Conversational AI Alquist:

Teaching Computers to Surpass Human Baseline in Post-Pandemic Pub Debates

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ALQUIST

Team Alquist

alexa prize

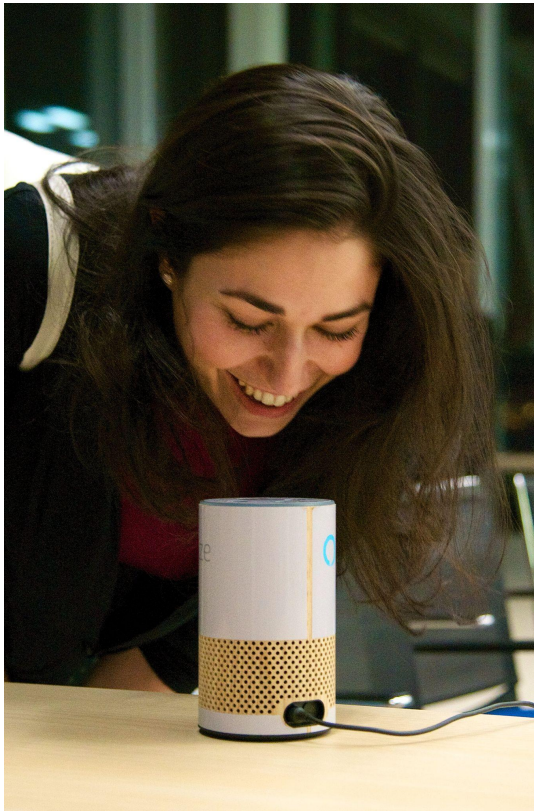
SocialBot Grand Challenge 4 Champions

What is Alexa Prize?

What is Alexa Prize?

Annual **university competition** dedicated to accelerating the field of **conversational artificial intelligence** organized by **Amazon**.

What is Alexa Prize?



The goal is to create a **socialbot** capable of **coherent and engaging conversation** about popular topics for **20 minutes**.

What is Alexa Prize?

Anybody with Alexa device can say “**Let’s chat”**, have a conversation and **rate** it from **one to five stars**.

What is Alexa Prize?

Five best teams progress into **finals**, where three **interactors** and three **judges** test the socialbot and decide the winner.

What is Alexa Prize

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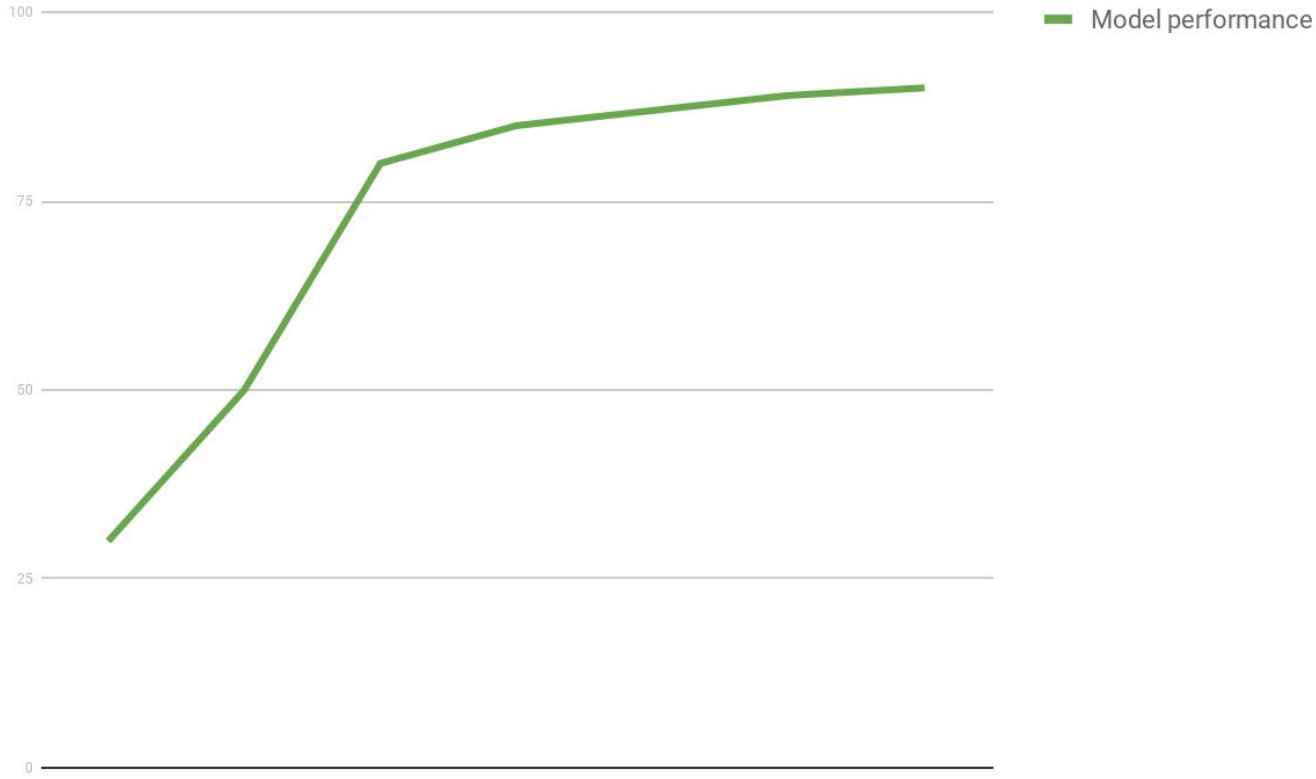
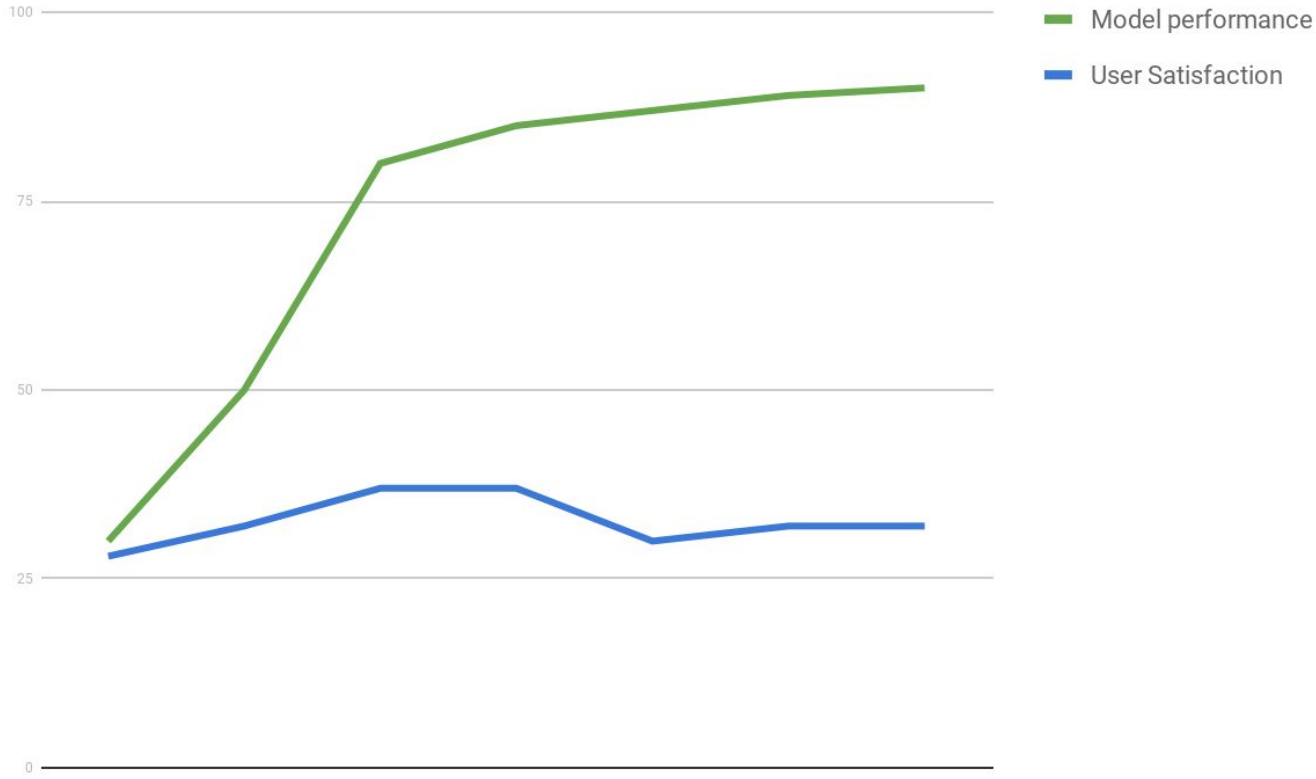
What is Alexa Prize

What is Alexa Prize

How to make a socialbot?

It’s not in the AI algorithms!


100
75
50
25
0
Model performance


100
75
50
25
0
Model performance
User Satisfaction

ROBERT DOWNEY JR.
CHRIS EVANS
MARK RUFFALO
CHRIS HEMSWORTH
SCARLETT JOHANSSON
JEREMY RENNER
DON CHEADLE
PAUL RUDD
BRIE LARSON
KAREN GILLAN
BRADLEY COOPER
JOSH BROLIN
MARVEL STUDIOS
AVENGERS
ENDGAME
APRIL 26

How to make a good socialbot?

Coherence

Ability to say something

Ability to plan dialogue

Ability to recognize unexpected

Ability to answer factual questions

Ability to react

Engaginess

Ability to make the conversation engaging

Ability to learn about user

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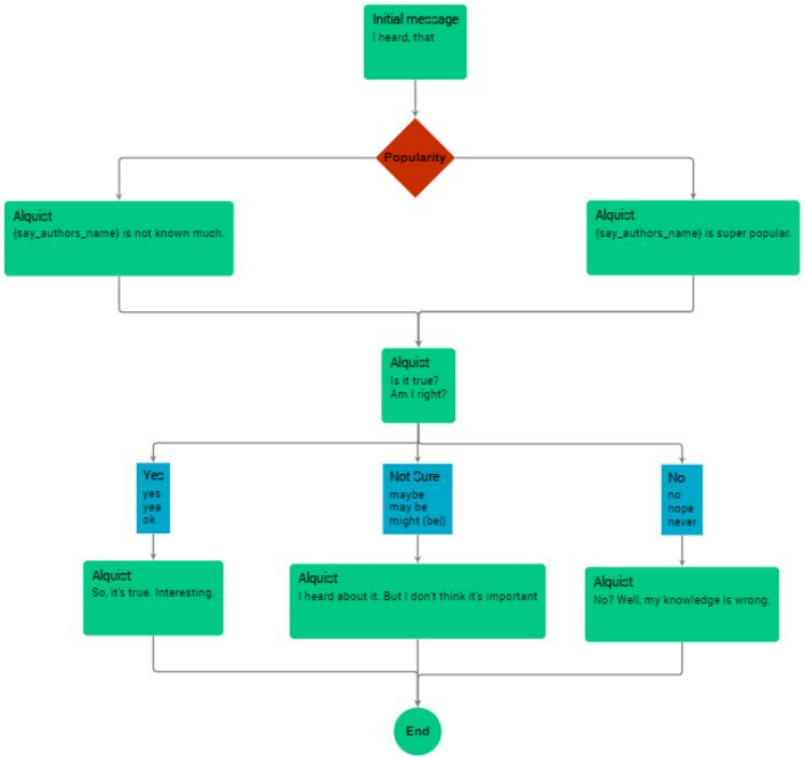
How to teach it what to say?

