speech Recognition

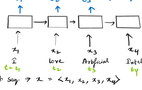
Application

① Speech Recognition
Google Assistant
Alexa
Siri
} Speech-to-Speech & speech to text

② Prediction problem / Time Series Data
③ Search Engine
④ Sentiment analysis
⑤ Image caption
⑥ Next word predictor
⑦ Auto-Complete
⑧ Text Summarization
⑨ Language translator

Encoder

o_1 o_2 o_3 o/p seq → o = <o_1, o_2, o_3>



i/p sequence length
may or may not match
with output sequence length

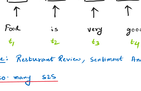
Decoder

x_1 x_2 x_3 x_4
I love Artificial Intelligence
t_1 t_2 t_3 t_4

i/p seq → x = <x_1, x_2, x_3, x_4>

many-to-One S2S

positive

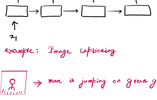


Food is very good
t_1 t_2 t_3 t_4

i/p

example: Restaurant Review, sentiment Analysis

One-to-many S2S



x_1

example: Image captioning

→ man is jumping on green grass

One-to-One

Image classification

→ dog / cat

RNN (Recurrent Neural Network)

ANN → artificial neural network
CNN → Convolutional " " → image
RNN → recurrent " " → text/audio

speech to text

time-stamp

x_2 & o/p of x_1 $o_3 = f(x_3, o/p \text{ of } R_1 \& R_2)$

Sequence

<SOS> I love NLP <EOS>

end of sequence

Company → Service (TCS)
→ Product
google

MNC
Project
team APP
↓
Training
new model

Start-up
Project
team ?

end-to-end

Data collection
Processing
Training
Test / Validate
Deploy