Sequences:

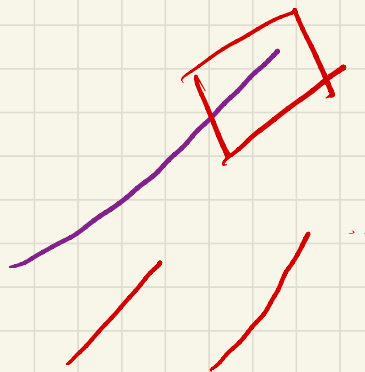$$MLP \atop CNN \Big\} \ Fixed \ length \ data$$

Language Translation   Length of i/p & o/p not fixed.

→ Images of Varying resolution.

       medical records.

Varying length i/p :   →   fixed length problem.

       " fixing the len sequence"

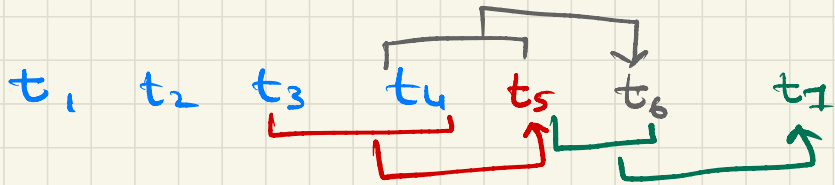Collection of items in an order : Sequences.

Day	Temp
1	30
2	32
3	33
4	31
5	?

how much to go back?

taking Only the past 2 days.

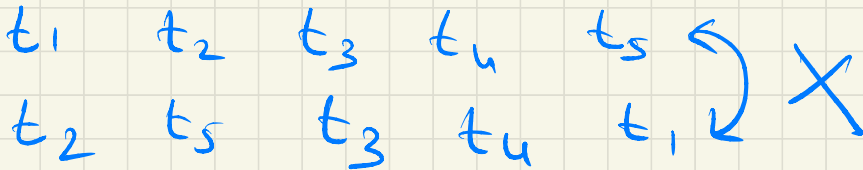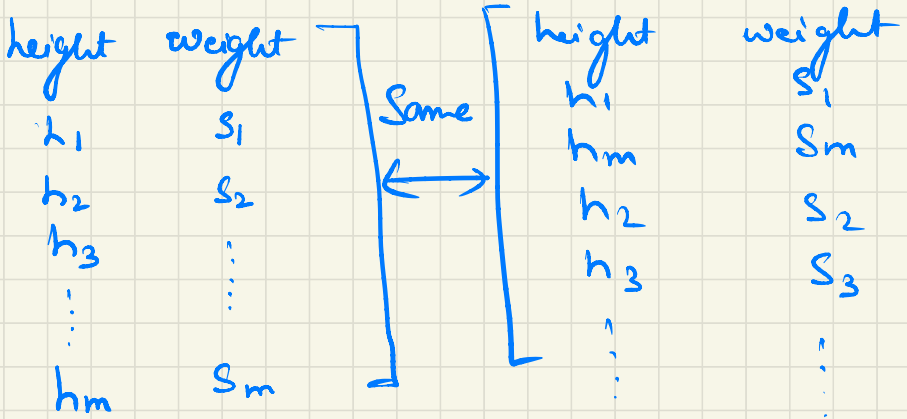$$t_5 = b + w_1 t_4 + w_2 t_3$$

$$t_6 = b + w_1 t_5 + w_2 t_4$$

$$t_1 \quad t_2 \quad t_3 \quad t_4 \quad t_5 \quad t_6 \quad t_7$$

Auto Regressive models.

Self   looks back in time.

$x_1 \quad x_2$

height	weight		height	weight
h_1	s_1	Same	h_1	s_1
h_2	s_2	$\leftrightarrow$	h_m	s_m
h_3	$\vdots$		h_2	s_2
$\vdots$			h_3	s_3
h_m	s_m		$\vdots$	$\vdots$

$$t_1 \quad t_2 \quad t_3 \quad t_4 \quad t_5$$
$$t_2 \quad t_5 \quad t_3 \quad t_4 \quad t_1$$

$$t_0 \quad t_1 \quad t_2 \quad t_3 \quad t_4 \quad t_5 \quad t_6$$

X

t_0 t_1 t_2

t_1 t_2 t_3

t_2 t_3 t_4

t_3 t_4 t_5

Y

t_3

t_4

t_5

t_6

fix "b"

AR(p) : $x_t = b + \sum\limits_{i=1}^{p} w_i \, x_{t-i}$

$p = 1$:

AR(1) :

$x_t = b + w_1 \, x_{t-1}$

$x_2 = b + w_1 \, x_1$

$x_3 = b + w_1 \, x_2$

Markov:

O/p : next State

how many next states ?

Sequences

AR(p)
kind of
Regression

Markov
finite states
& need to get
the transition matrix.

↓

fix the size &

get the prob.
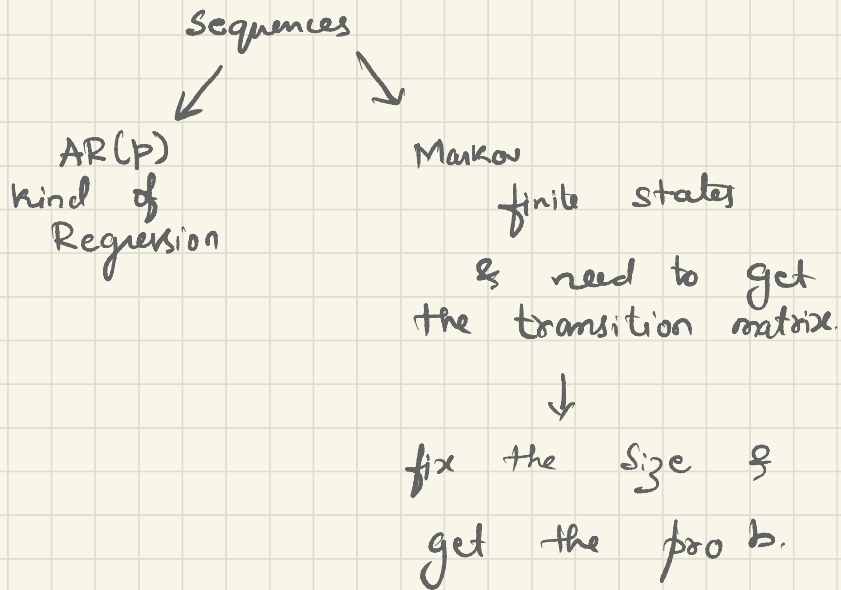
Text   to   Numbers ?

I   am   enjoying   my   studies
(821)
0   1   2   3   4

I   love   my   country
(242)
0   1   2   3

Oxford   English   Dict.

1   world

2

3

⋮

242 : country.

enjoy :   821

Coffee   is   great

car battery is dead, oh great

each wnd Some number based on
the index of constructed dictionary

I am from Mysre
My name i's Raghava
I like eating Dosa.

- Tokenisation:

Vocabulary