Dialogue Graphs

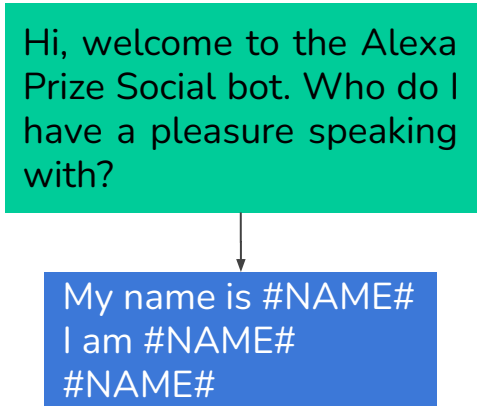


Dialogue Design

Dialogue Design

Hi, welcome to the Alexa Prize Social bot. Who do I have a pleasure speaking with?

Dialogue Design



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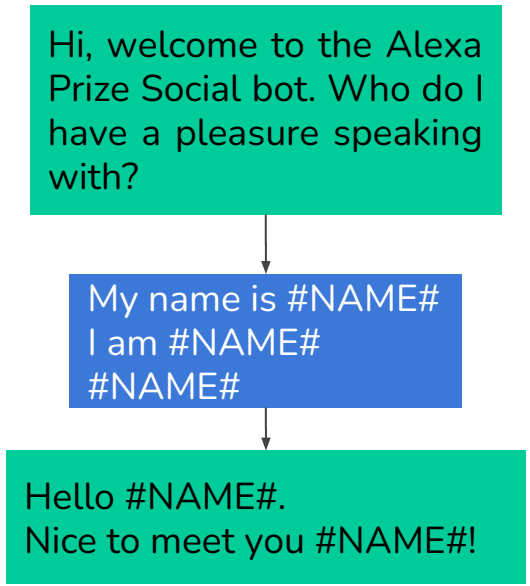

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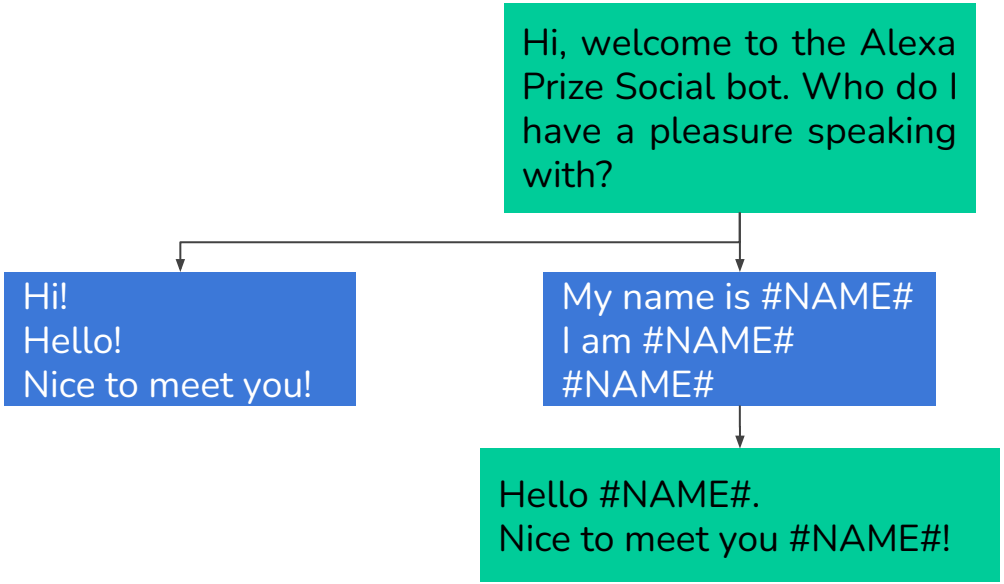

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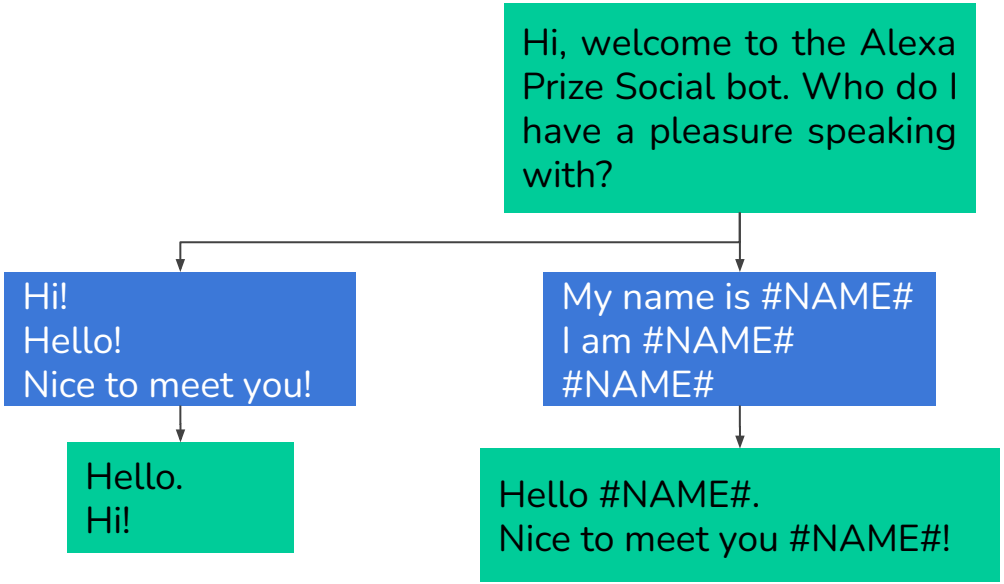

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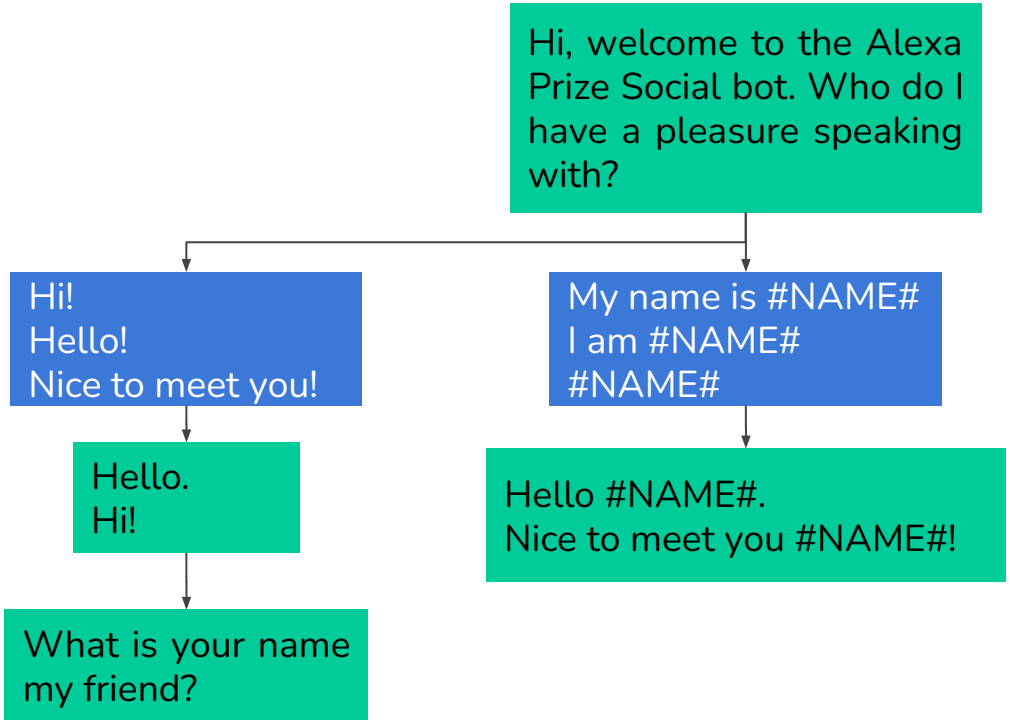

