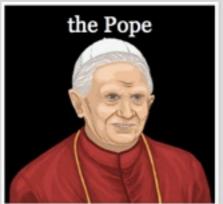
# Language models that stimulate creativity

by Matthew Huebert

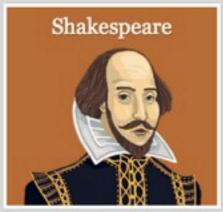


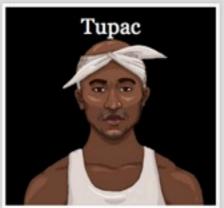






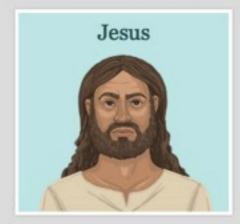




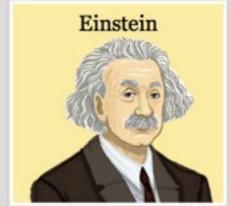


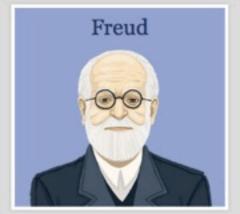








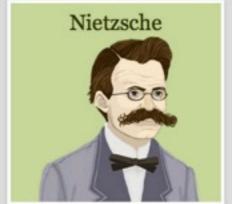












# **BrainTripping**



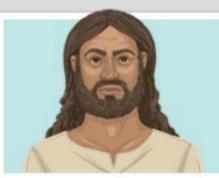
My greatest works live on, as ring tones. You can have them all for nine dollars.

Jesse tripping on Beethoven last month









Once upon a time I had a dinner with some friends. For God's sake, people are still talking about it.

phzbox tripping on Jesus 4 months ago













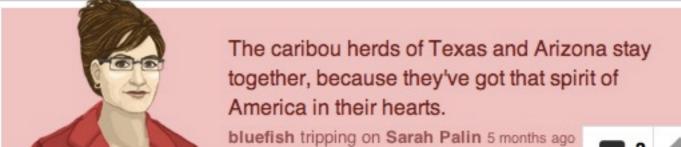
### My hair is hiding Obama's real birth certificate.

Elizabeth tripping on Donald Trump last month













matt tripping on the Pope 12 hours ago
Nothing compares to monopoly of a man's soul.



Reply As...





HQT tripping on Kim Jong-II 3 months ago

You call turtle-shaped necks taste? In North Korea anyone with criminal fashion like you, is scorned and beaten by Yan-lu's tongue-lashings. Reform! Or be licked.

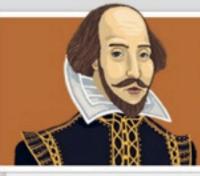


matt tripping on Steve Jobs 3 months ago

Just look at your operating-system. Enough said.



Reply As...



Hopdance! Hopdance to work, hopdance to play. Hopdance like it's dooms-day.

matt tripping on Shakespeare 4 months ago





shalty tripping on Edgar Allan Poe 4 months ago

Hop-Frog Hop-O'My-Thumb! Finally a certain Somebody bewitched as I with violent shaking as pleasure!





HQT tripping on Tupac 4 months ago

Hip hip Hip-Hop hooray!! Thanks to y'all, my former bored ass is dancin like a hot plate!





aaroniba tripping on Jane Austen 4 months ago

Hop step and repeat. If you don't trust my words, then watch my dancing feet.





HQT tripping on Jane Goodall 4 months ago

What bumping beats! Even dung-swirling herbivores couple get sprung to this!

