

# The past, present, and future of AI

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## Three waves in AI research:

60s, 70s (80s): Intelligence is applied logic

80s, 90s (00s): Intelligence is applied statistics

00s, 10s ( ... ): Intelligence is networks of weighted sums  
and point nonlinearities  
[= “neural networks”]

And now it (almost) works!

In fact Human Language Technology  
is pretty amazing these days . . .

Questions to **OK Google**, in a quiet room in Paris (on an Android Nexus 5 in 2015!)

**Question:** “OK Google, what is the French word for ‘dog’?”

**Transcribed as:** “what is the French word for dog?”

**Answer:** “chien”

**Question:** “OK Google, what is 15 degrees centigrade in Fahrenheit?”

**Transcribed as:** “what is 15 degrees centigrade in Fahrenheit?”

**Answer:** “15 degree Celsius is 59 degrees Fahrenheit.”

**Q:** “What’s the name of the student newspaper at the University of Pennsylvania?”

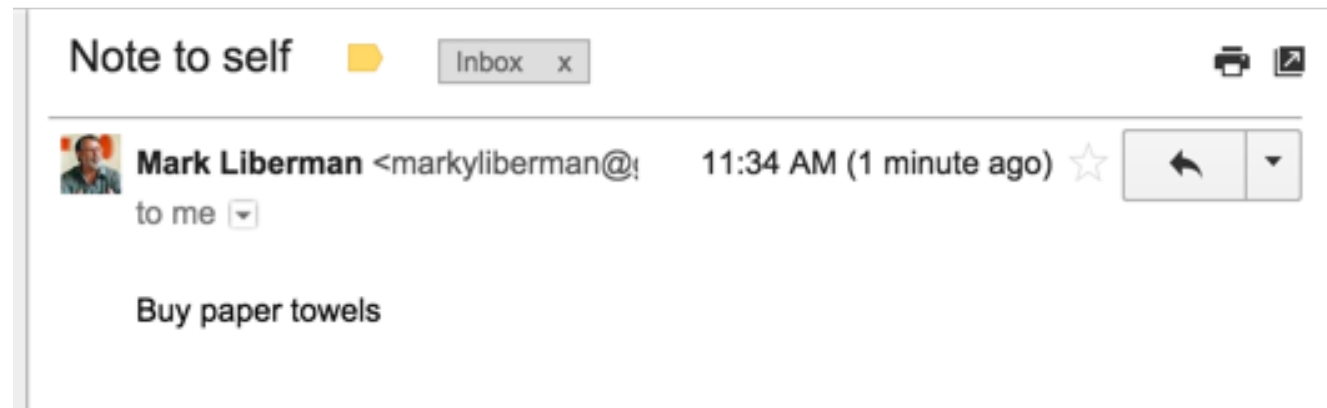
**Transcribed:** “What’s the name of the student newspaper at the University of Pennsylvania?”

**Answer:** Page of search links, with The Daily Pennsylvanian at the top

**Q:** “Note to self – buy paper towels.”

**Transcribed:** “note to self buy paper towels”

**Answer:**



**Question:** “When was Hadley Wickham’s book ggplot2 published?”

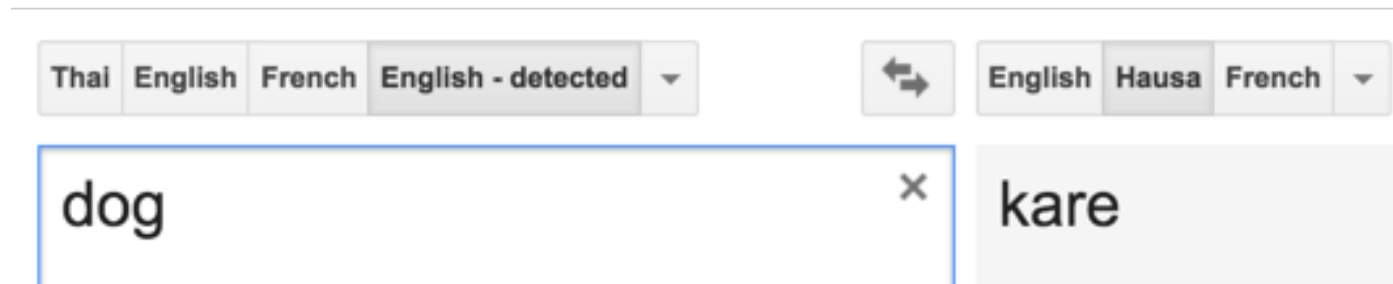
**Transcribed:** “when was Hadley Wickham zbook ggplot2 published”