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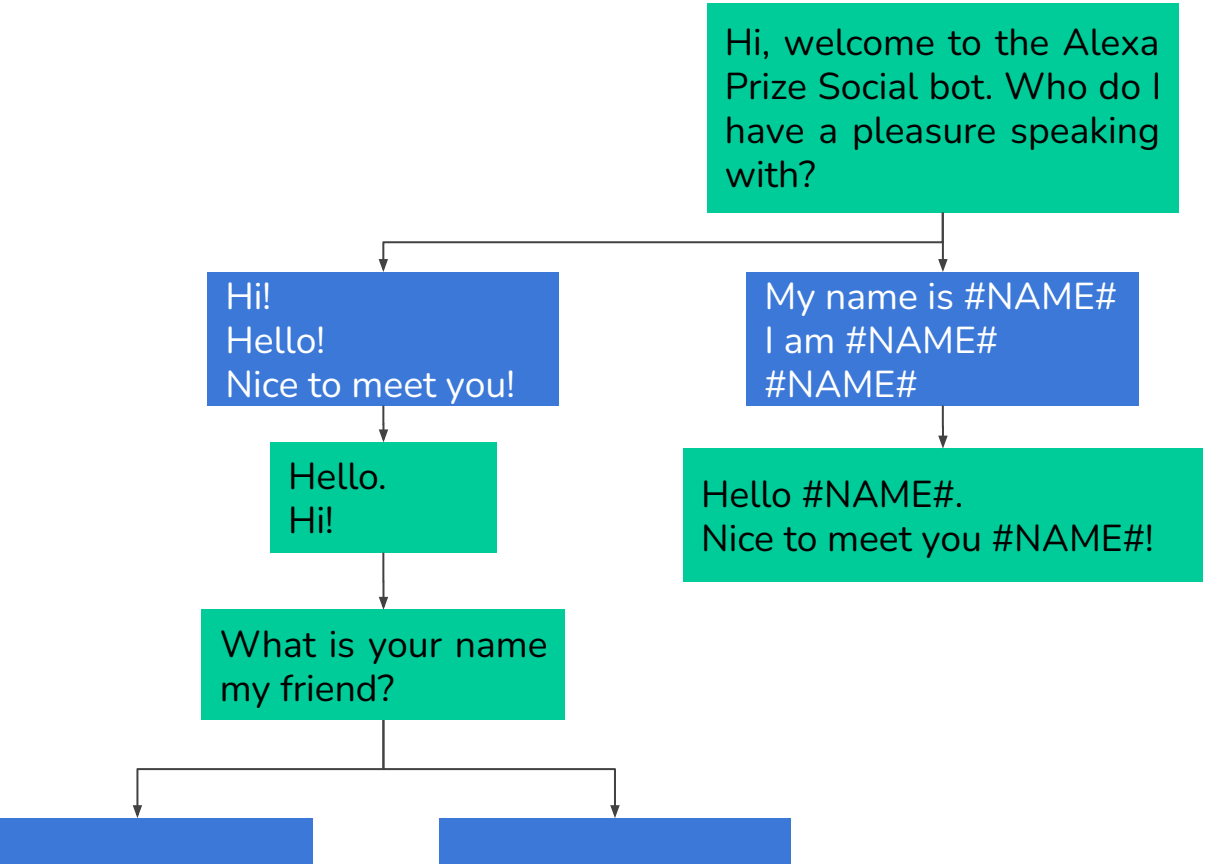

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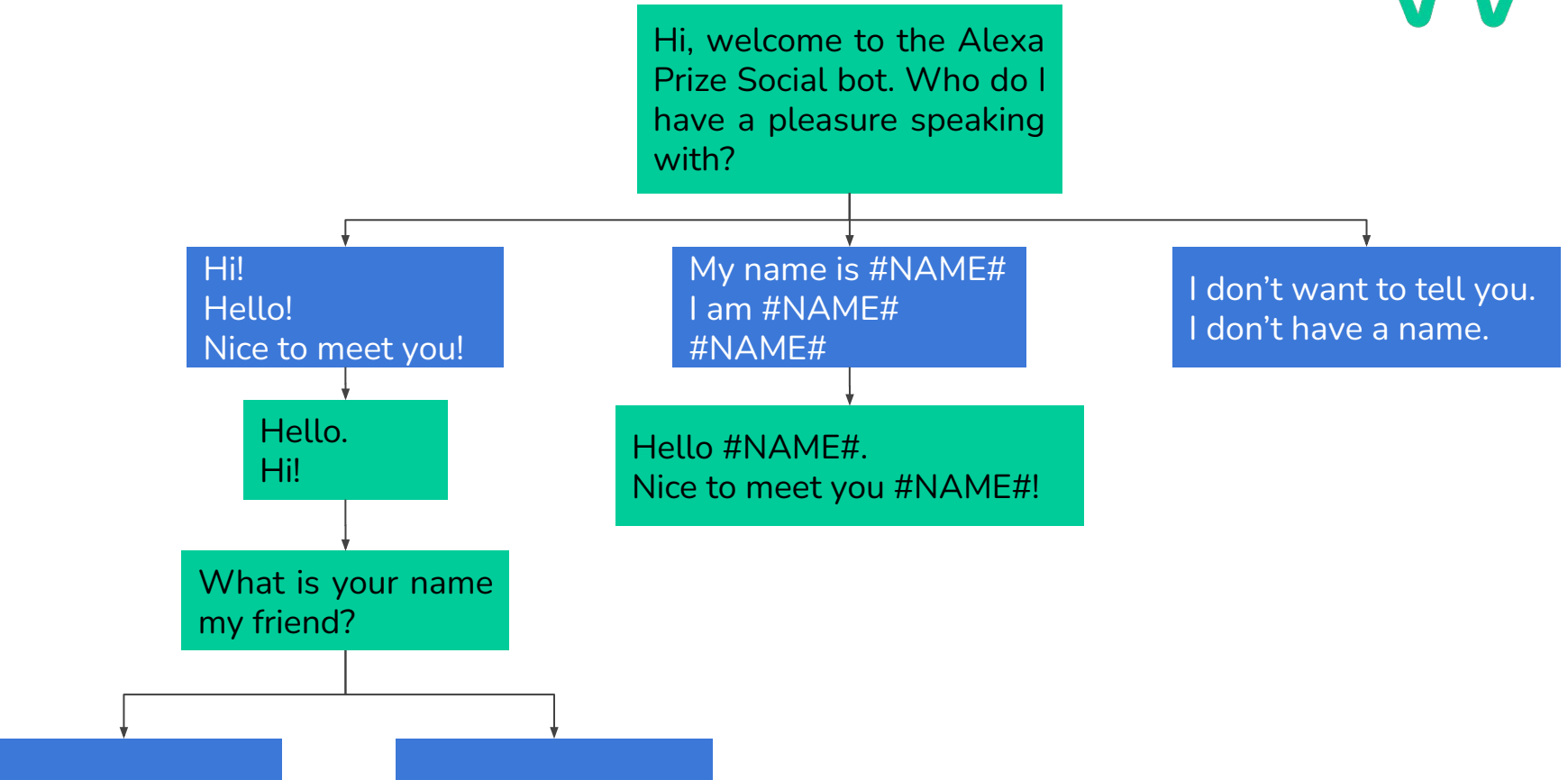

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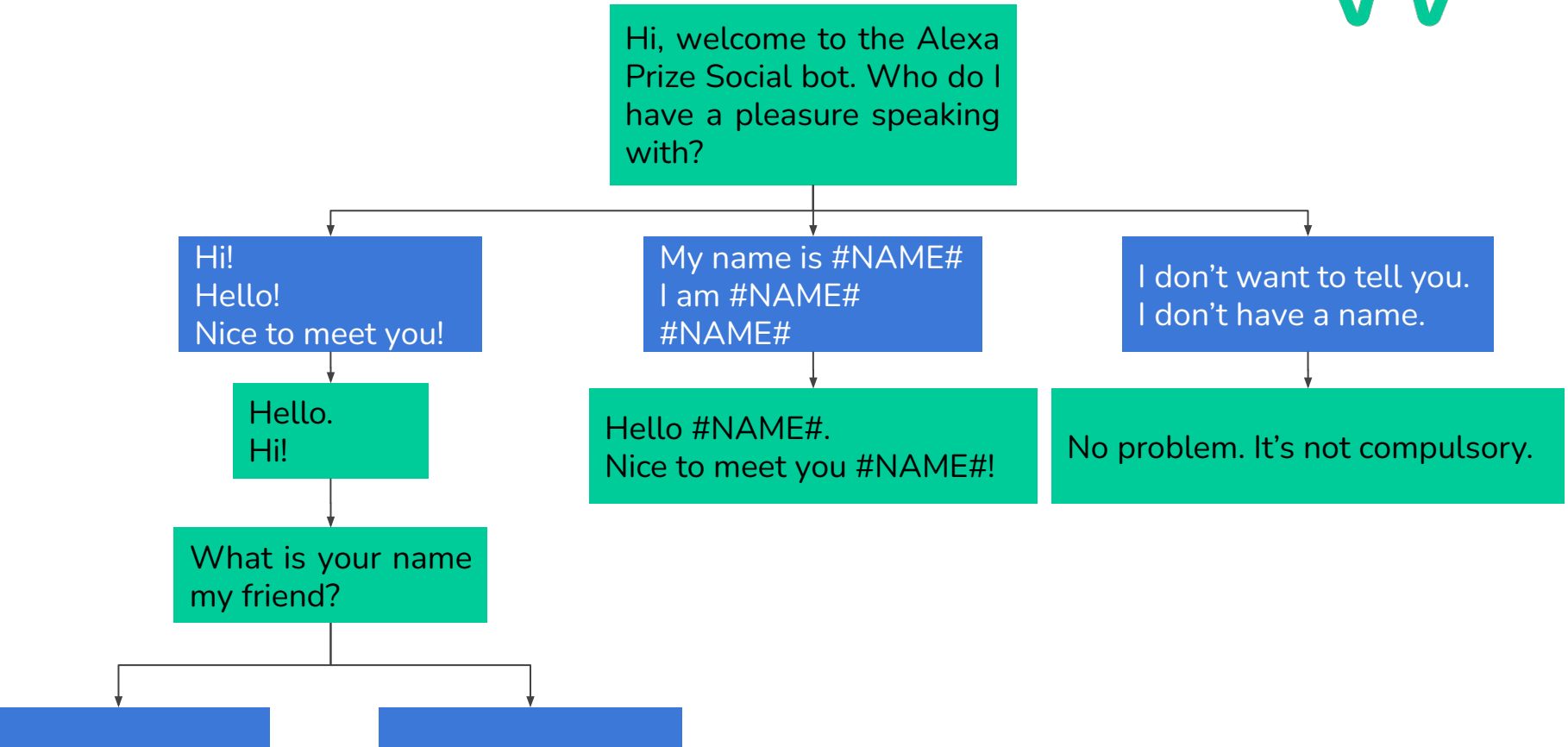