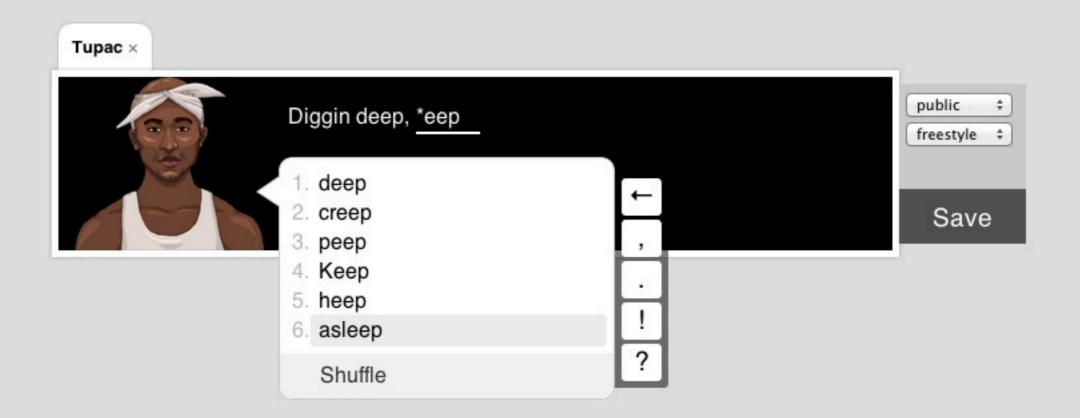


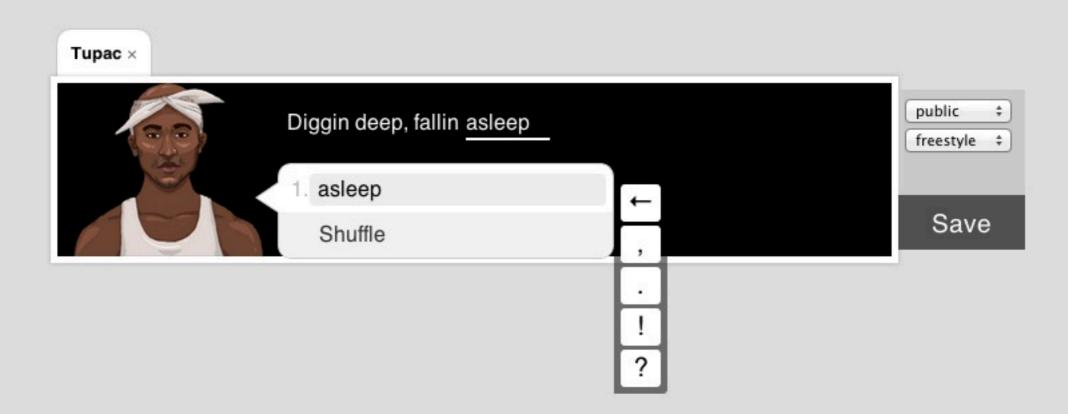


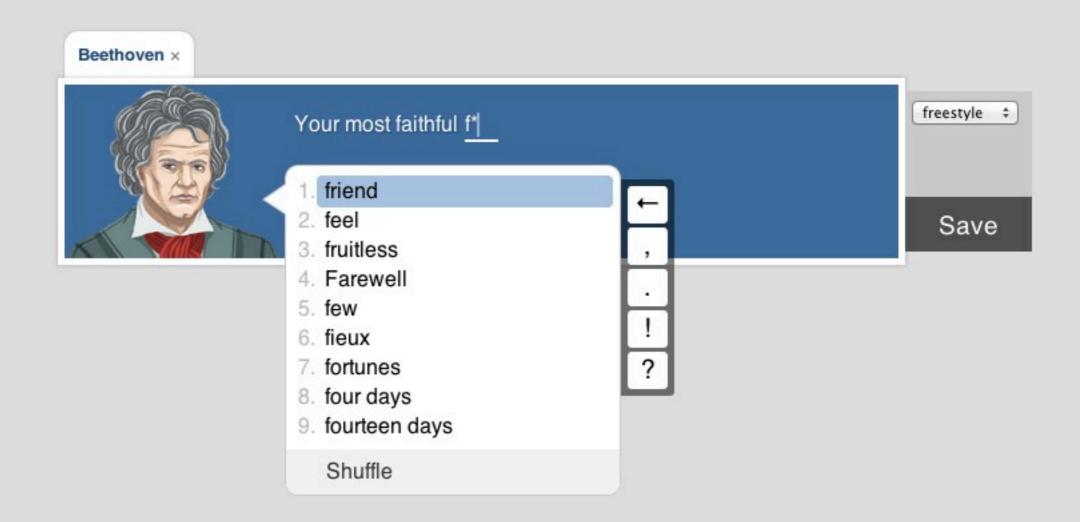
shalty tripping on the Pope 4 months ago

Oh my Oh my, my shoulders just moved one way and then the other, it feels like two angels are emasculating my mind.









# **Building BrainTripping**

- + Lessons Learned
  - + Observations

### makin' brains











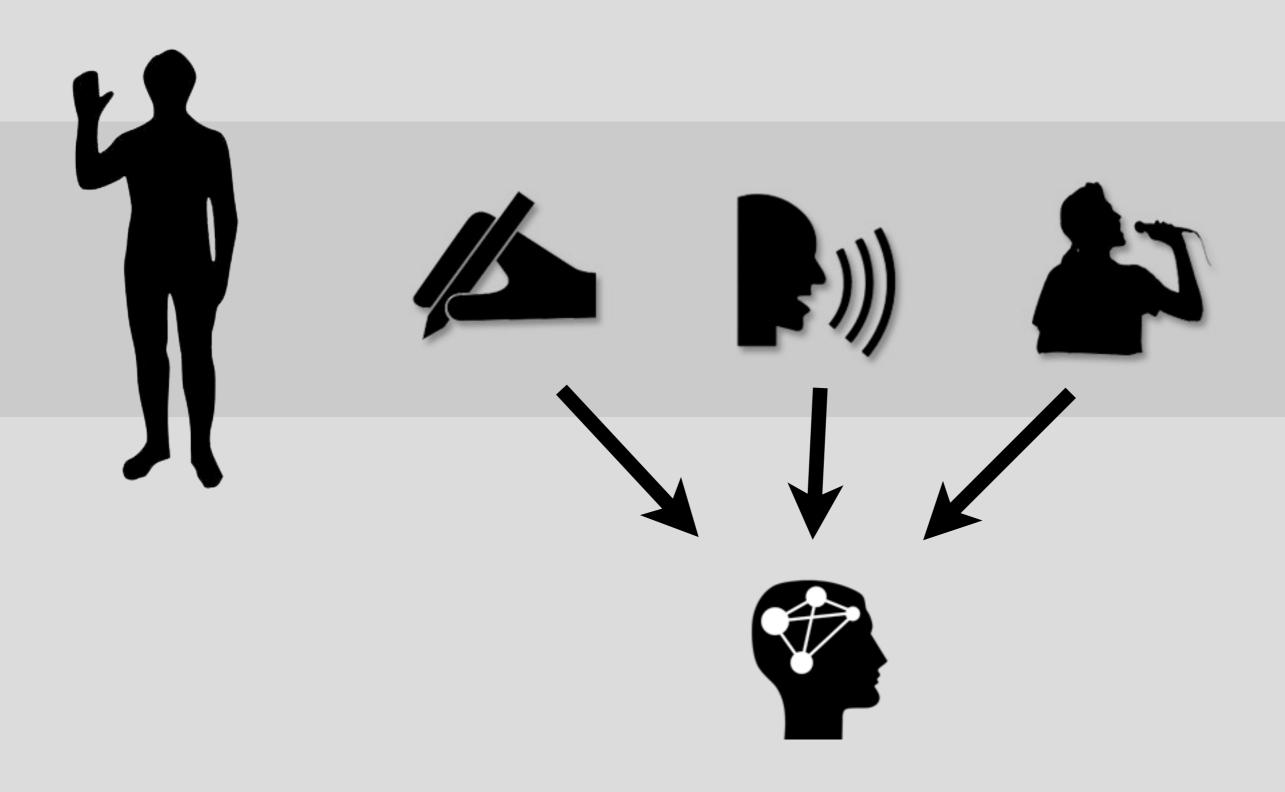














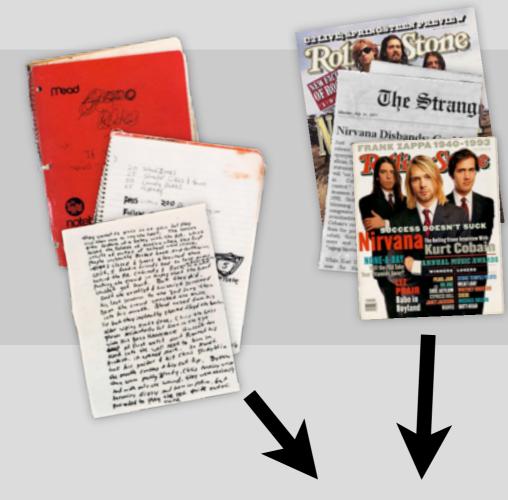
















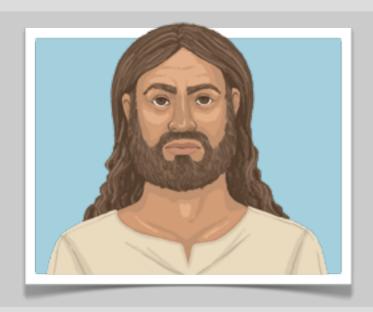


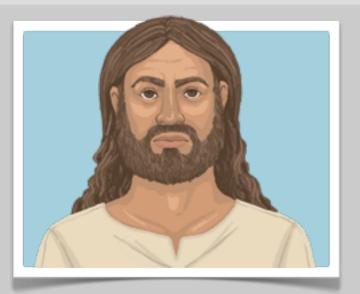


NIRVANA

MRVANA

IN UTERO





MATTHEW 9:05 527

who built his house no the rock, "The rain rame down, the streams row, and the winds blew and heat against that house, yet it did not fall, he means it had its fall as followed by the second its did not fall, he means it had its fall as followed by the second down of the mode, "But everyone who heart chose successful of more and down and yet items into practice is life a facility of more and down and part them into practice is life a facility of the rown of the mode of the second of the the streams spen, and the winds blew and boat against that because yet is didn stort. All, we saw it had all in themselves to see that the state of the state of the state of mines and does not per themse into possible in the state of mines and does not per them into possible in the state of the state of the state boat like beautiful him broans on stand. "The ratio are stated to the state of t

The Man With Legrosy

Notes the carried them from the mountainsich, lungs
revends influenced time. It is man with hyprosy "came
and lasted before the carried them from the mountainsich, lungs
growth influenced time. It man with hyprosy "came
and lasted before them and said. "Liesd, if you are willing
you can made me clean."