**Answer:** Page of search results with the Amazon listing for ggplot2 at the top

**Question:** “What is the word for “dog” in Hausa?”

**Transcribed:** “what is the word for dog in hausa?”

**Answer:** “Here is your translation:”



This morning I asked Google Chrome (by voice):

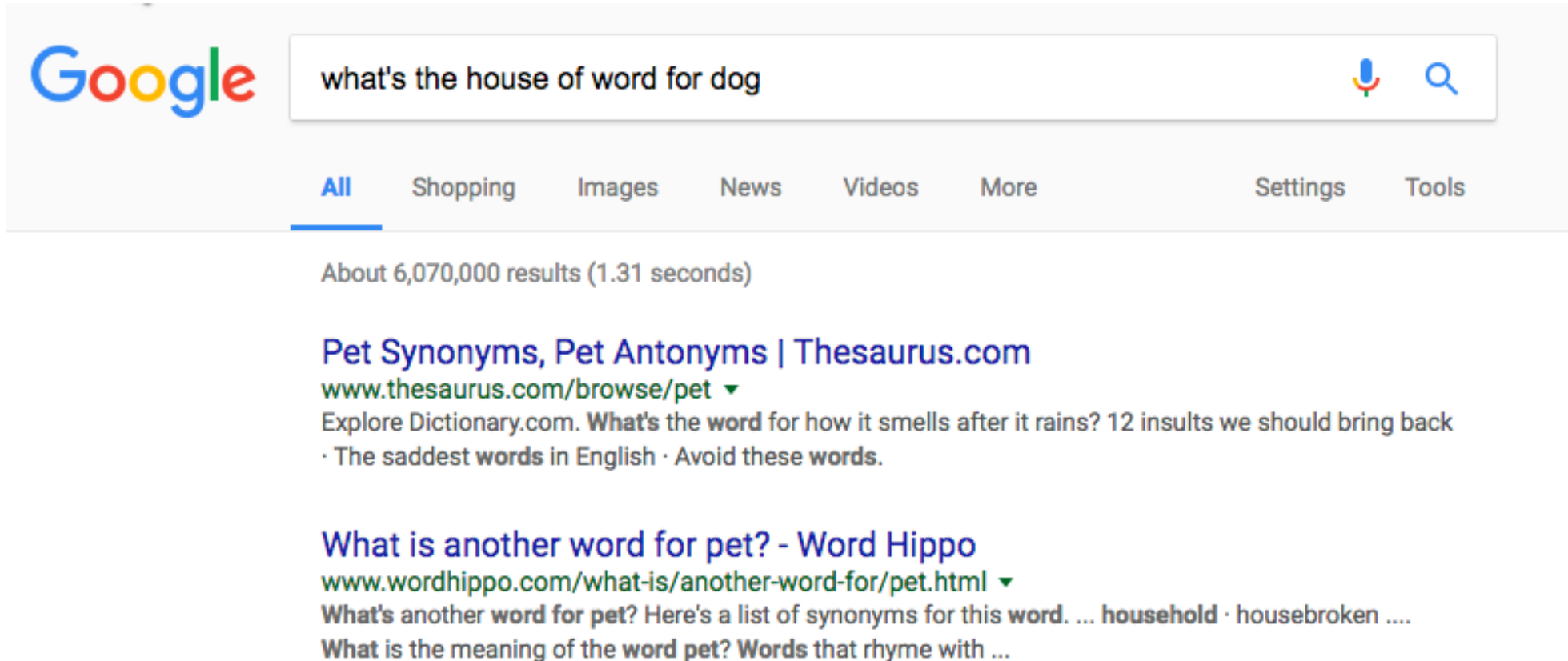
The image shows a Google search interface. At the top left is the Google logo. The search bar contains the text "what's the capital of Kazakhstan". To the right of the search bar are icons for voice search and a magnifying glass. Below the search bar are navigation tabs: "All" (underlined), "Maps", "News", "Images", "Videos", "More", "Settings", and "Tools". Below the tabs, it says "About 556,000 results (1.05 seconds)".

The main content area is titled "Kazakhstan / Capital". On the left is a photograph of the Bayterek tower at night. To the right is a map of Astana, Kazakhstan, with labels for "Astana", "Астана", "Koschi", "Косшы", "Saryoba", "Сарыоба", "Novodolinka", "Новодолинка", "Olginka", "Ольгинка", "Blagodatnoe", "Благодатное", "Sabyndy", "Сабынды", "Tastak", "Тастак", "Pervomayka", "Первомайка", "M-36", and "A1". The map data is attributed to "©2017 Google".