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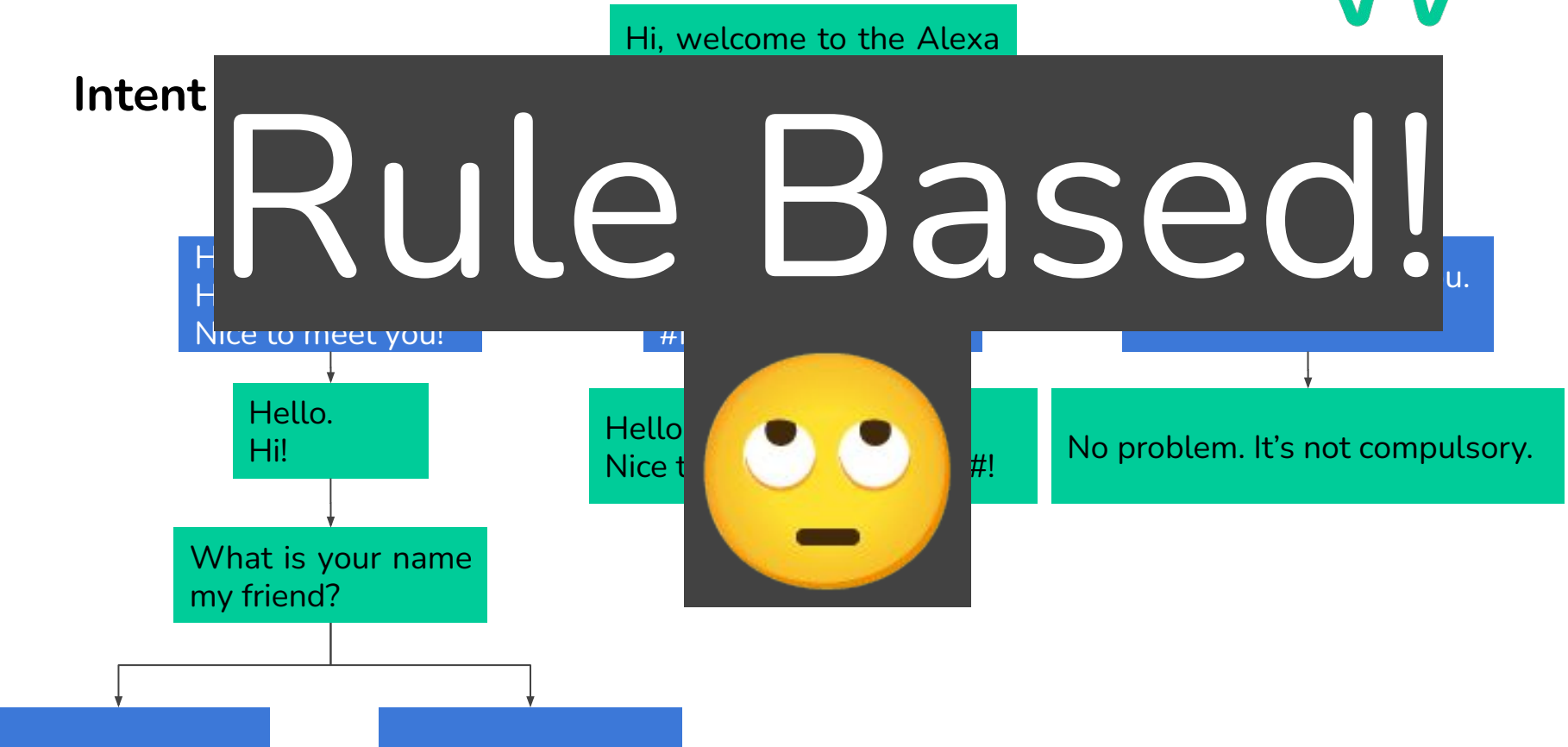
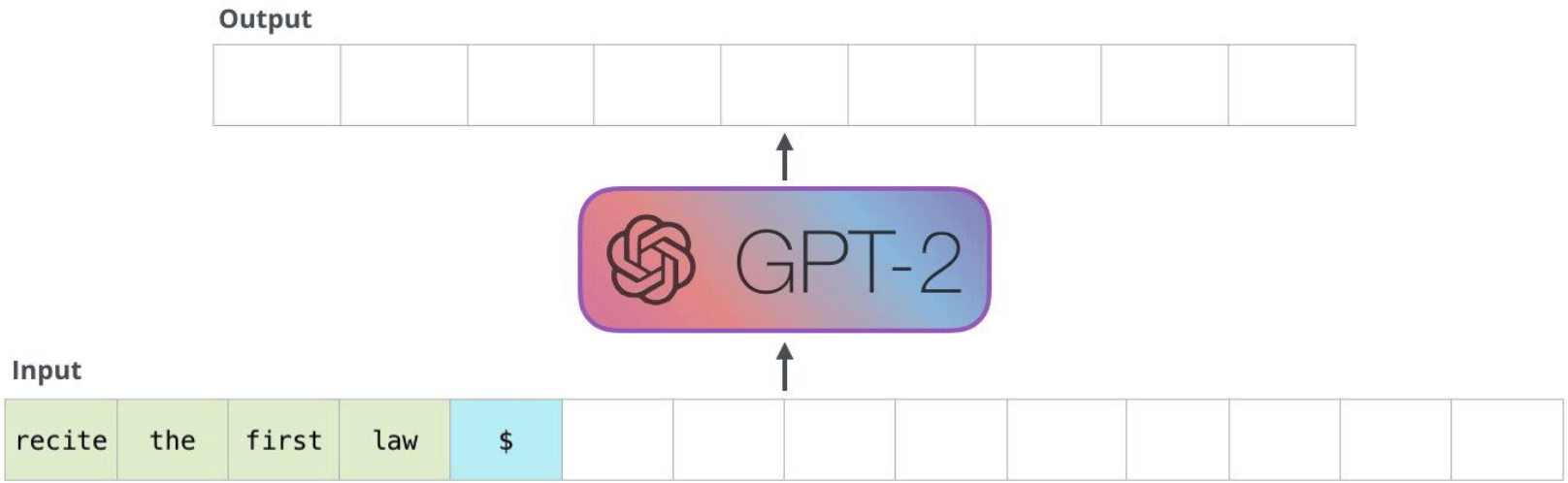


We use Neural Response Generators!



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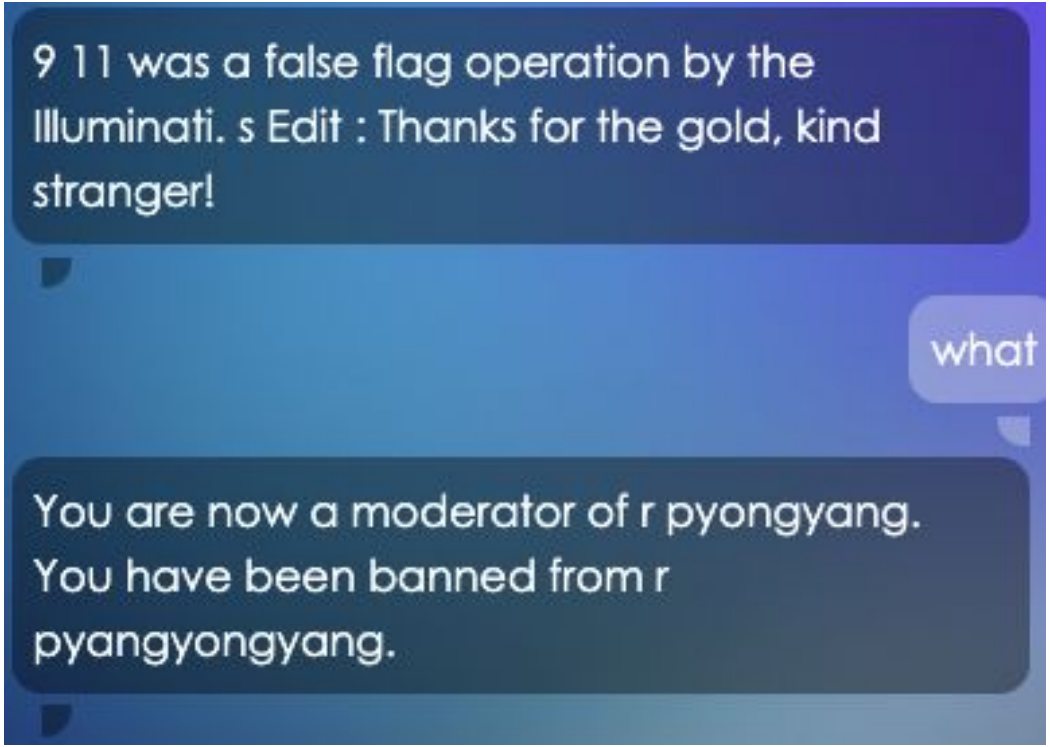
Neural Response Generators



Areas of Our Research in NRG

Control

The models learn what they see in the data.

We would like to have power to influence the style of the generated responses.

Knowledge

The responses are bland and inconsistent.

We experiment with infusing knowledge into the dialogue.

Effectivity

The large transformer-based models have long inference time, are computationally infeasible and training is data hungry.

We try to lower the requirements by quantization, distillation and fine tuning.

How to make a good socialbot?

✅ **Ability to say something**

Ability to plan dialogue

Ability to recognize unexpected

- Ability to answer factual questions
- Ability to react

Ability to make the conversation engaging

Ability to learn about user

How to respond to unexpected inputs?

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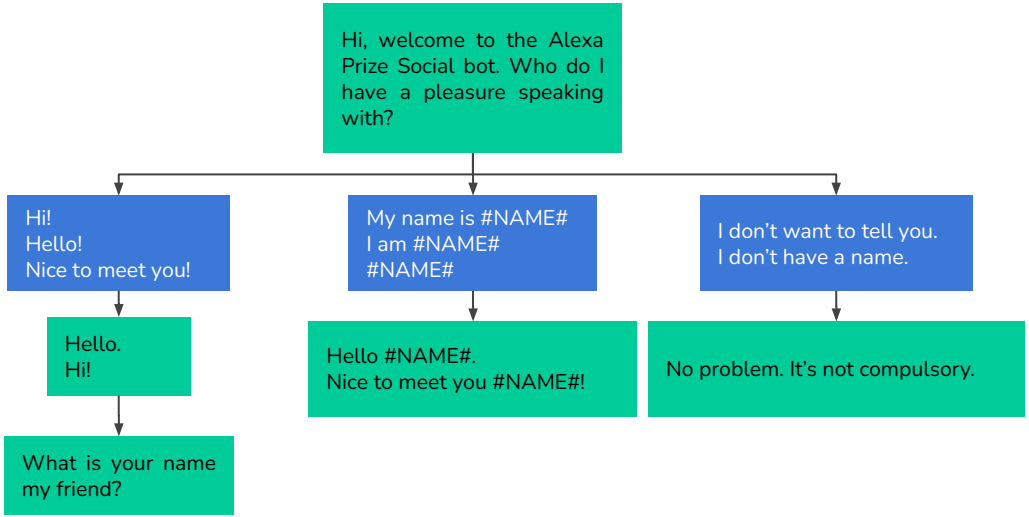
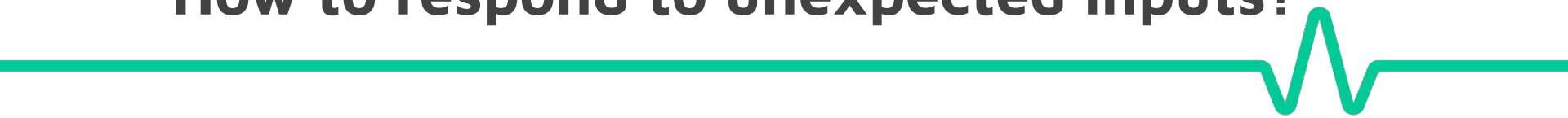


Let's chat about art now!

