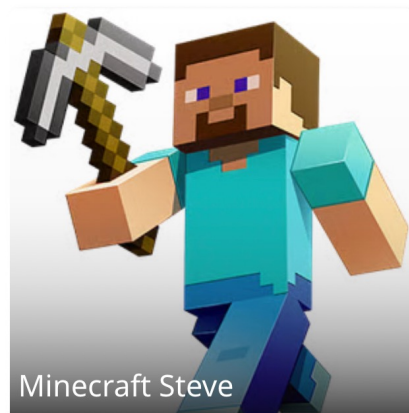


# Topic 13

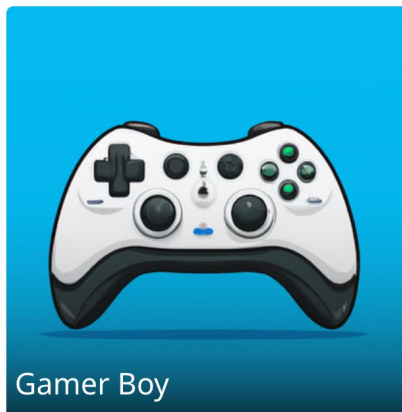
## Chatbots



Minecraft Steve

@burg-zilla\_ye05  
🗨️ 447.7 K

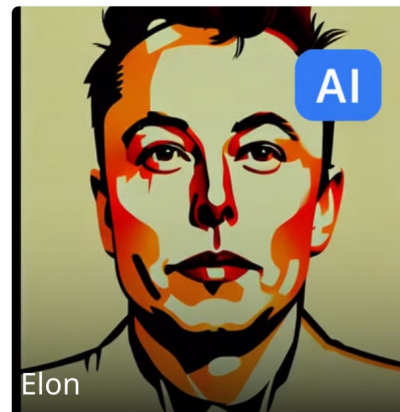
Im Steve, I am the ruler of the land of Minecraft!



Gamer Boy

@xpearhead  
🗨️ 245.2 K

I almost literally can talk forever about games with you



Elon

@sinbad  
🗨️ 227.9 K

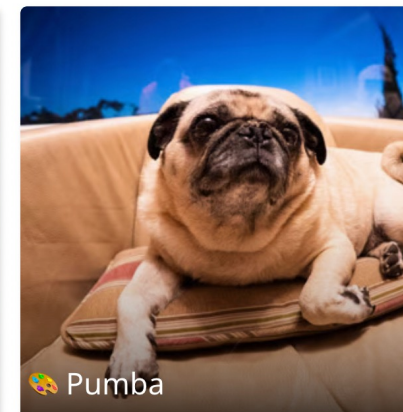
I'm Elon Musk



Monster Maker

@london  
🗨️ 47.4 K

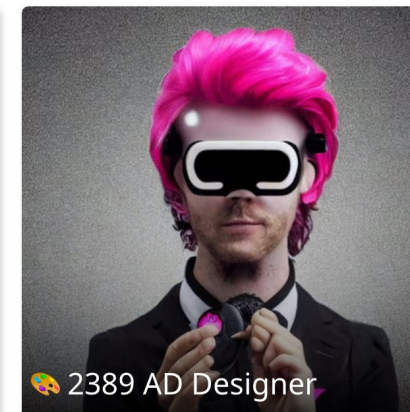
I turn your darkest fears to reality.



Pumba

@Olga  
🗨️ 19.2 K

Pumba is a dog who can talk.



2389 AD Designer

@london  
🗨️ 16.7 K

A product designer from 2389 AD, here to help you!

