

Poetry in Python



Using Markov chains to simulate text

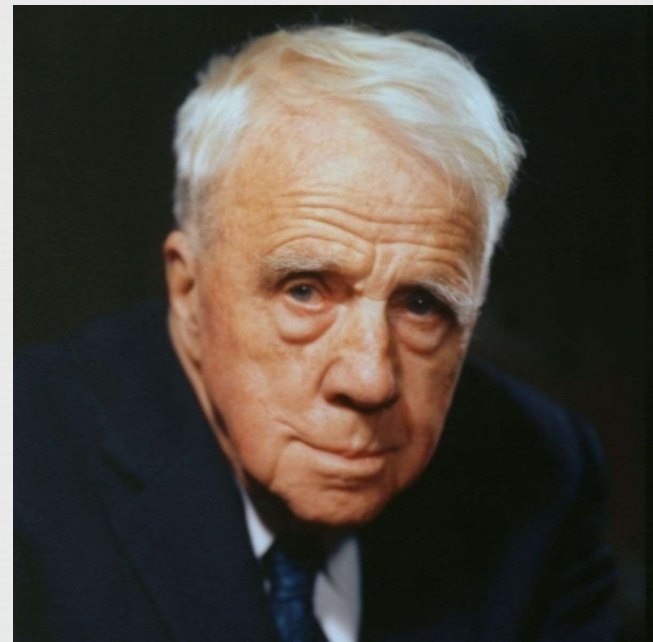
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Robert Frost



- ❧ You may have heard of
 - ❧ The Road Not Taken
 - ❧ Fire & Ice
 - ❧ A Boy's Will

- ❧ Kidnap Robert Frost?
 - ❧ Cost of flights to US
 - ❧ Ethical Issues
 - ❧ Died in 1963



A Simpler Robert Frost



⌘ Needed: A simple model for text

⌘ Version 1: Words by probability

Word	Prob
The	0.044
To	0.034
I	0.020
A	0.018
Of	0.017

A Simpler Robert Frost



*“ had Deeper to and fell my rest.
with coat remain him wasted grief
go different on down the me
A on his I The
Hold she to face hold his ”*



Markov Chains



- ⌘ Needed: A better model for text
 - ⌘ Must at least “feel” like real text
 - ⌘ Must still be simple – Under 15 minutes of work

⌘ Markov Chains

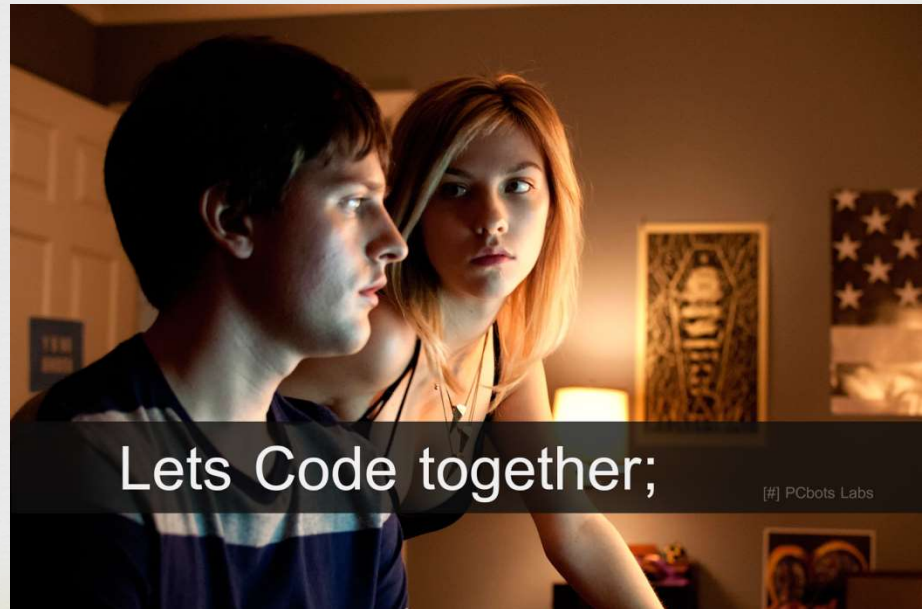
- ⌘ Remember the last words
- ⌘ Order: How far back do we remember
- ⌘ Choose the next depending on the state



Let's Code



- ⌘ Markov class – 27 lines of code (can probably be 15)
- ⌘ Simple `__init__`
 - ⌘ Pretty much nothing there
- ⌘ Train method
 - ⌘ Learn from text
- ⌘ Generate method
 - ⌘ Create Random text



Init



```
def __init__(self, order):
```

```
    self.order = order
```

```
    self.group_size = self.order + 1
```

```
    self.text = None
```

```
    self.graph = {}
```

```
    return
```

Order = How far back
we remember

The training text

The actual information

Train

`def train (self, filename):`



Train



```
def train (self, filename):  
    self.text = file (filename).read () .split ()  
    self.text = self.text + self.text [ : self.order]
```

Get text from File

Train



```
def train (self, filename):  
    self.text = file (filename).read () .split ()  
    self.text = self.text + self.text [ : self.order]  
  
    for i in range (0, len (self.text) - self.group_size):  
  
        key = tuple (self.text [i : i + self.order] )  
        value = self.text [i + self.order]
```

Get the state and
the next word

Train



```
def train (self, filename):
    self.text = file (filename).read () .split ()
    self.text = self.text + self.text [ : self.order]

    for i in range (0, len (self.text) - self.group_size):

        key = tuple (self.text [i : i + self.order] )
        value = self.text [i + self.order]

        if key in self.graph:
            self.graph [key] .append (value)
        else:
            self.graph [key] = [value]
    return
```

Save it!

