

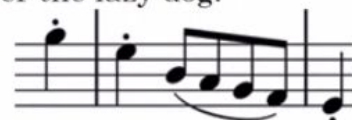
# Examples of sequence data

Speech recognition



→ "The quick brown fox jumped over the lazy dog."

Music generation



Sentiment classification

"There is nothing to like in this movie."



DNA sequence analysis

AGCCCCTGTGAGGAACTAG



AG**CCCCTGTGAGGAACTAG**

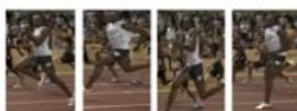
Machine translation

Voulez-vous chanter avec moi?



Do you want to sing with me?

Video activity recognition



Running

Name entity recognition

Yesterday, Harry Potter met Hermione Granger.



Yesterday, **Harry Potter** met **Hermione Granger**.  
Andrew Ng

An input audio clip X and asked to map it to a text transcript Y. Both the input and the output here are sequence data, because X is an audio clip and so that plays out over time and Y, the output, is a sequence of words.

## NAME IDENTIFICATION

# Motivating example

x: (Harry Potter) and (Hermione Granger) invented a new spell.

$x^{(1)}$

$x^{(2)}$

$x^{(3)}$

...

$x^{(t)}$

...

$x^{(9)}$

→ y:

1

1

0

1

1

0

0

0

0

$T_x$  = Length of input sequence

$T_y$  = Length of output sequence

# Motivating example

NLP

x: Harry Potter and Hermione Granger invented a new spell.

$\rightarrow x^{(1)} \quad x^{(2)} \quad x^{(3)} \quad \dots \quad x^{(t)} \quad \dots \quad x^{(9)}$

$$T_x = 9$$

$\rightarrow y:$

$y^{(1)} \quad y^{(2)} \quad y^{(3)} \quad \dots \quad y^{(9)}$

$$T_y = 9$$

$x^{(i)(t)}$

$$T_x^{(i)} = 9$$

15

$y^{(i)(t)}$   
↑

$$T_y^{(i)}$$

Andrew Ng

To represent words in a sentence we come up with a **vocabulary / dictionary**.

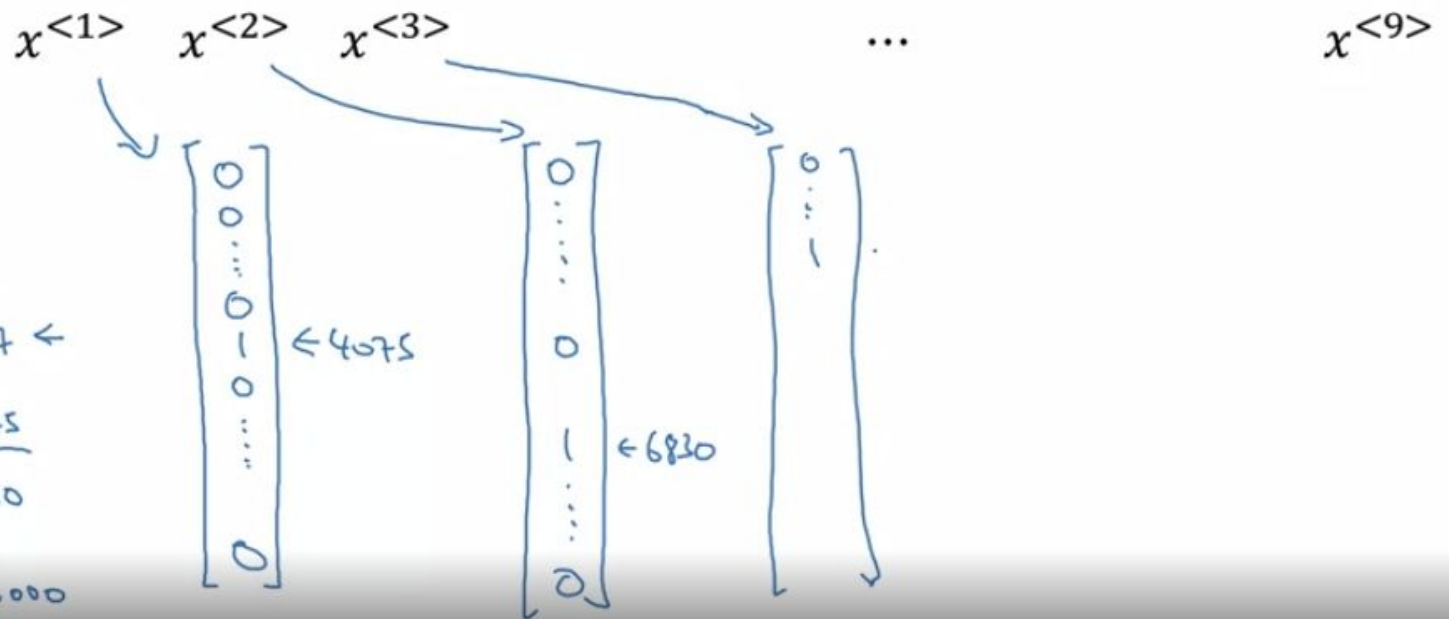
VOCABULARY ->

Vocabulary

a	1
aaron	2
...	...
and	367
...	...
harry	4075
...	...
potter	6830
...	...
zulu	10,000
	10,000

One-hot representations to represents these words

Harry Potter and Hermione Granger invented a new spell.



$(x, y)$

# Representing words

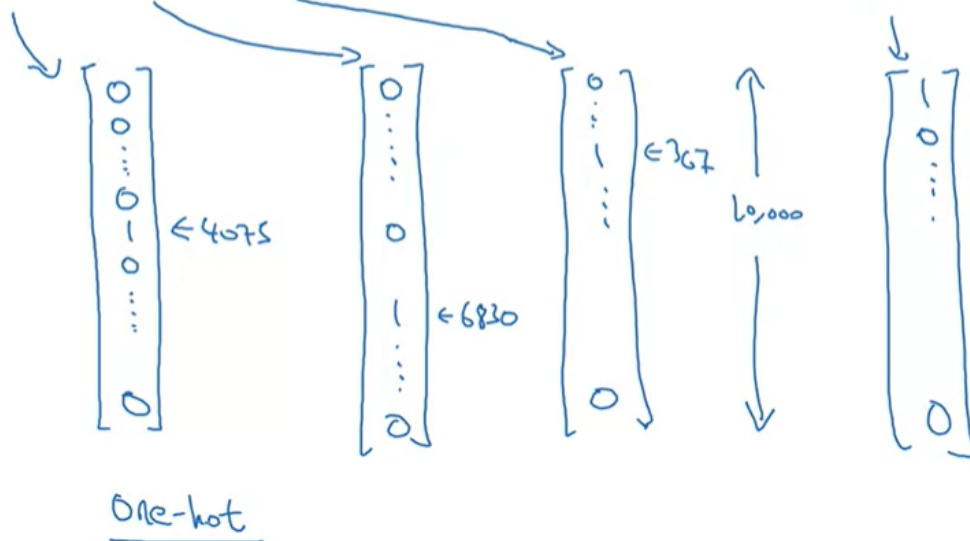
$x^{(t)}$

$x$ : Harry Potter and Hermione Granger invented a new spell.

$x^{(1)}$   $x^{(2)}$   $x^{(3)}$  ...  $x^{(7)}$   $x^{(9)}$

Vocabulary

a	1	←
aaron	2	
...	...	
and	367	←
...	...	
harry	4075	
...	...	
potter	6830	
...	...	
zulu	10,000	
		10,000



Andrew Ng