"Broan-new hard out his hand and two-thed fibe man,
"shown the mountainsich hand and two-thed fibe man,
"shown the mountainsich hand and two-thed fibe man,
"shown the mountainsich hand and two-thed fibe man,
"shown the middle and the clean." Internationally he was
counted by the said. "We clean." Internationally he was
counted by the said. "We clean." Internationally he was
counted by the said. "We clean." Internationally the was
counted by the said. "We clean." Internationally the was
counted by the said. "We clean." Internationally the was
counted by the said. "We clean." Internationally the
"The first had the Cantarian.

"When he can had entired Capterinams, a revisition
came in him, adding the beligh. "Lind." In the said. "May we
was the limit of the Cantarian.

"The cantains praished and on to reverble ariely the said." "May see
"The cantains praished and on to reverble ariely the said." "My see
"The cantains and the fibroid." "Lind. I do not discuss to
have you come under my read from him at a man
and any servariant. The discuss the said by the said.
"The cantains of the said." "And I do not discuss to
have you come under my read from him a man
and any servariant. The discuss and be done in."

"The cantains of the said with a said provide and said
when leaves have discuss the said by the said." "I say to
have many wall come himse for each and did to
such case to their servariant. The way is a said
to these bildings (ins.). "I till prove the rows, I have no
bound anyme in lated with the said by the west
and will take their places a said with wall, great laid." "I say to
so that many will come himse for each and did to
such a said of the said." "Which is easily to
the said of the said w

Aron Beah Many
"Albest heave came into Peter's house, he saw Peter's
mothers because the first heat with a foote, "the touched
her hand and the lives helt heat, and she gas up and beme to read to he lives helt heat, and she gas up and be"Albest-evening-came, many able some demandpersecond were freezight to him, and he gade not betill what was spoken through the open phore to the
fill what was spoken through the prophet house.

"She will be most was having dimers at Matthew's bounce,
many ian collectors and "sincers" came and als with
han of the depression of the depressio

I resident a Familyis.

No, and be given and that ones. Cheese, and the course, I say is any cervant, Do thus, and be does it.

"When it shows broad this, the was assembled and said to those believes broad the course. I have not been described and said to those believes broad express in located stray bases, T is ell you the reput, I have not broad express in located stray bases, and gives taken, I say to you that many said course limits the case and the north and still have their places as that gives taken, I say to you that many said course limits the case and the north and said part of the said that man, and self the form was absoluted and that their places as the fines and the handour control of the languages of the languages of the handour control of the said based to the said to the control of the languages of the handour control of the languages of the languages of the languages of the languages of the handour control of the languages of the langua

Mambur sitting at the tax collector's booth. "Fellow "when revening cases, many who were demons possible with a world and besided all the sell. "This was to led!" "While breast was sharing dismort at Manthew is home. "While breast was sharing dismort at Manthew is home. "While breast was sharing dismort at Manthew's home. The took upon information and carried out diseases."

The took upon information and diseases."

The fact of following Peass

"When breast man are the remod around him, he grownform to cross the other state of the lake. "Then the breast was the other state of the lake. "Then the breast was the other state of the lake. "Then the breast was the other state of the lake. "Then the breast was the other state of the lake. "Then the breast was the took of the lake. "Then the breast was the took of the lake the was was the breast was, but the face of them has no places to take the lake of the lake." Then the lake the la

12 The Great word was used by system domining the data—and accountly beginning. 12 Great made dom: 127 based 50 x 127 bases regarding Garganina, others Garganina. 123 Bases to

### 538 MAITHEW 9:56

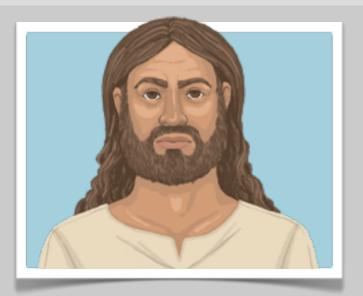
From Feedy Out the Teacher

10 the california to drive out with quarter and gare them austrarily to drive out with quarter and to be selected processors of the tourier appealed from the selected processors of the tourier appealed from the tourier appea

came when the bridegroom will be taken from those: wractione: To not go among the Gentalin or enter any times they will last.

The coursews a part to of unableauta shorts on an old generation that the panch will got less only from the generation and generation that the panch will got less only from the same poor area with a single destination. Evidently off the case is not all the same poor area with a single of the same and the stimulation will be retired for visits will run out and the stimulation will be retired to provide the same and the stimulation will be retired to the same and the provided of the same and the stimulation will be retired to the same and same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and part your hand on their, and due to fill the same and t

\*1 Cost under: \*4 The Grek and one well be return discound being the date—out necessarily legacy. \*25 Grek discoland of Bellation. \*29 Grek an asserter: \*18 Most 19.



who built his house on the rock. "The rain rame down, the circuits roce, and the winds blew and best against that there are did not full, because it had in foundation one, and the winds blew and best against that house, we is did not full, because it had in foundation on the not." "But everyone who bears there excell not not not." "But everyone who bears there excels of notes and does not put them into practice in till a families of notes and does not put them into practice in till a families has who built his house on sund. "The rain came down, the streams note, and it full with a great rain," "You of little faith, who are you so an willing." "Ne clean" "I will go and heat him." the kingdoon of beaver, "that the true of the dropper notation, better the true of the tempting and granding of "Get it will be conditioned in a condition of the "Get it will be conditioned in a condition of the "Get it will be conditioned in a condition of the "Get it will be conditioned in a condition of the "Get it will be "Get i "Trues have holes and birds of the air have nests, but the Sen of Man has ne place to key his head." "How can the guests of the bride-groom mourn, while he is with them? The time will

The girl is not dead but asleep."

came when the bedegenom will be taken from those, then they will but.

"Yo one were a pain to of unathroad cloth on an old garment, but the parks will guill now from the garment, and the parks will guill now from the garment area unaing the team wares. "Standard of more para area with into old networkins, if they do, the claim will bound, the wine will run not and the winekins will bound. No, they pour new wine into old networkins, if check do, will be ruited.