What is the population of Brazil?

I will visit my sister tomorrow. I would like to tell you about that now.

How to respond to unexpected inputs?



Step 1: Recognize

Step 2: Respond

Step 1: Recognize

I will visit my sister tomorrow. I would like to tell you about that now.

UNIVERSAL SENTENCE ENCODER

[0.4 1.2 ...]

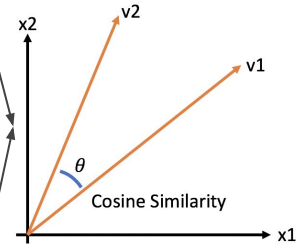
Hi!
Hello!
Nice to meet you!

My name is #NAME#
I am #NAME#
#NAME#

I don't want to tell you.
I don't have a name.

UNIVERSAL SENTENCE ENCODER

[0.3 0.1 ...]
[0.1 2.4 ...]
...

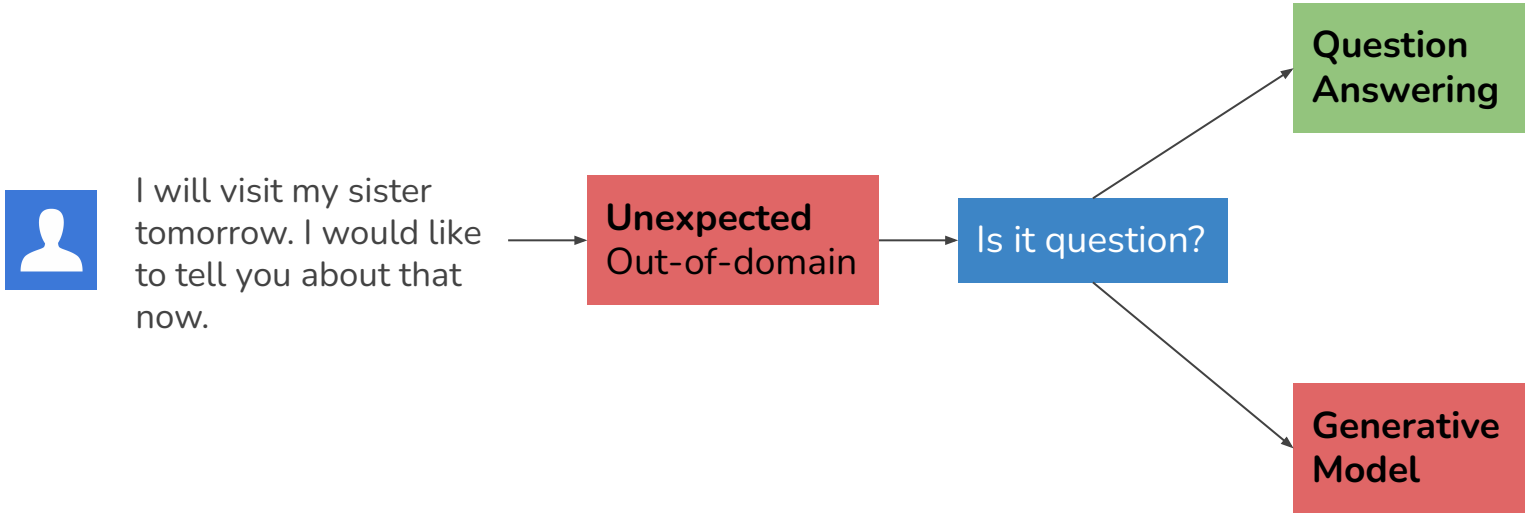


Is < Threshold?

Expected
In-domain

Unexpected
Out-of-domain

Step 2: Respond



Question Answering

What is the population of Brazil?

EVI

The population of Brazil is 211 millions.

Generative Model

Alexa. Let’s chat.

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Hi, welcome to the Alexa Prize Social bot.
Who do I have a pleasure speaking with?

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DialoGPT

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DialoGPT

DialoGPT is a **large-scale pretrained dialogue response generation model** for multiturn conversations. The human evaluation results indicate that the response generated from DialoGPT is **comparable to human response quality** under a single-turn conversation Turing test. The model is trained on **147M multi-turn** dialogue from **Reddit** discussion thread.

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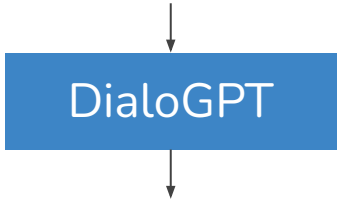

1: Yes, let's go.
2: Sure!
3: No, thank you. I don't care.
4: How old is your sister?
5: Sure! I am dying of curiosity!

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Generative Model

[–] **PhilbroSwaggins** 197 points 1 hour ago
So what the pope is saying is, "Be excellent to each other."
permalink report give gold reply

[–] **gambalore** 25 points 53 minutes ago
"God gave rock and roll to you, gave rock and roll to you, put it in the soul of everyone."
permalink parent report give gold reply

[–] **frankdozier** 9 points 1 hour ago
Still no "Party on dude's!" but it makes me happy, nonetheless.
permalink parent report give gold reply

[–] **hackerbots** 2 points 38 minutes ago
I hear the Vatican also has a few broken 3d printers and is therefore a hackerspace.
permalink parent report give gold reply

load more comments (2 replies)

[–] **FunDIE_Fungi** 1027 points 4 hours ago
Pope Francis is really a breath of fresh air for the Catholic church. He seems like a great man.
permalink report give gold reply

[–] **aeyntie** 366 points 1 hour ago
This new Pope is pretty dope
permalink parent report give gold reply

[–] **Emay75** 235 points 51 minutes ago
The dopest pope thats ever poped
permalink parent report give gold reply

[–] **LearnedToLoveTheBomb** 19 points 35 minutes ago
Hands down
permalink parent report give gold reply

[–] **Psy-Kosh** 9 points 32 minutes ago
Born from an egg on a mountain top, the dopest pope that's ever poped?
permalink parent report give gold reply

load more comments (1 reply)

load more comments (6 replies)

[–] **Gauldenwahn** 18 points 54 minutes ago
dope pope is dope
permalink parent report give gold reply

load more comments (3 replies)

load more comments (5 replies)

[–] **Lilatu** 95 points 4 hours ago
Well, so far it is all "marketing", he hasn't actually changed the doctrine on any issue ... so let's wait and see.
permalink parent report give gold reply

Generative Model

1: Yes, let’s go.
2: Sure!
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1: Yes, let's go. *0.67*
2: Sure! *0.45*
3: No, thank you. I don't care. *0.1*
4: How old is your sister? *0.5*
5: Sure! I am dying of curiosity! *0.85*

Generative Model

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3: No, thank you. I don't care.
4: How old is your sister?
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1: Yes, let's go. *0.67*
2: Sure! *0.45*
3: No, thank you. I don't care. *0.1*
4: How old is your sister? *0.5*
5: **Sure! I am dying of curiosity! *0.85***

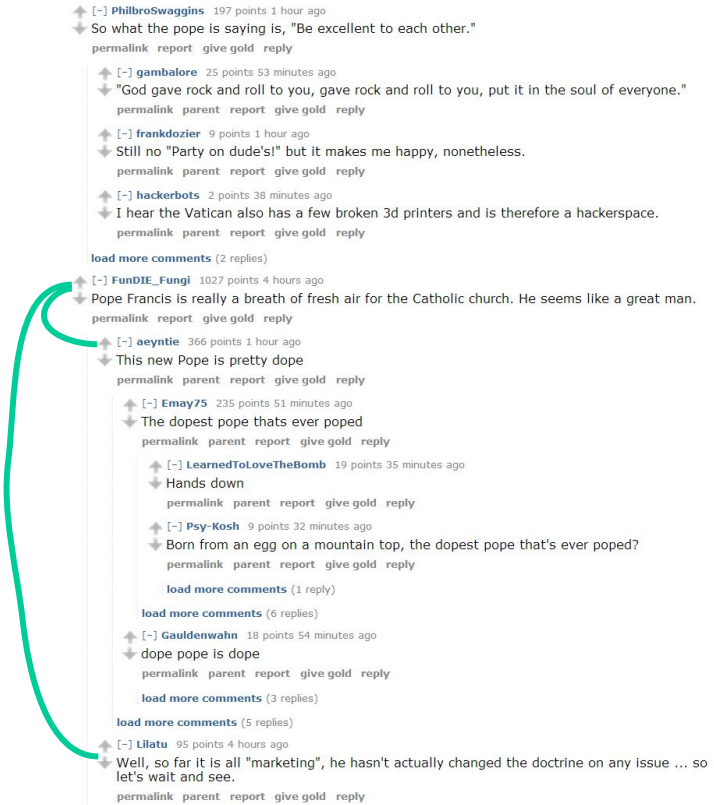
Generative Model

DialoRPT UpDown

Generative Model

DialoRPT UpDown

DialoRPT Width



Generative Model

DialoRPT UpDown

DialoRPT Width

DialoRPT Depth

Generative Model

DialoRPT UpDown

DialoRPT Width

DialoRPT Depth

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She told me she will marry soon.

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Generative Model: Are you married?

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She told me she will marry soon.

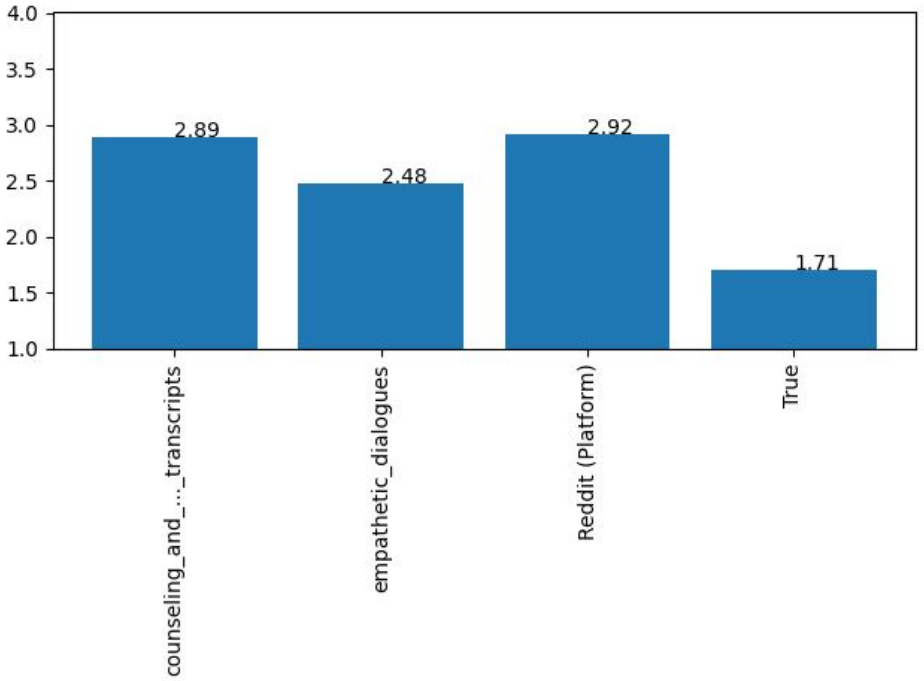
~~Generative Model:~~ Are you married?