Below the map, the word "Astana" is displayed in a large font. At the bottom, there is a button with a downward-pointing chevron and the text "Plan a trip and points of interest".

The technology can fail –

“What’s the Hausa word for dog?” was transcribed wrong:



The image shows a screenshot of a Google search interface. The search bar contains the text "what's the house of word for dog". Below the search bar, the "All" tab is selected. The search results show "About 6,070,000 results (1.31 seconds)". The first result is from Thesaurus.com, titled "Pet Synonyms, Pet Antonyms | Thesaurus.com", with the URL "www.thesaurus.com/browse/pet". The snippet for this result reads: "Explore Dictionary.com. What's the word for how it smells after it rains? 12 insults we should bring back · The saddest words in English · Avoid these words." The second result is from Word Hippo, titled "What is another word for pet? - Word Hippo", with the URL "www.wordhippo.com/what-is/another-word-for/pet.html". The snippet for this result reads: "What's another word for pet? Here's a list of synonyms for this word. ... household · housebroken .... What is the meaning of the word pet? Words that rhyme with ..."

... then quickly corrected to “what’s the household word for dog”



But today, HLT (often) works.

To what do we owe this gift?

Reason #1 that HLT (almost) works:

Advances in “Machine Learning”

...and the computer power to apply them

# Reason #2:

A digital shadow universe

increasingly mirrors real life  
in flows and stores of bits.

Society is mostly about communication.

And most communication is text

(or talk, which is just text in fancy calligraphy)

. . . more and more often in digital form.

# Simple properties of text

(like the words that make it up)

are a good proxy for content.

*Better than anything else we have, anyhow...*

Bigger faster cheaper digital everything

(and better programming languages, and . . . )

make it easier and easier

to pull content out of the flows of text  
in that digital shadow universe.

So there's a new evolutionary niche

where a host of newly-evolving life forms  
have got means, motive, and opportunity  
to live off of these flows and stores of language

. . . while adding their digestion products  
to the ecosystem.

But as usual –

The good news is also the bad news.

These programs work by learning how the world is

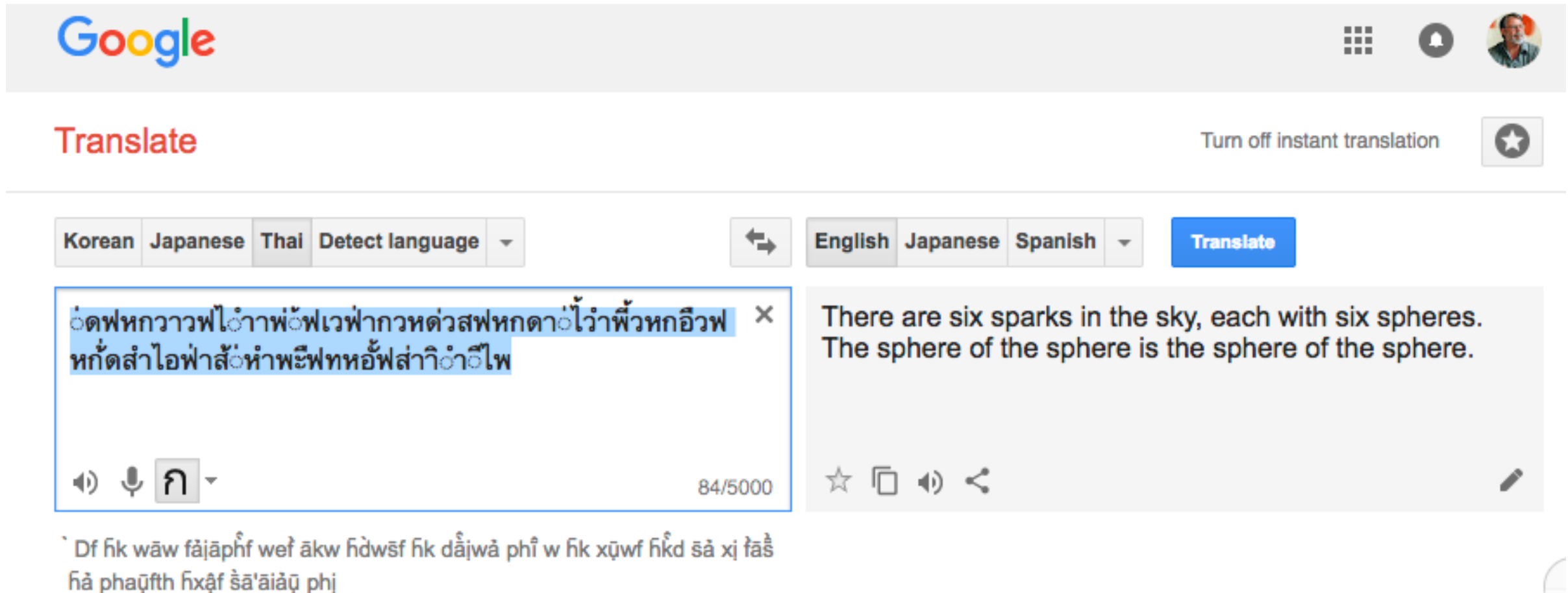
... or how the things that they've seen  
make the world seem to be.