No, they pour new wine into new without not not garden, and both one, or extent tomic, or another or a still, but the pour new wine alone of the second of the second

The vidid children will refer agreed their past of the past of the

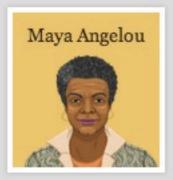
your halfs will in be done to you."

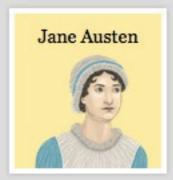
"Secondington

"Production on a state his true has a see above his master. "It is except and the stratem than the stratem that his master. The is except and the stratem that his master. The is except and the stratem that his master. The his master, the state has a called Declaration, make more the members of his lowested."

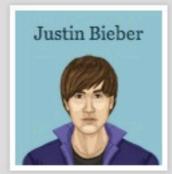




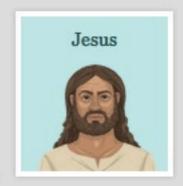




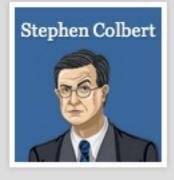




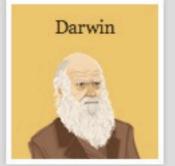




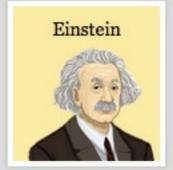


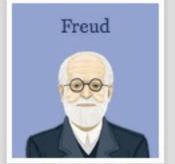