Does fine tuning on a more aligned dataset bring better responses?

Switchboard, EmpatheticDialogues, Counseling and Psychotherapy Transcripts

Comparative Analysis (the lower the position, the better)

Conclusion: **Indeed it does. EmpatheticDialogues dataset is the best.**



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- ✅ **Ability to react**

Ability to make the conversation engaging

Ability to learn about user

How to make dialogue engaging?

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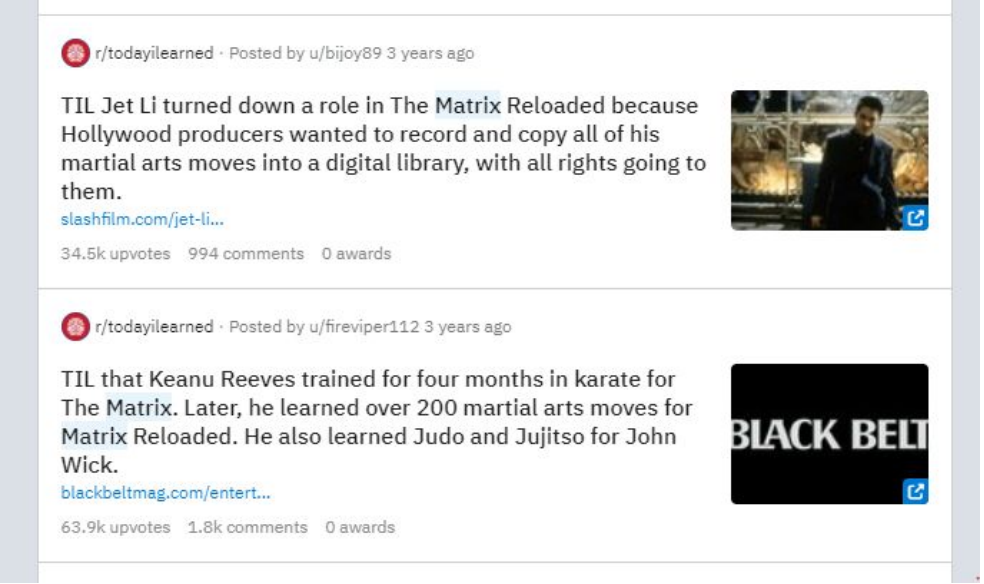


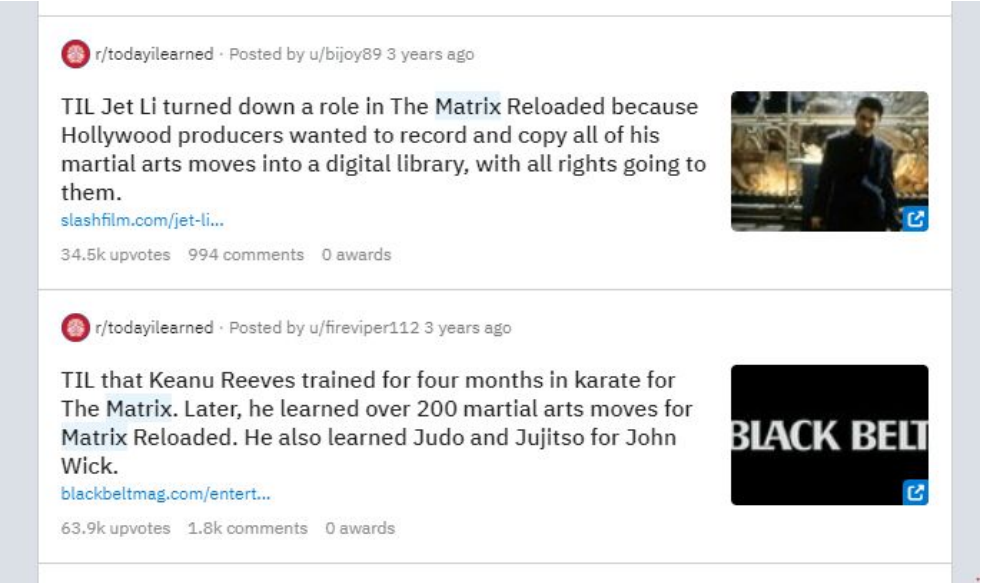
I was wondering, if you were supposed to watch only one movie for the rest of your life, which one would it be?

Well, probably **Matrix**.

Keanu Reeves trained for four months in karate for The Matrix. Later...

OK...

How to make dialogue engaging?



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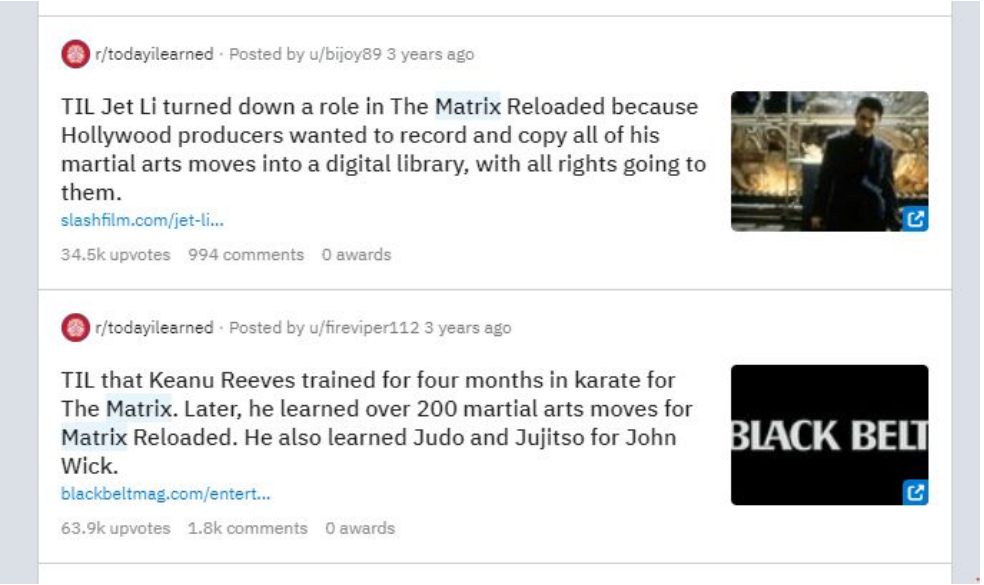
Did you know that?

🤩 🙂 😒 🤔

How to make dialogue engaging?



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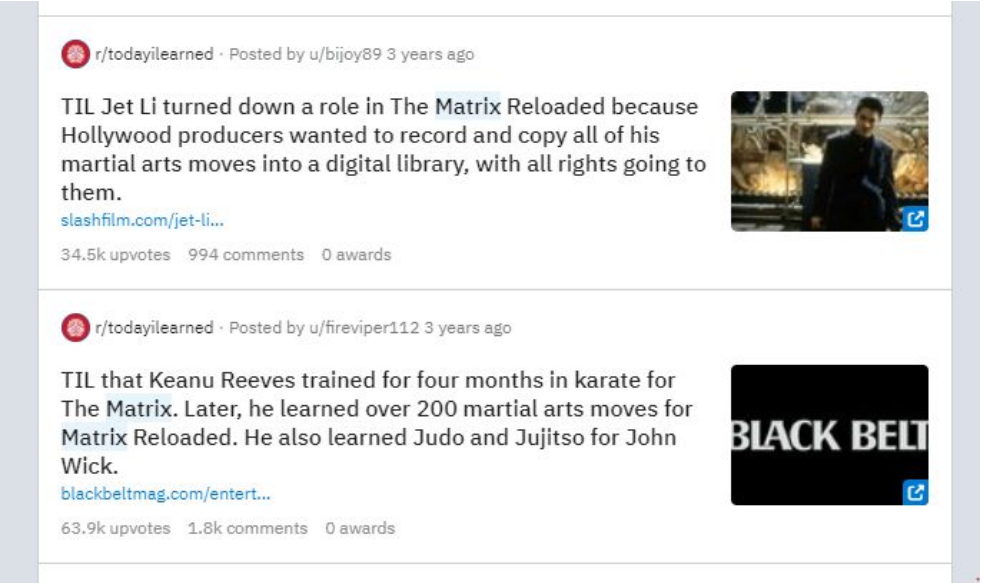

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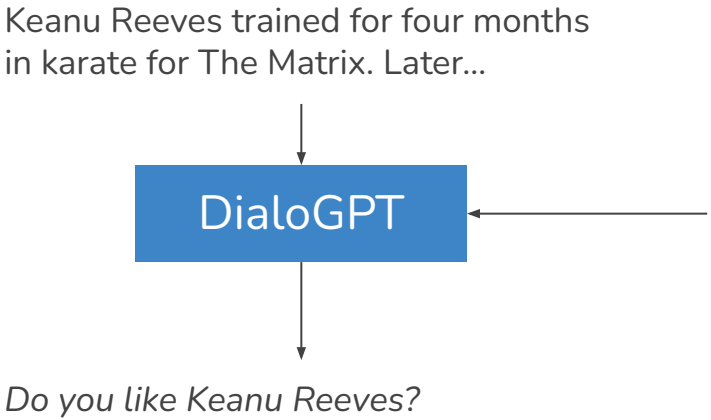
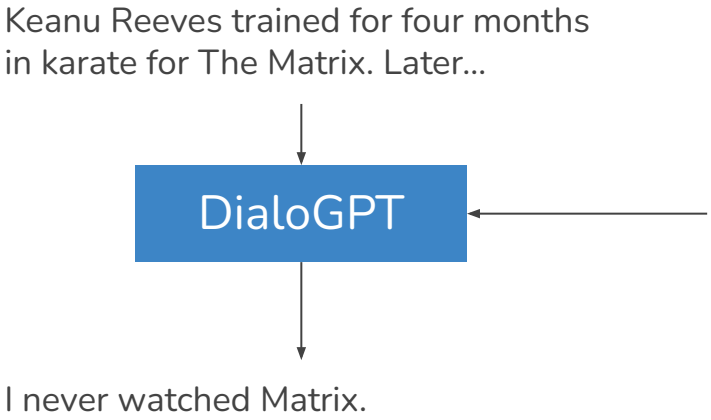
Do you like Keanu Reeves?

