

The day after COVID-19 is defeated

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Somewhere on Stanford campus



**Gio (User)**



**Gio (User)**

I want an Italian restaurant nearby.



**Gio (User)**

I want an Italian restaurant nearby.



**Almond (VA)**



**Gio (User)**

I want an Italian restaurant nearby.

Mmm ...  
I found this restaurant:  
name=Terún,  
cuisine=Italian,  
price=moderate,  
location=California Ave.



**Almond (VA)**



**Gio (User)**

I want an Italian restaurant nearby.

Mmm ...  
I found this restaurant:  
name=Terún,  
cuisine=Italian,  
price=moderate,  
location=California Ave.



**Almond (VA)**

I should ask if he wants to make a reservation.



**Gio (User)**

I want an Italian restaurant nearby.



**Almond (VA)**





**Gio (User)**

I want an Italian restaurant nearby.

I see Terún.  
It is a moderate Italian restaurant in the area.  
Would you like me to book the restaurant for you?



**Almond (VA)**



**Gio (User)**

I want an Italian restaurant nearby.



**Gio (User)**

I see Terún.  
It is a moderate Italian restaurant in the area.  
Would you like me to book the restaurant for you?



**Almond (VA)**



**Gio (User)**

I want an Italian restaurant nearby.

I see Terún.  
It is a moderate Italian restaurant in the area.  
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**Almond (VA)**



**Gio (User)**

No, give me something more luxurious.



**Gio (User)**

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**Almond (VA)**



**Gio (User)**

No, give me something more luxurious.



**Almond (VA)**



Gio (User)

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I see Terún.  
It is a moderate Italian restaurant in the area.  
Would you like me to book the restaurant for you?



Almond (VA)



Gio (User)

No, give me something more luxurious.

I found this restaurant:  
name=Vina Enoteca,  
cuisine=Italian,  
price=expensive,  
location=Palo Alto



Almond (VA)



Gio (User)

I want an Italian restaurant nearby.

I see Terún.  
It is a moderate Italian restaurant in the area.  
Would you like me to book the restaurant for you?



Almond (VA)



Gio (User)

No, give me something more luxurious.

I found this restaurant:  
name=Vina Enoteca,  
cuisine=Italian,  
price=expensive,  
location=Palo Alto

This is the second time,  
I should be  
**concise**



Almond (VA)



Gio (User)

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I found this restaurant:  
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Gio didn't like my first suggestion. I need to reflect this in my **sentiment**

This is the second time, I should be **concise**



Almond (VA)



**Gio (User)**

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**Almond (VA)**



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Almond (VA)



Gio (User)

No, give me something more luxurious.

I see Vina Enoteca.  
It is an expensive Italian restaurant in the area.  
Would you like me to book the restaurant for you?



Almond (VA)

How about Vina Enoteca? It is more expensive.  
Should I make the reservation?



Gio (User)

I want an Italian restaurant nearby.

I see Terún.  
It is a moderate Italian restaurant in the area.  
Would you like me to book the restaurant for you?



Almond (VA)



Gio (User)

No, give me something more luxurious.

I see Vina Enoteca.  
It is an expensive Italian restaurant in the area.  
Would you like me to book the restaurant for you?

How about Vina Enoteca? It is more expensive.  
Should I make the reservation?

How about Vina Enoteca? It will be an upscale dining experience!  
Should I make the reservation now?



Almond (VA)

# Controllable and Natural Response Generation for VAs

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- We have:
  - A large set of synthetic dialogues for the restaurants domain
  - In each turn, a superset of what VA needs to say back to the user in ThingTalk code
  - A baseline model that converts ThingTalk code to natural sentences

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  - In each turn, a superset of what VA needs to say back to the user in ThingTalk code
  - A baseline model that converts ThingTalk code to natural sentences
- **Question:** How do we choose what to say, and how to say it?
- We want a neural model that:
  - receives ThingTalk code and desired attributes (sentiment, etc.) as input
  - generates informative natural sentences with those attributes

# Challenges



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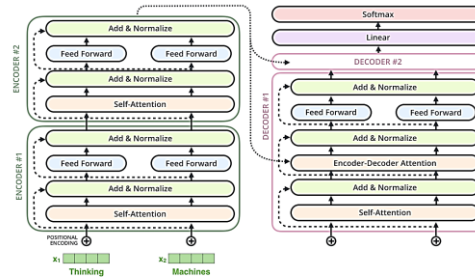
# Challenges

- **Unlike** prior work on chitchat dialogue datasets like PersonaChat, the virtual assistant needs to
  - provide accurate information
  - always stay on topic
- Available in-domain data is limited in terms of variety of attributes.
- Automatic evaluation metrics do not always correlate with human judgment

# Tools to Find a Solution

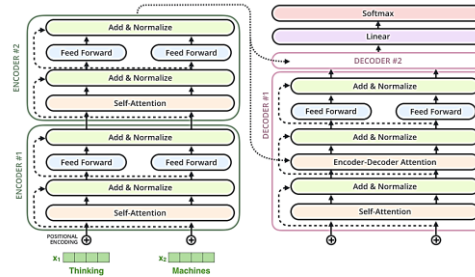
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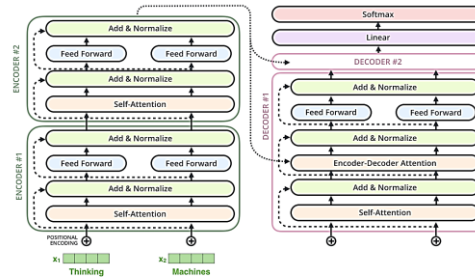
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# Tools to Find a Solution

- Natural Language Processing
- Heavy use of pretrained language models like BERT and GPT-2
- Use of out-of-domain sentiment analysis, summarization, and sentence compression datasets
- Human evaluation on Amazon Mechanical Turk