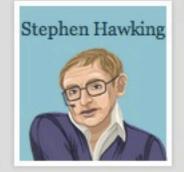


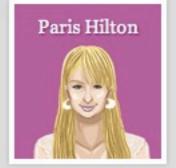


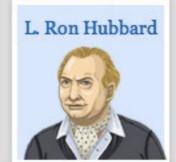






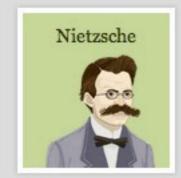




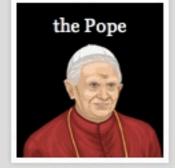


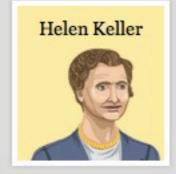




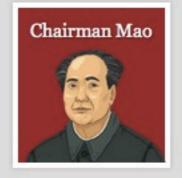




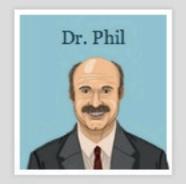


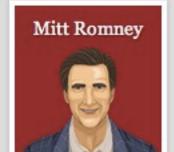


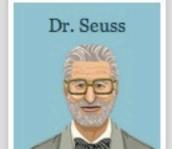


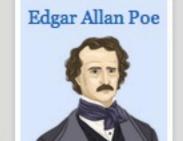




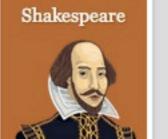








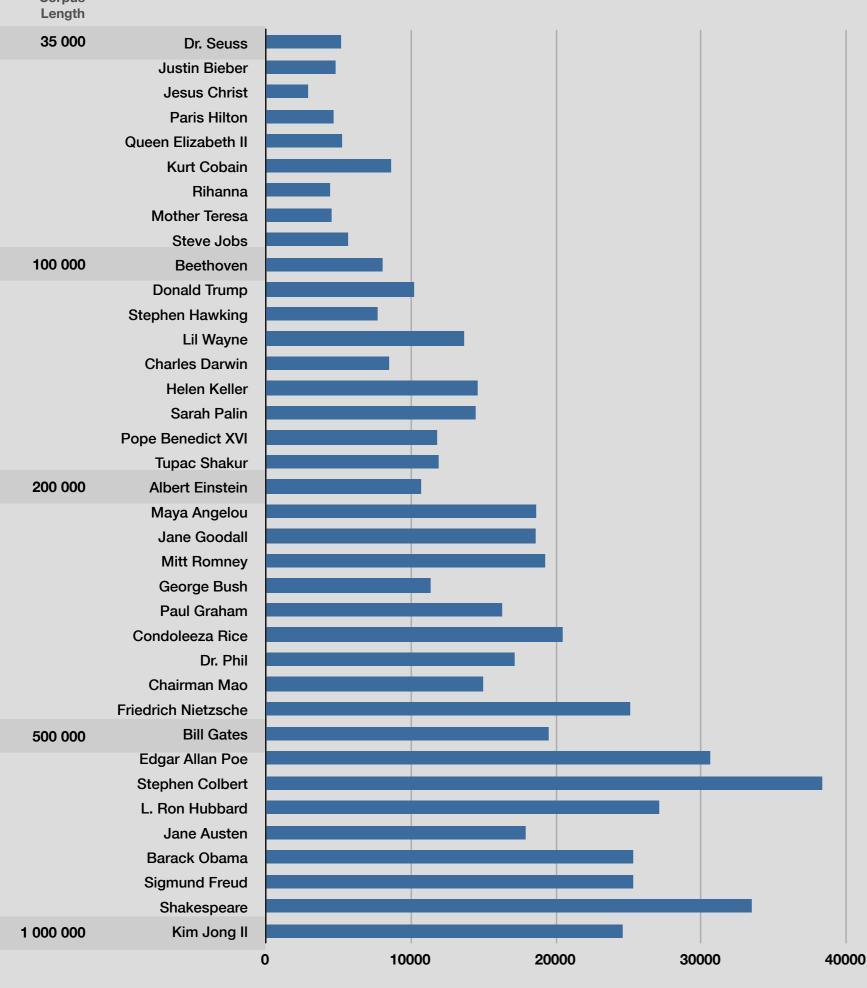








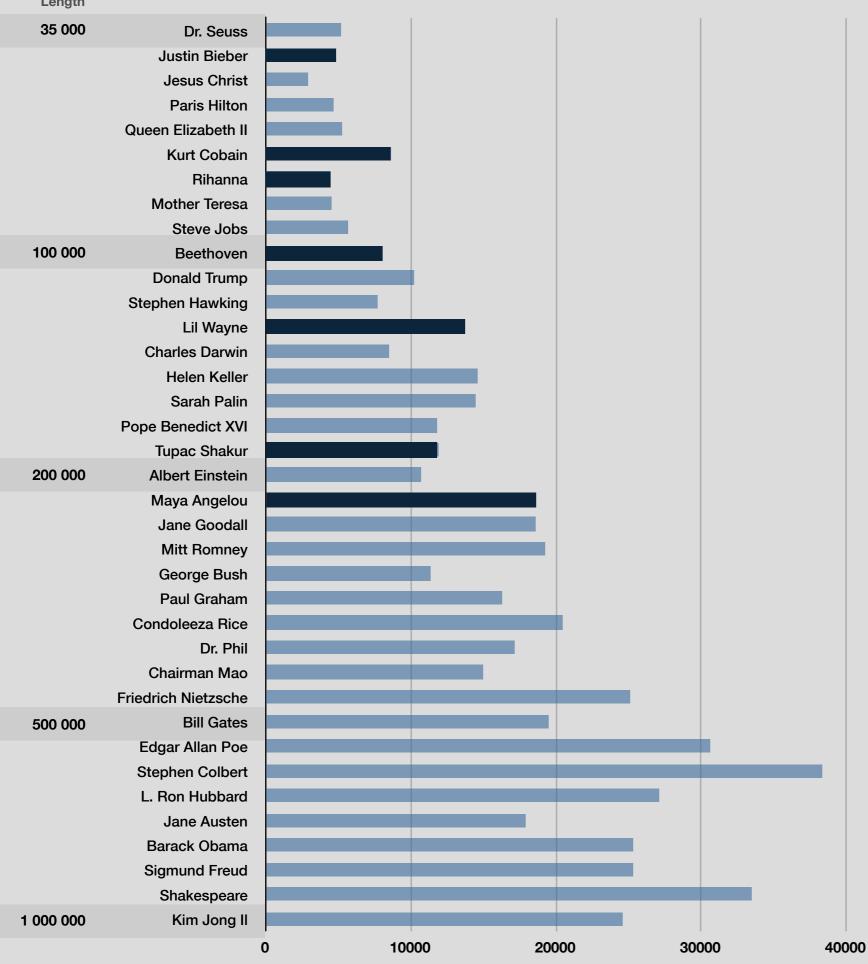
Corpus



### Vocabulary size

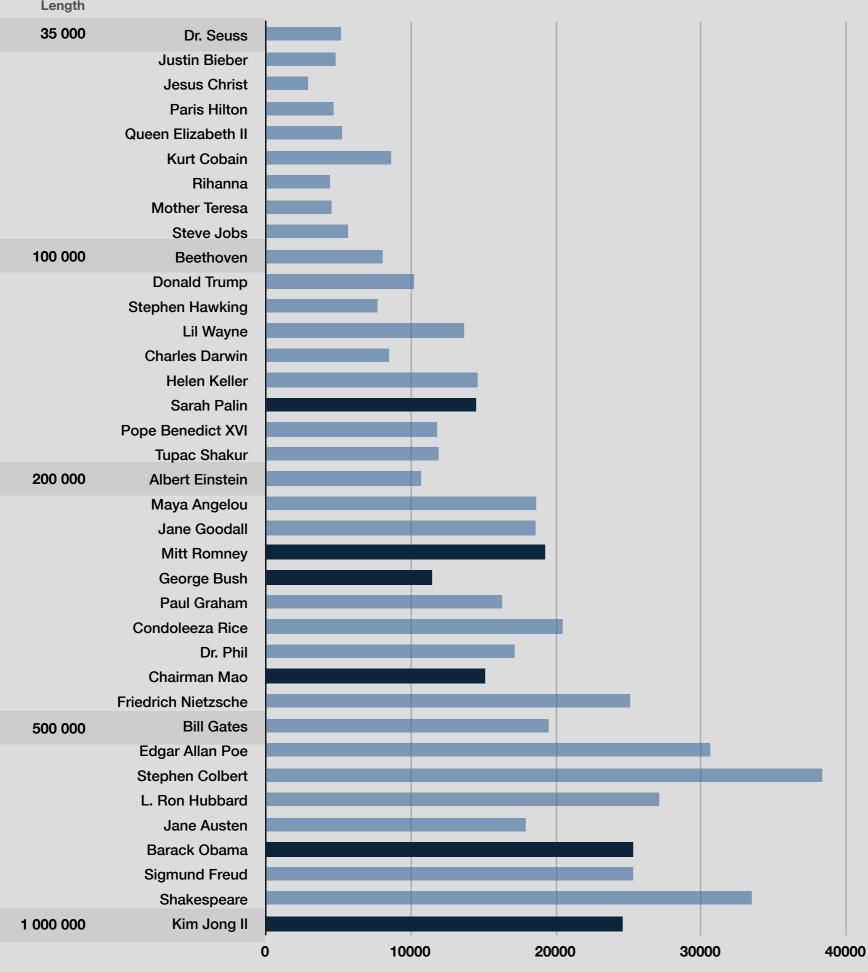
Authors are listed in order of corpus length

Corpus Length



### Musicians

Corpus Length



### **Politicians**



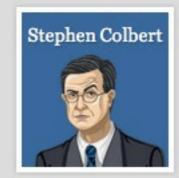
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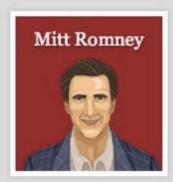
categories... ‡