This alchemical distillation of experience  
can lead them to some bizarre hallucinations  
for inputs outside their experience.

Try probing Google translate  
with meaningless character sequences  
in scripts like Japanese or Thai or Arabic,  
and you'll create interesting absurdist poetry...

# Drumming your fingers on a keyboard set to Thai might produce something like this:



The screenshot shows the Google Translate web interface. At the top left is the Google logo. On the right side of the header are icons for a grid, a notification bell, and a user profile picture. Below the header, the word "Translate" is displayed in red on the left, and "Turn off instant translation" with a star icon is on the right. The main interface features two language selection dropdowns: the first is set to "Thai" and the second to "English". A blue "Translate" button is positioned between them. The input field on the left contains Thai text: "อดฟหกวางฟไ้่าฟัฟเวฟากหวด่วสฟหกดา์ไว้่าฟัฟหกอีฟ" and "หกดส์่าไอฟ้าสั้ห่าพะฟทห้อฟส์่ากิ๊่าไ้ฟ". Below the input field are icons for speaker, microphone, and a Thai character "ก", along with a character count "84/5000". The output field on the right displays the English translation: "There are six sparks in the sky, each with six spheres. The sphere of the sphere is the sphere of the sphere." Below the output field are icons for star, copy, speaker, and share, and a pencil icon for editing. At the bottom left, there is a small snippet of Thai text: "ัดฟหกววางฟไ้่าฟัฟเวฟากหวด่วสฟหกดา์ไว้่าฟัฟหกอีฟ" and "หกดส์่าไอฟ้าสั้ห่าพะฟทห้อฟส์่ากิ๊่าไ้ฟ".

# Repetitions of the Arabic characters *alef lam* ال

The

Alal

Alalal

No no no no no no no

For Alalalala

All these are all

All these are alkaline

For those who do not

All these are the reasons why

For those who do not

All these are the reasons why

For those who do not do this

For those who do not have the money

All these are the reasons why not

For those who do not have the money

All these are the reasons why all these are not

For all that, there are not any

These are the reasons why all these are not so

What are these? What are these? Are not these? What are the reasons?

Are these not possible or not?

## Repetitions of the Japanese hiragana sequence えぬ “e nu”

- (1) Nonsense
- (2) Sorry
- (3) To endure
- (4) I am sorry
- (5) I am sorry
- (6) I am sorry
- (7) I am sorry to have kept you waiting
- (8) I am sorry to keep you warm.
- (9) Let's have a sunny day with you tomorrow

And with 17 repetitions we get

**Translate**

Turn off instant translation



Thal English Korean Japanese - detected

English Thal Spanish

**Translate**

えぬえぬえぬえぬえぬえぬえぬえぬえぬえぬえぬえぬ  
 えぬえぬえぬえぬえぬえぬえぬえぬ

Let's go through the sunny evermind



34/5000



Suggest an edit

Enu enu enu enu enu enu enu enu enu enu enu enu enu enu enu enu

So rather rather than this:



...we're more likely to get this:



(that one is from repetitions

of the Japanese katakana sequence ヤス “ya su”)

Does this matter in practical situations?

It's hard to tell,  
because neural net theory  
is procedures and metaphors,  
not mathematics.

So let's talk about it.

Thank you!





# Repetitions of the Japanese katakana sequence ヤス “ya su”:

Us

Chasus

Chasuasus

Chanusasu

Jurasurus

Jurasurasus

Jurasurasusus (2x)

Jurasurasususus

The sky chase supernatural

Worth seeing is not good. Jasusturus swasher

Soundtracks of the sun

It 's a good thing.

It 's a sort of a sweet sun.

It is a surprisingly good thing.

It is a surreptitious one,

It is a photograph of the photograph taken by a photograph

It is a photograph of the photograph taken by the photographer.

It is a photograph taken on the next page

This is a series of photographs of a series of photographs (4x)

This is a series of photographs of a series of photographs of a series of photographs

# Translate

Turn off instant translation




Thai English Korean Japanese - detected ▾



English Thai Japanese ▾

Translate

 0/5000

Type text or a website address or [translate a document](#).

