THIS IS

CPSC110H
BASIC BUTTON CODE
HACKER EDITION – 3 STATES
BASIC NEURAL NETWORKS

NO STATE
An example from the hip 90s
An example from the hip 90s

The movie was a bomb.

The movie was the bomb.
An example from the hip 90s

Laputa: castle in the sky is the bomb. The message is as strong as his newer works and more pure, fantastic and flying pirates how could it be any better!.

This movie blends comedy, action and great special effects. It even has a person in it that does a lot of voices on The Simpsons. William H. Macy is the bomb.
An example from the hip 90s

This movie was terrible! I rented it not knowing what to expect. I watched the 1st 5 minutes and the movie and knew it was a bomb.

The first movie that was a remake of the Disney cartoon classic starring Glenn Close as Cruella De Vil, it seemed like a sure hit, but it was just a bomb.
THE PROCESS

Laputa: castle in the sky is the bomb.

Tokenization

['laputa', ':', 'castle', 'in', 'the', 'sky', 'is', 'the', 'bomb', '.']
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unigrams

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unigrams

['laputa', ':', 'castle', 'in', 'the', 'sky', 'is', 'the', 'bomb', '.']

bigrams

[['$', 'laputa'], ['laputa', ':'], [':', 'castle'], ['castle', 'in'], ['in', 'the'], ['the', 'sky'], ['sky', 'is'], ['is', 'the'], ['the', 'bomb'], ['.', '$']]


Laputa: castle in the sky is the bomb.
WITH NGRAMS WE CAN FAKE SEQUENCES.

Just add integers for ngrams.
Was a great solution
NGRAMS

Not a good solution
PROBLEM.RESTATE

- Neural Networks stateless
- Can fake it by using ngrams
- But that feels unsatisfactory
- We need state
- Not just for language but for other problems
RNN - recurrent neural network
PLAIN OLD NN

activation(dot(W, input_t) + b)

PLAIN OLD NN VS RNN

activation(dot(W, input_t) +
        dot(U, state_t) + b)
PLAIN OLD NN

activation(dot(W, input_t) + b)

PLAIN OLD NN VS RNN

activation(dot(W, input_t) +
    dot(U, state_t) + b)
state_t = np.zeros((output_features,))

for input_t in inputs:
    output_t = np.tanh(np.dot(W, input_t) + np.dot(U, state_t) + b)
    successive_outputs.append(output_t)

state_t = output_t
RECURRENT NEURAL NETWORKS

RNN - KERAS
from keras.layers import SimpleRNN
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>>> model.add(Embedding(10000, 32))

>>> model.add(SimpleRNN(32))

Dimensionality of output space
RNN – recurrent neural network
SOMETIMES WE WANT THE LAST OUTPUT

```python
from keras.layers import SimpleRNN

>>> model.add(Embedding(10000, 32))

>>> model.add(SimpleRNN(32))
```
SOMETIMES WE WANT THE ENTIRE OUTPUT

```python
from keras.layers import SimpleRNN

>>> model.add(Embedding(10000, 32))

>>> model.add(SimpleRNN(32, return_sequences=True))
```
NEXT TIME

RNN LAB 1
RNN – recurrent neural networks – in Keras