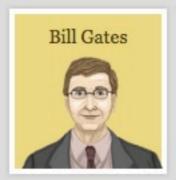




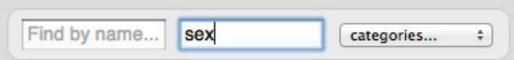


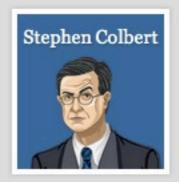


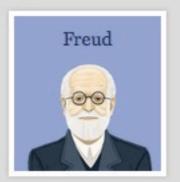


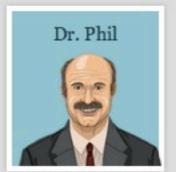




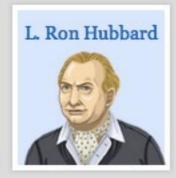










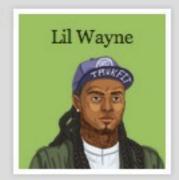


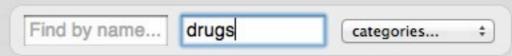




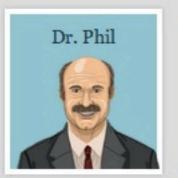




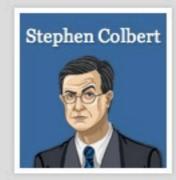




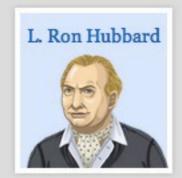








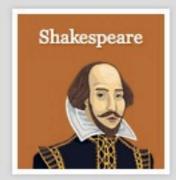












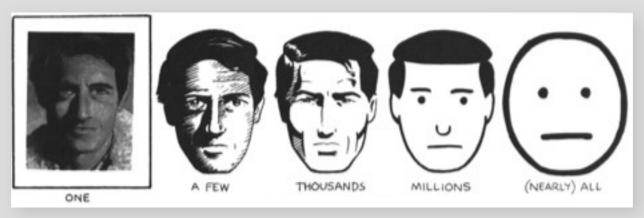
## portraits



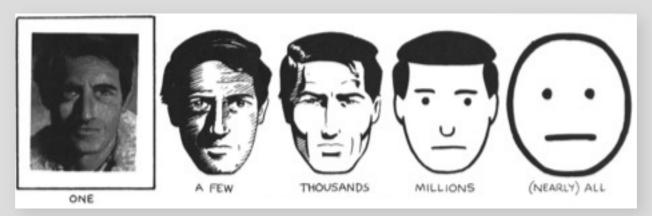




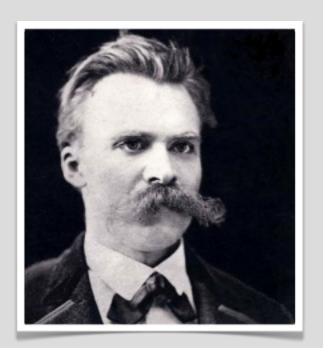




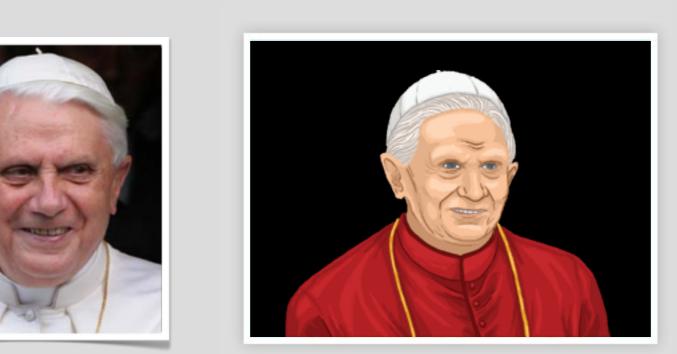
Scott McLeod

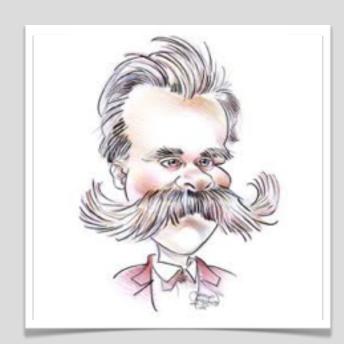


Scott McLeod









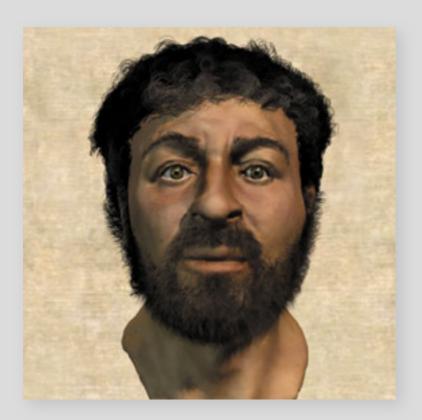
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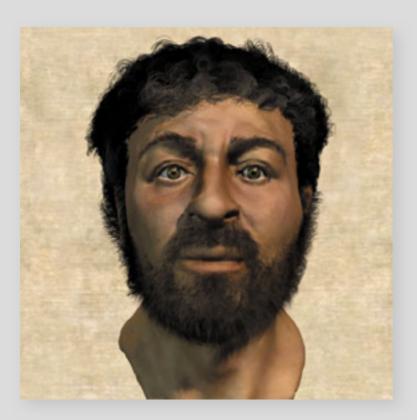
Keith Kasnot / National Geographic Image Collection [left]
The Unit of Art in Medicine/The University of Manchester [right]



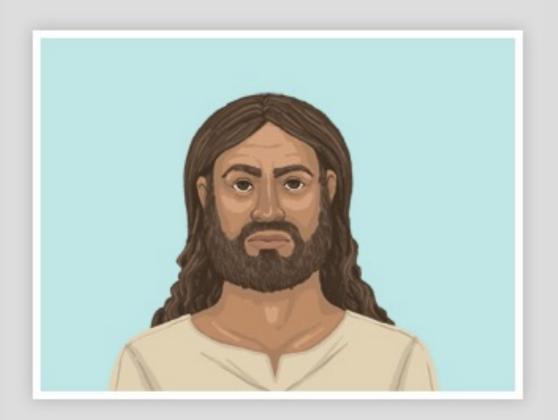
BBC Photo Library



Keith Kasnot / National Geographic Image Collection [left]
The Unit of Art in Medicine/The University of Manchester [right]