Generate

def generate (self,length):



Generate



```
def generate (self,length):
```

```
    index = random.randint (0, len (self.text) - self.order)
```

```
    result = self.text[index : index + self.order]
```

Choose a random
place to start

Generate



```
def generate (self,length):
```

```
    index = random.randint (0, len (self.text) - self.order)  
    result = self.text[index : index + self.order]
```

```
    for i in range (length):
```

```
        state = tuple (result [len (result) - self.order : ] )  
        next_word = random.choice (self.graph [state] )  
        result.append (next_word)
```

Move along choosing
randomly

Generate



```
def generate (self,length):
```

```
    index = random.randint (0, len (self.text) - self.order)
    result = self.text[index : index + self.order]
```

```
    for i in range (length):
```

```
        state = tuple (result [len (result) - self.order : ] )
        next_word = random.choice (self.graph [state] )
        result.append (next_word)
```

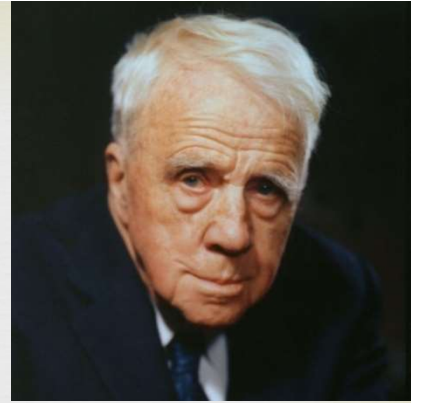
```
    return " ".join (result [self.order : ] )
```

Return result

Results?



Results – Order 1



*“one way: you had in a week,
Can cure me up bodily,
chair and through, High in just
such as my strength put it
opened with a whipstock, ”*

Results – Order 2



“too clear water.

One drop fell from a fern,

and lo, a ripple Shook whatever it was all about.

There might be something He had in mind to say”

Lord of the Rings

Order 1



They must carry off that all that,' said Legolas. I stole. But the Cross-roads touching Gandalf's eyes first, as if reason Mithrandir never felt that was standing on the valour has come to see the Ring, or in Rivendell

Lord of the Rings

Order 2



The ruffians had clubs in their houses, unless you should still be sitting here when Spring had passed into Nan Curunír, the Wizard's Vale, I think; but I see as much ale as was possible on such a chase as shall be moving this autumn,' he said.

Lord of the Rings

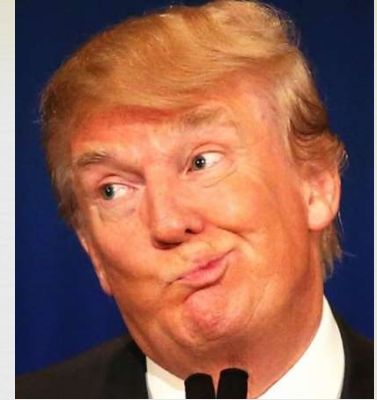
Order 3



Scouts reported that they were on a shadowy sea, the high dim tops and broken pinnacles of old towers forlorn and dark. He turned to go back to his hole, and stood for a moment filled with dread Frodo became aware that it was not so, for a shapeless fear lived within the ruined walls. Nine Lords there were, and after the first bottle. There was plenty of everything left for Frodo.

Donald Trump

Order 2



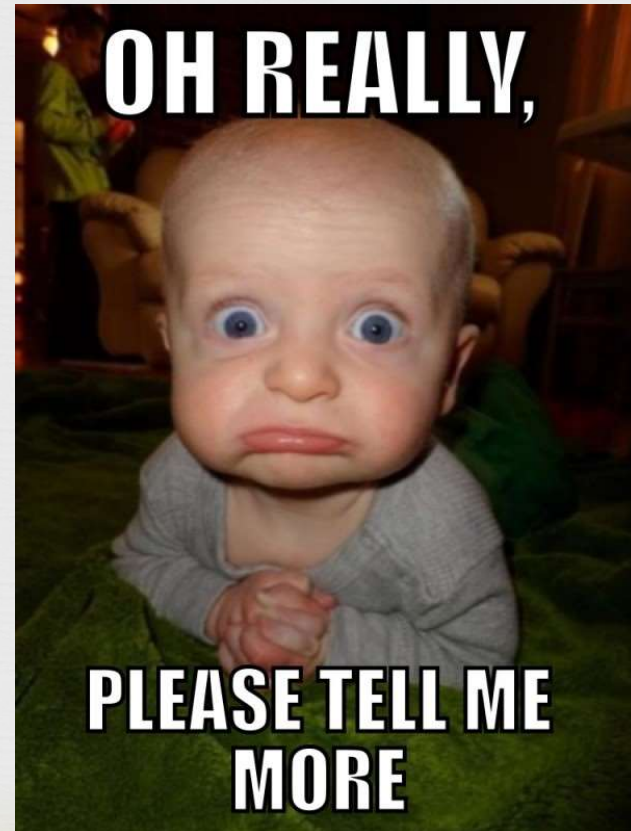
Every poll with our jobs and Tanzania
– never again; only a good to build the
state of state and engaged in the reverse
will all remember when I know that,
right?

Then John Kerry tried to be complex,
but she was a 2017 defense program for
a great, great detail, I have to say
something.

More



- More texts
- Punctuation
- Words \ Letters



Questions?



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