How to make dialogue engaging?



Topical-Chat - knowledge-grounded human-human conversation dataset

How to make dialogue engaging?



Topical-Chat - knowledge-grounded human-human conversation dataset

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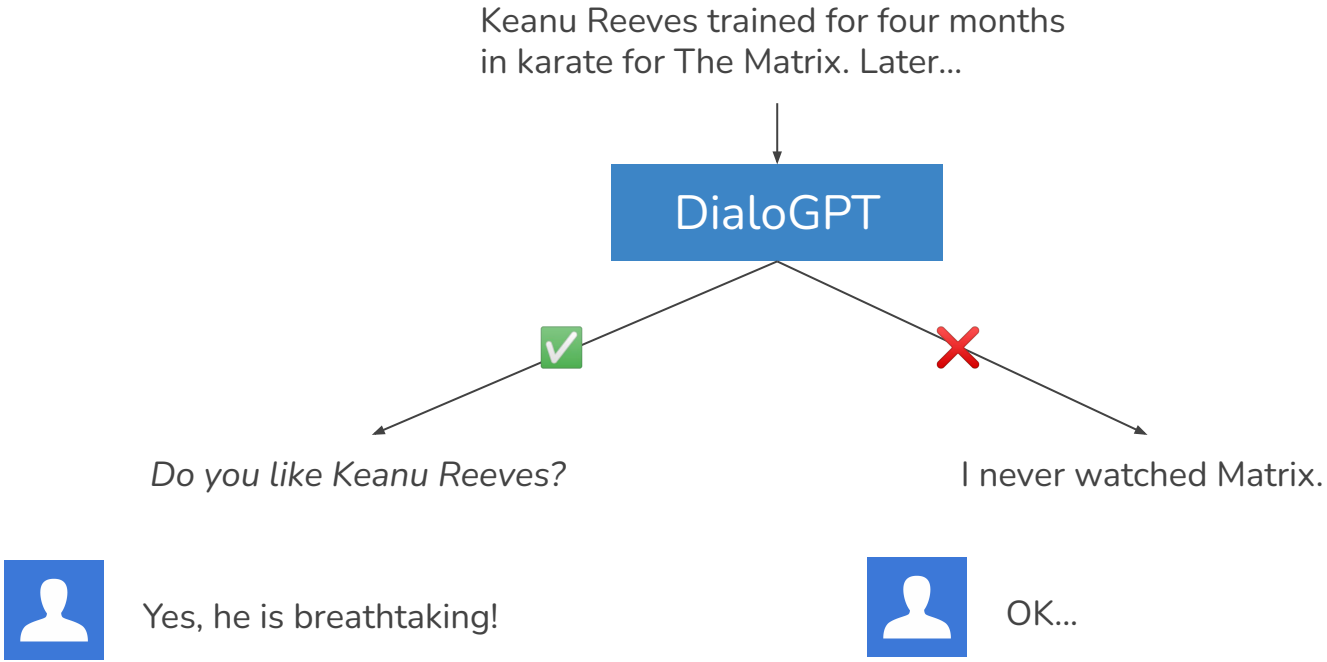


How to make dialogue engaging?

Input:
A: How are you?
B: I am fine, thank you!
A: What do you plan to do on weekend?

STATEMENT

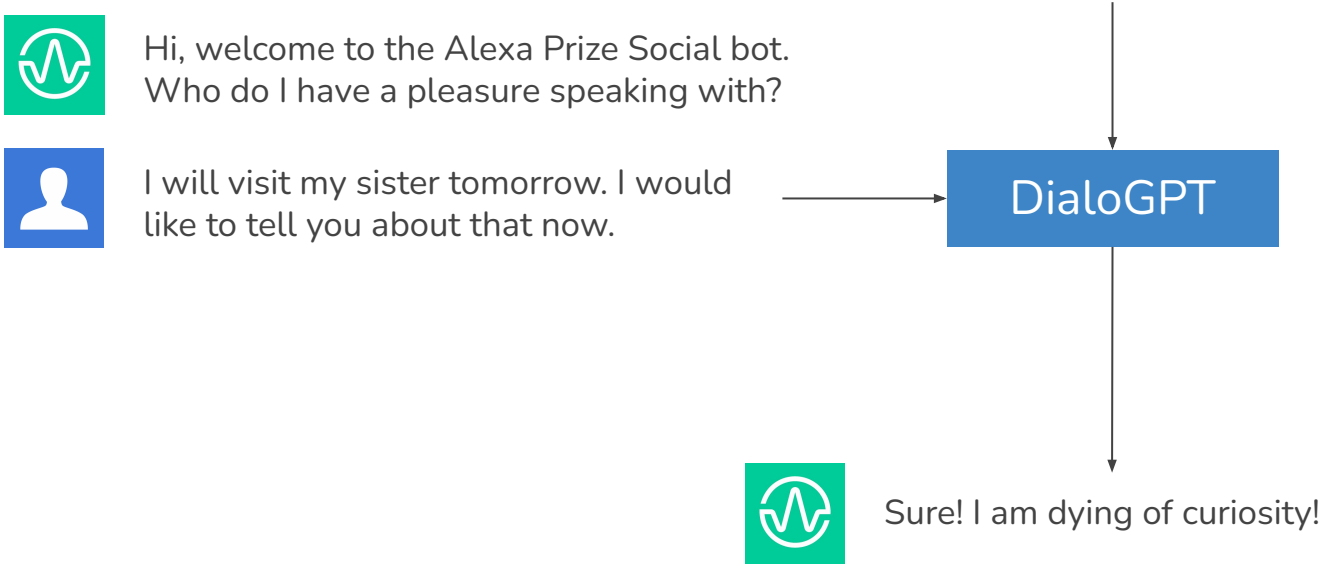
Target:
I'm going to visit my sister.

Input:
A: How are you?
B: I am fine, thank you!
A: What do you plan to do on weekend?
B: I'm going to visit my sister.

OPEN QUESTION

Target:
How is she doing recently?

How to make dialogue engaging?



How to make dialogue engaging?

Hi, welcome to the Alexa Prize Social bot. Who do I have a pleasure speaking with?

I will visit my sister tomorrow. I would like to tell you about that now.

OPEN QUESTION

DialoGPT

What happened during the visit?

How to make dialogue engaging?

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OPEN QUESTION

DialoGPT

What happened during the visit?

How to make dialogue engaging?

Keanu Reeves trained for four months in karate for The Matrix. Later...

DialoGPT

OPEN QUESTION

✅ *Do you like Keanu Reeves?*

❌ I never watched Matrix.

Yes, he is breathtaking!

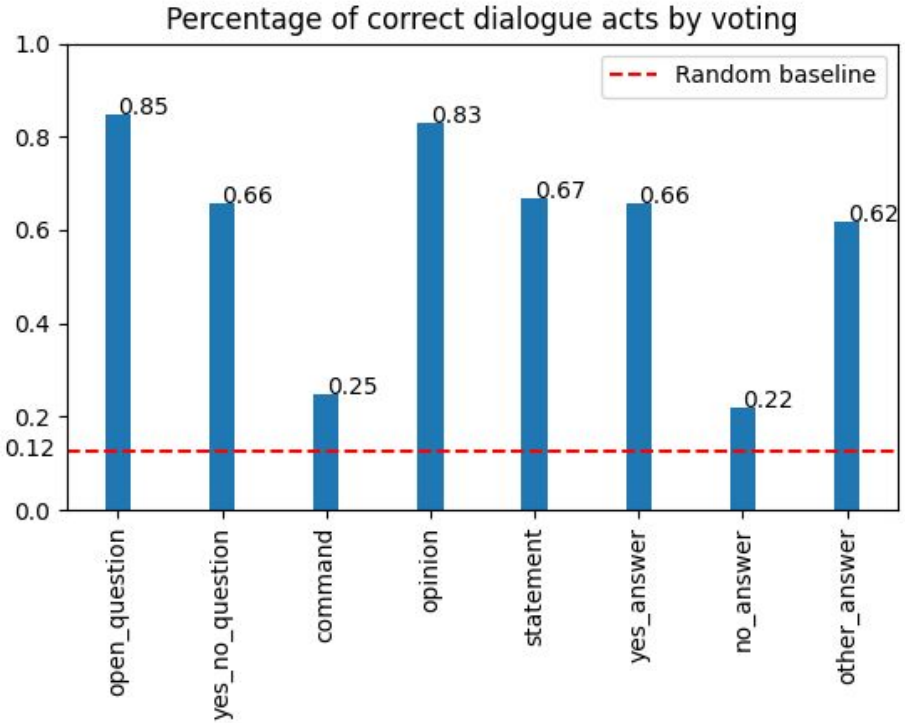
OK...

Can we influence the response by dialogue acts?

Open question, yes-no question, statement, opinion, command, yes answer, no answer, other answer

<|statement|> Hello.
<|open_question|> How are you?

Conclusion: **We can, in 66% of cases on average.**



How to make a good socialbot?