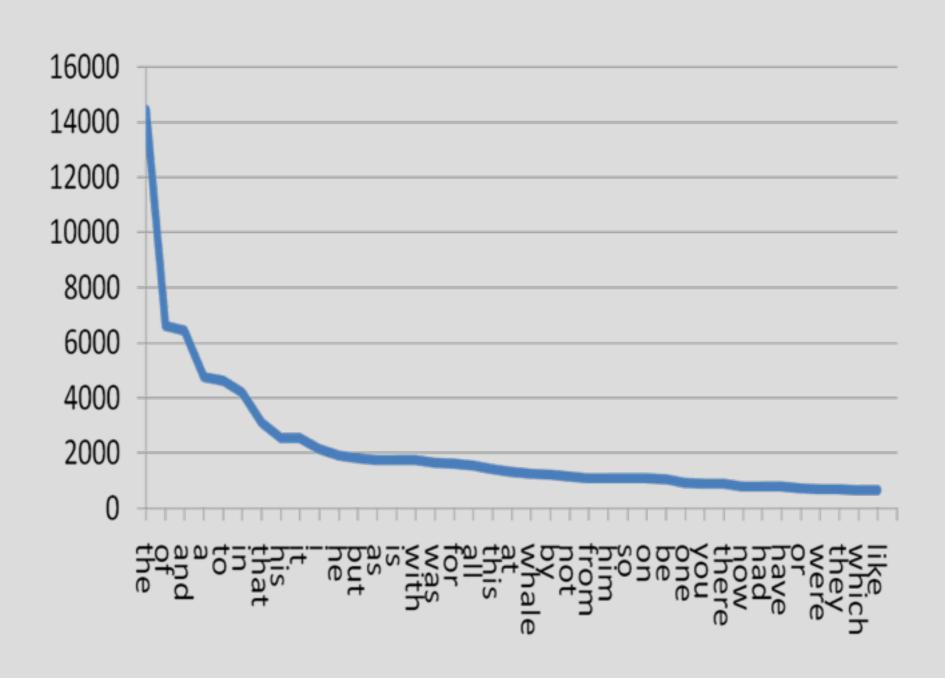


BBC Photo Library



# suggestion algorithm

# Zipf's Law



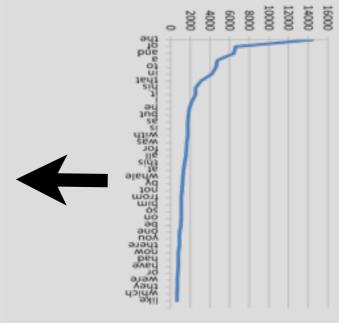
# Zipf's Law



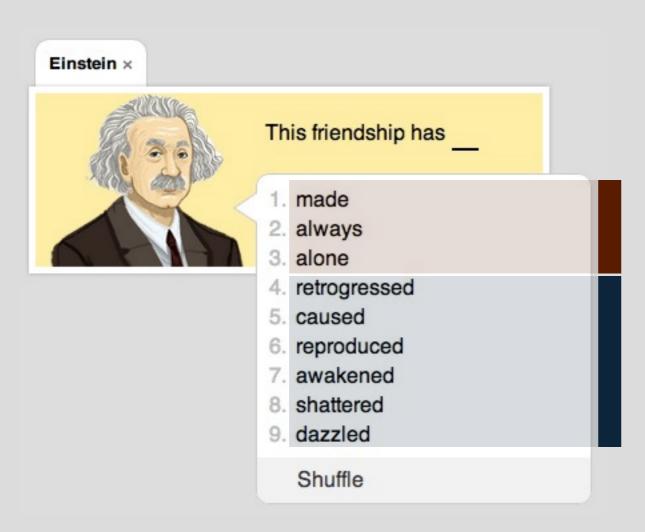
8. shattered

9. dazzled

Shuffle

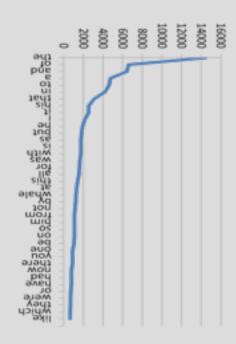


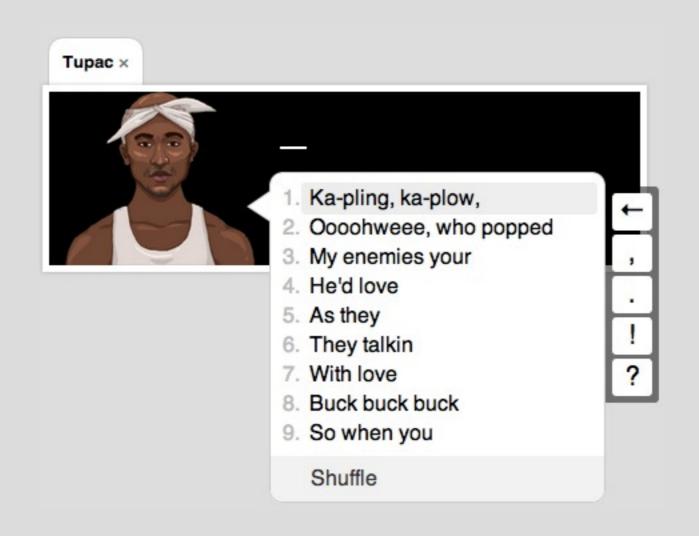
# Zipf's Law



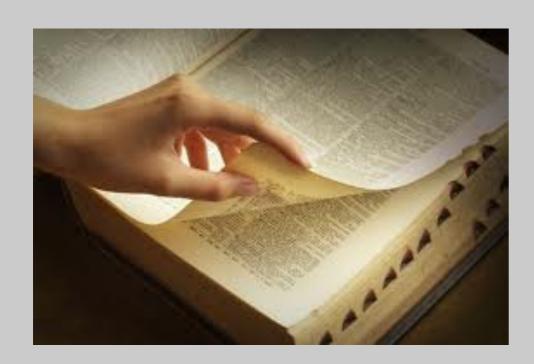
High Frequency "glue" words

Low Frequency unexpected, random

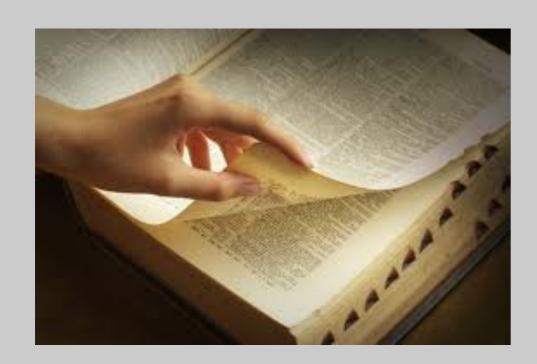




speed



10 seconds



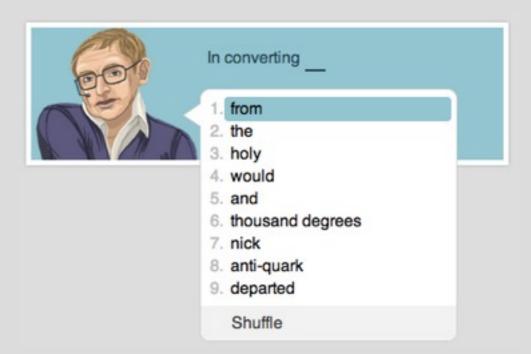
10 seconds

read; synthesize; produce



10 seconds

read; synthesize; produce

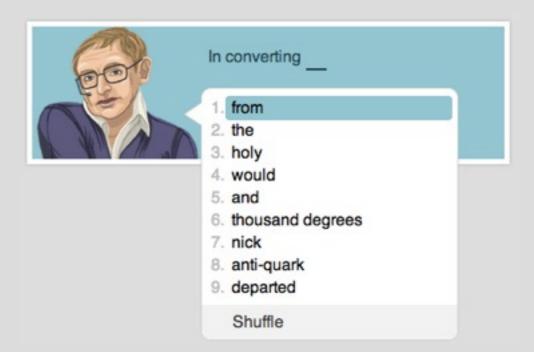


100 milliseconds



10 seconds

read; synthesize; produce

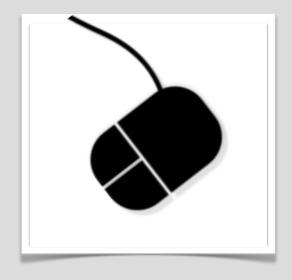


100 milliseconds

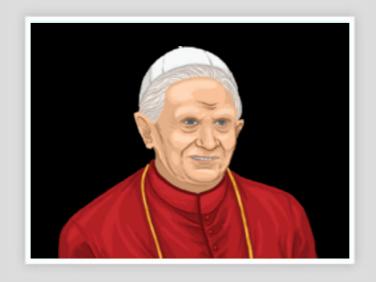
real-time interaction

# **Shared Authorship**

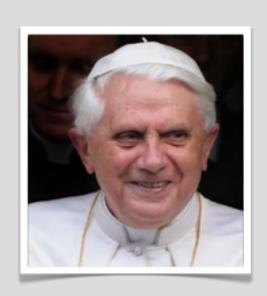
user



algorithm



source author



### Anonymity



**Real Identity** 



**Matthew Huebert** 

## **Anonymity**



#### **Real Identity**



**Matthew Huebert** 

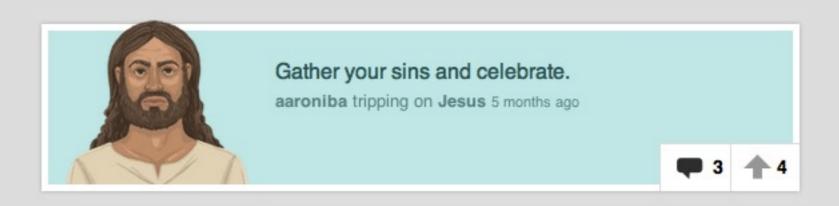
#### Mask

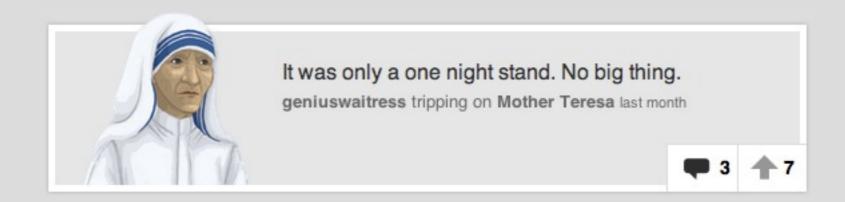
## Matt tripping on Freud



#### Mask







## intuition for data

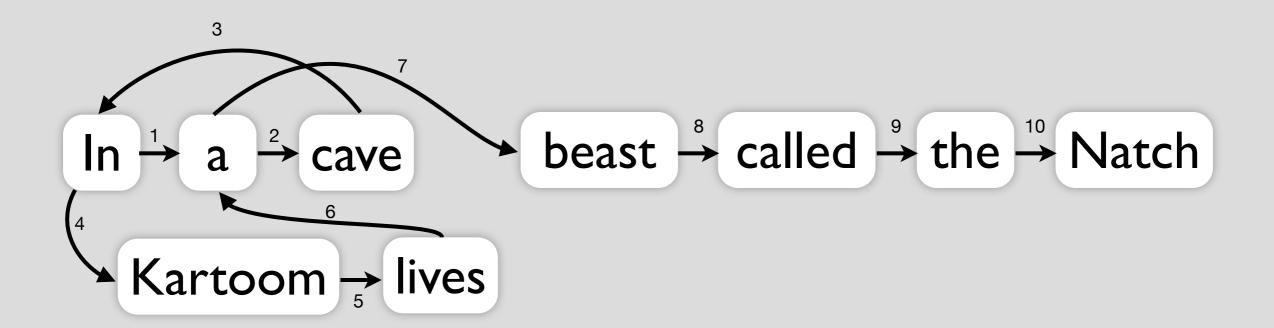
In a cave in Kartoom lives a beast called the Natch

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In 
$$\rightarrow$$
 a  $\rightarrow$  cave  $\rightarrow$  in  $\rightarrow$  Kartoom  $\rightarrow$  lives  $\rightarrow$  a  $\rightarrow$  beast  $\rightarrow$  called  $\rightarrow$  the  $\rightarrow$  Natch