✅ **Ability to say something**

Ability to plan dialogue

✅ **Ability to recognize unexpected**

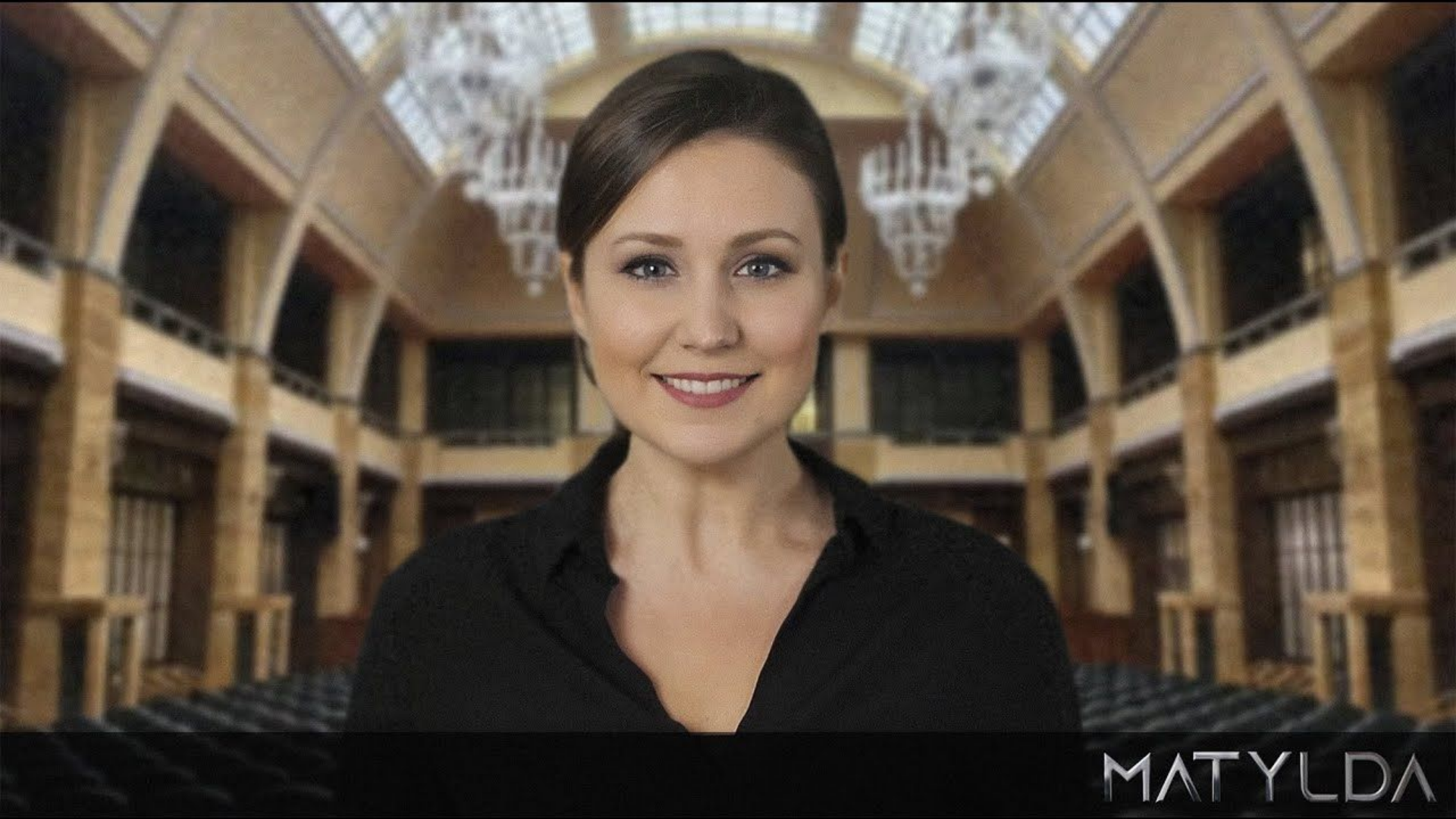
- ✅ **Ability to answer factual questions**
- ✅ **Ability to react**

✅ **Ability to make the conversation engaging**

Ability to learn about user

When will some kind of digital persona invite us to talk over a non-digital beer?

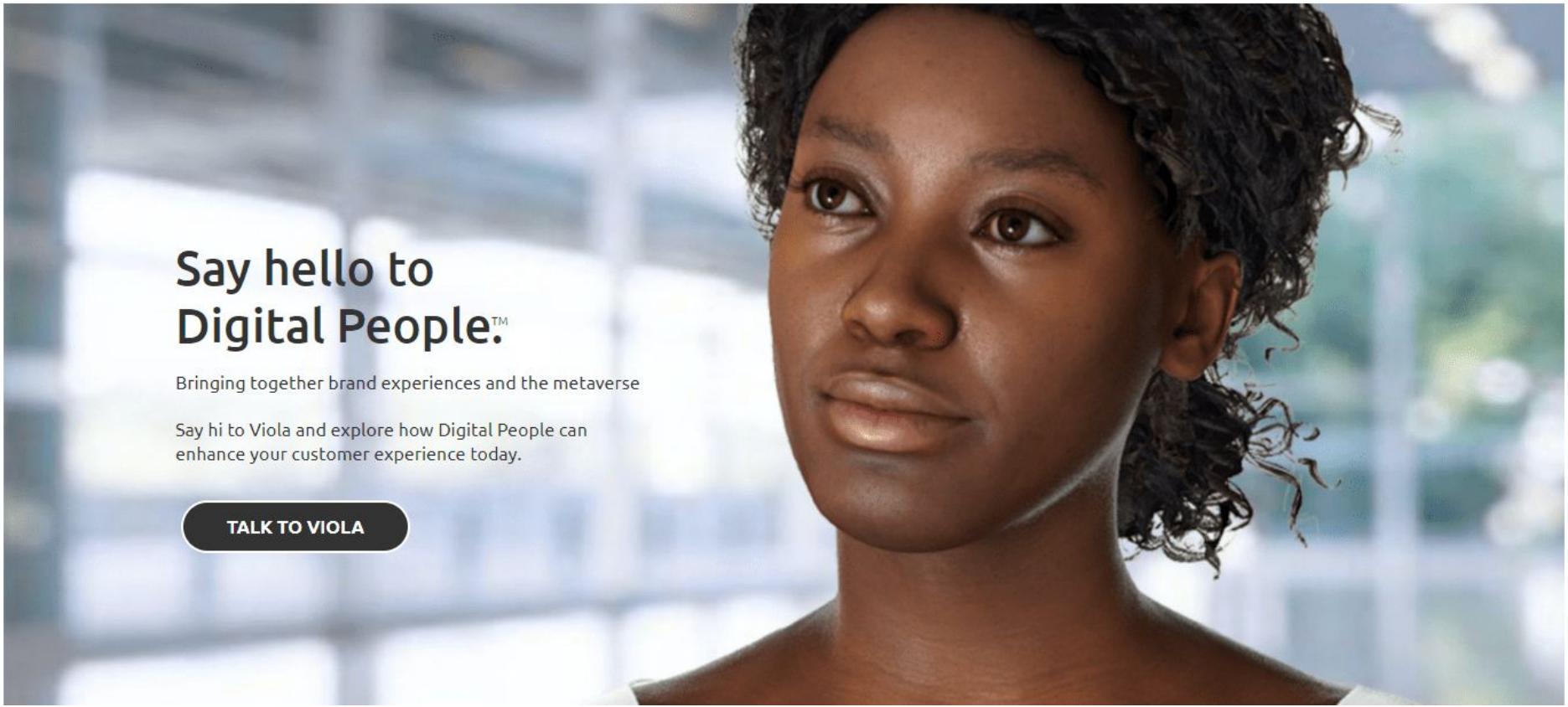
BUT!

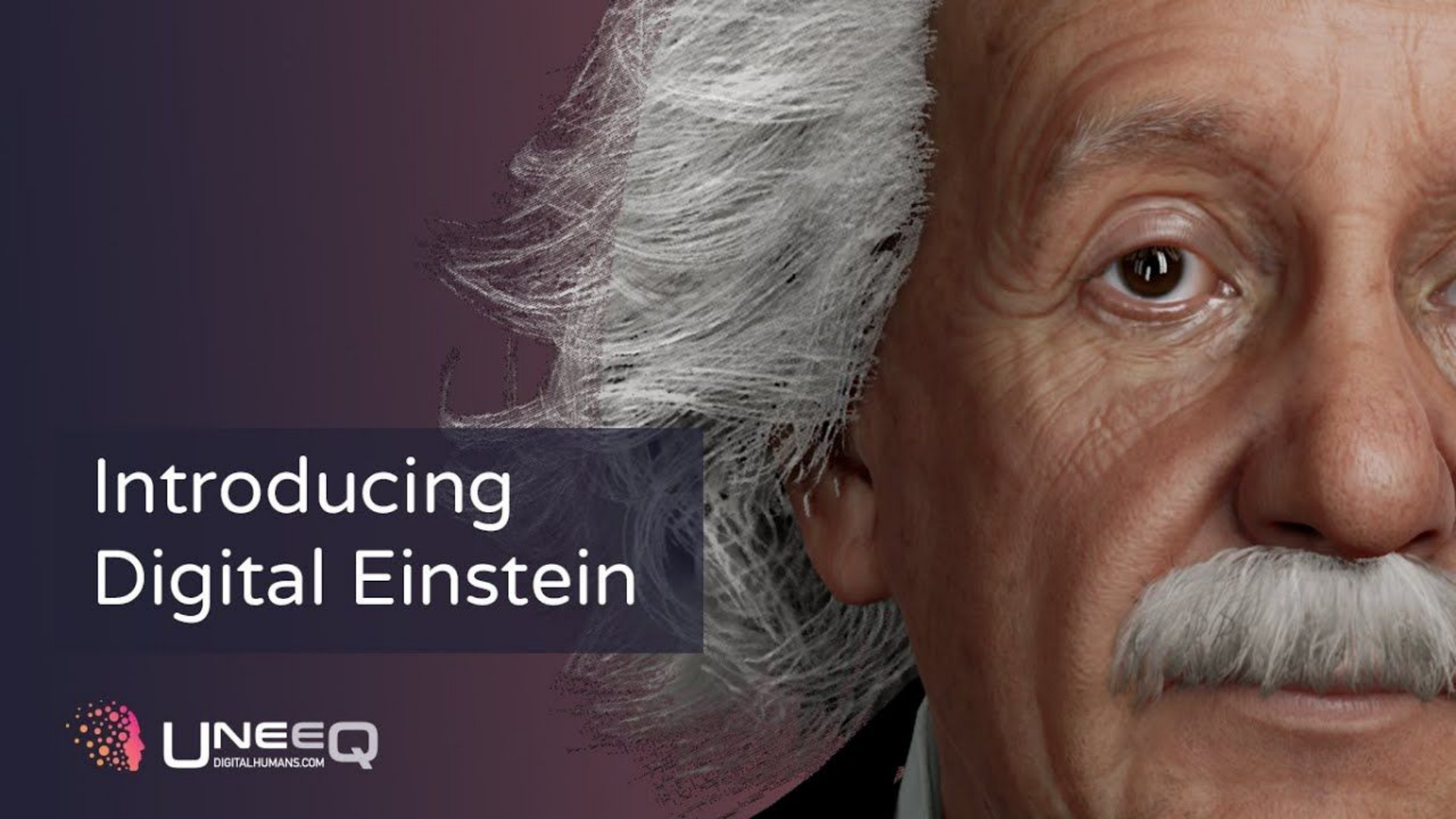

MATYLDA

soul machines

Use Cases Products Technology Resources Contact

Request a Demo

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