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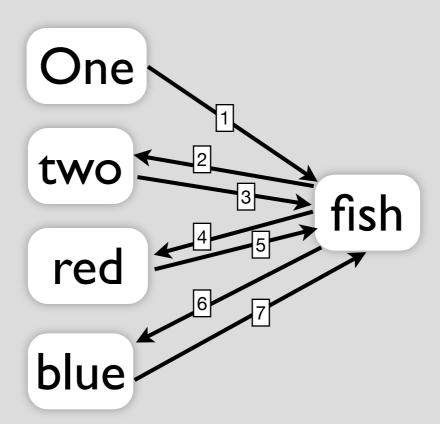
One fish, two fish, red fish, blue fish.

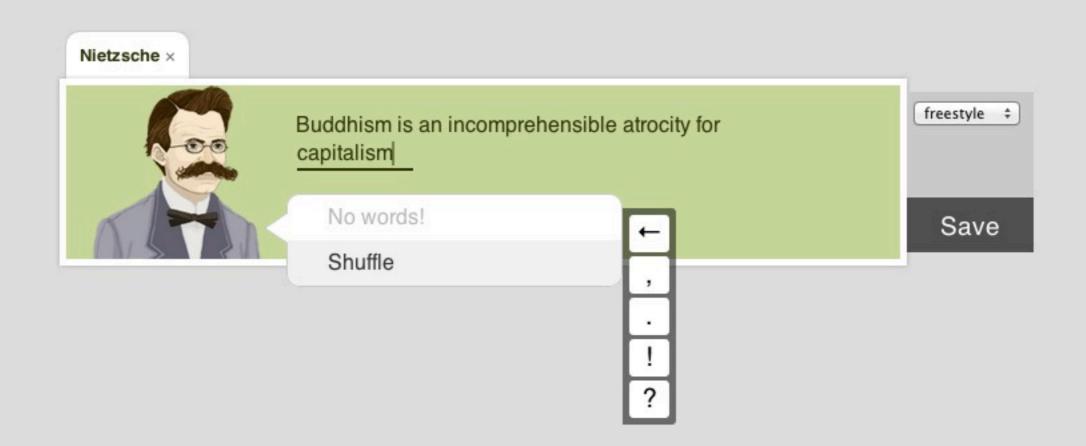
One fish, two fish, red fish, blue fish.

One 
$$\xrightarrow{1}$$
 fish  $\xrightarrow{2}$  two  $\xrightarrow{3}$  fish  $\xrightarrow{4}$  red  $\xrightarrow{5}$  fish  $\xrightarrow{6}$  blue  $\xrightarrow{7}$  fish

One fish, two fish, red fish, blue fish.

One 
$$\stackrel{1}{\rightarrow}$$
 fish  $\stackrel{2}{\rightarrow}$  two  $\stackrel{3}{\rightarrow}$  fish  $\stackrel{4}{\rightarrow}$  red  $\stackrel{5}{\rightarrow}$  fish  $\stackrel{6}{\rightarrow}$  blue  $\stackrel{7}{\rightarrow}$  fish







Bring'st all of thine cat paintings! I shall publish them post-haste to the inter nets!

comatosekid tripping on Shakespeare last month







# Implementation

# speed (developer, response time) simplicity

Heroku (managed servers, simple to scale) Node.js (same language on client and server) In-memory language models

# human process

## **Hacking BrainTripping**

Node.js hackathon in Montréal



Hisako, Gina Cook, Brian Doherty, Mary Ellen Cathcart, Jon Volkmar, Martin Provencher, Jeff Marshall

## **Experiment Quickly**





PRESENT

#### Thanks!



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Matthew Huebert
me@matt.is
@geoshift

#### **Future**

- Structured creative writing: "constrain and suggest"
- Foreign language "training wheels"