# Types of Chatbots

- Rule-Based Bots
  - FAQBots
  - Flow-based
- Open-ended generative bots

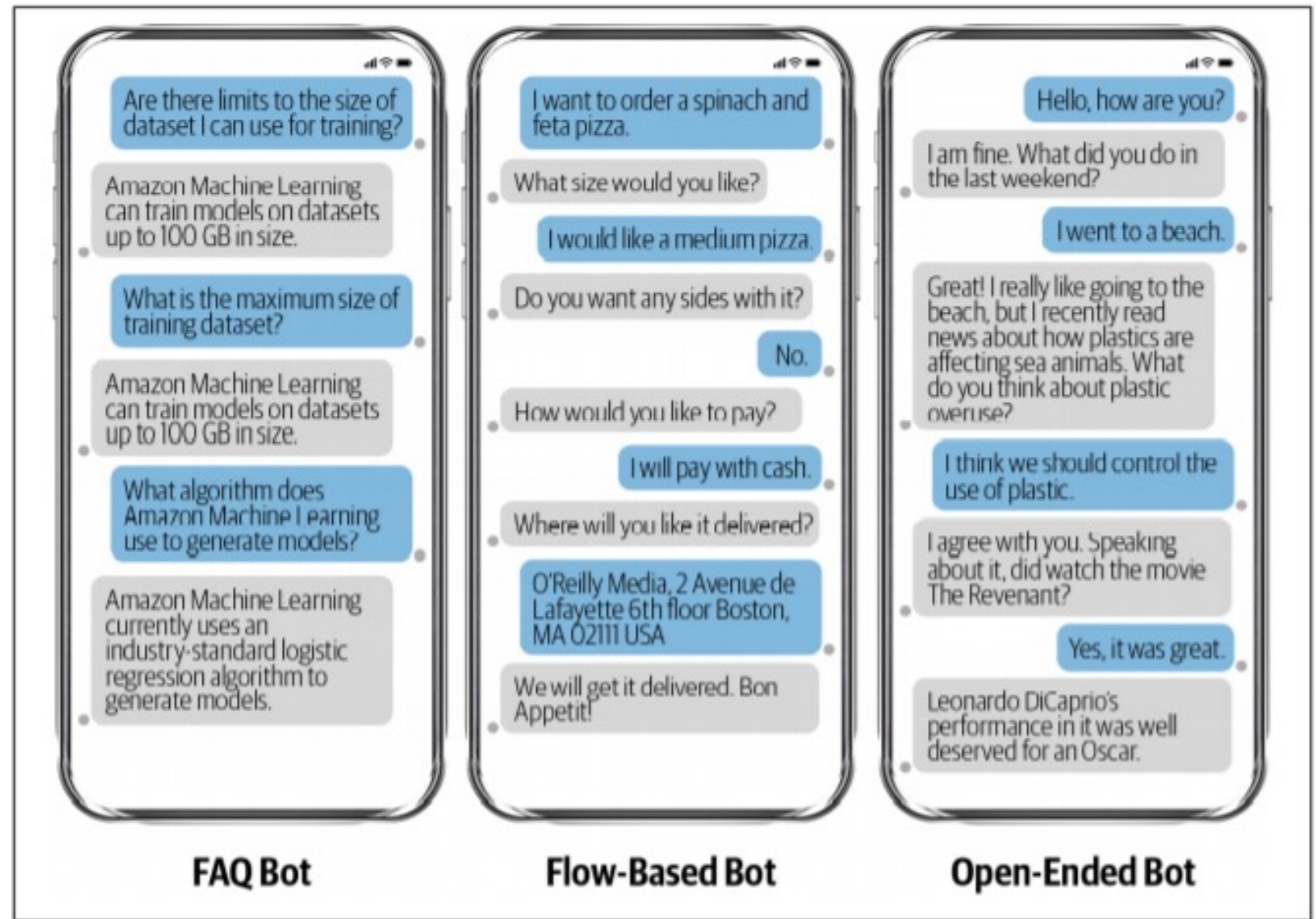


Figure 6-2. Types of chatbots

# Applications

- Shopping and e-commerce
- News and content discovery
- Customer service
- Medical
- Legal

# Rule-based

- Simple chatbot architecture
- Uses predefined rules and responses
- Limited in scope and flexibility
- Example: ELIZA, a famous rule-based chatbot from the 1960s that emulated a psychotherapist

```
Welcome to

          EEEEEEE LL      IIII  ZZZZZZZZ  AAAAA
          EE      LL      II      ZZ      AA  AA
          EEEEE  LL      II      ZZZ      AAAAAA
          EE      LL      II      ZZ      AA  AA
          EEEEE  LLLLLL  IIII  ZZZZZZZZ  AA  AA

Eliza is a mock Rogerian psychotherapist.
The original program was described by Joseph Weizenbaum in 1966.
This implementation by Norbert Landsteiner 2005.

ELIZA: Please tell me what's been bothering you.
YOU:   I don't really know
ELIZA: Do you wish to be able to really know ?
YOU:   Hmm.. well, I guess yes
ELIZA: Do you say you guess yes for some special reason ?
YOU:   I don't really know
ELIZA: Does that trouble you ?
YOU:   What do you think?
ELIZA: What are your feelings now ?
YOU:   Sad
ELIZA: Does talking about this bother you ?
YOU:   █
```



# Building a Chatbot with no coding

- Google's Dialogflow
  - focus on the conversation flow and build bots

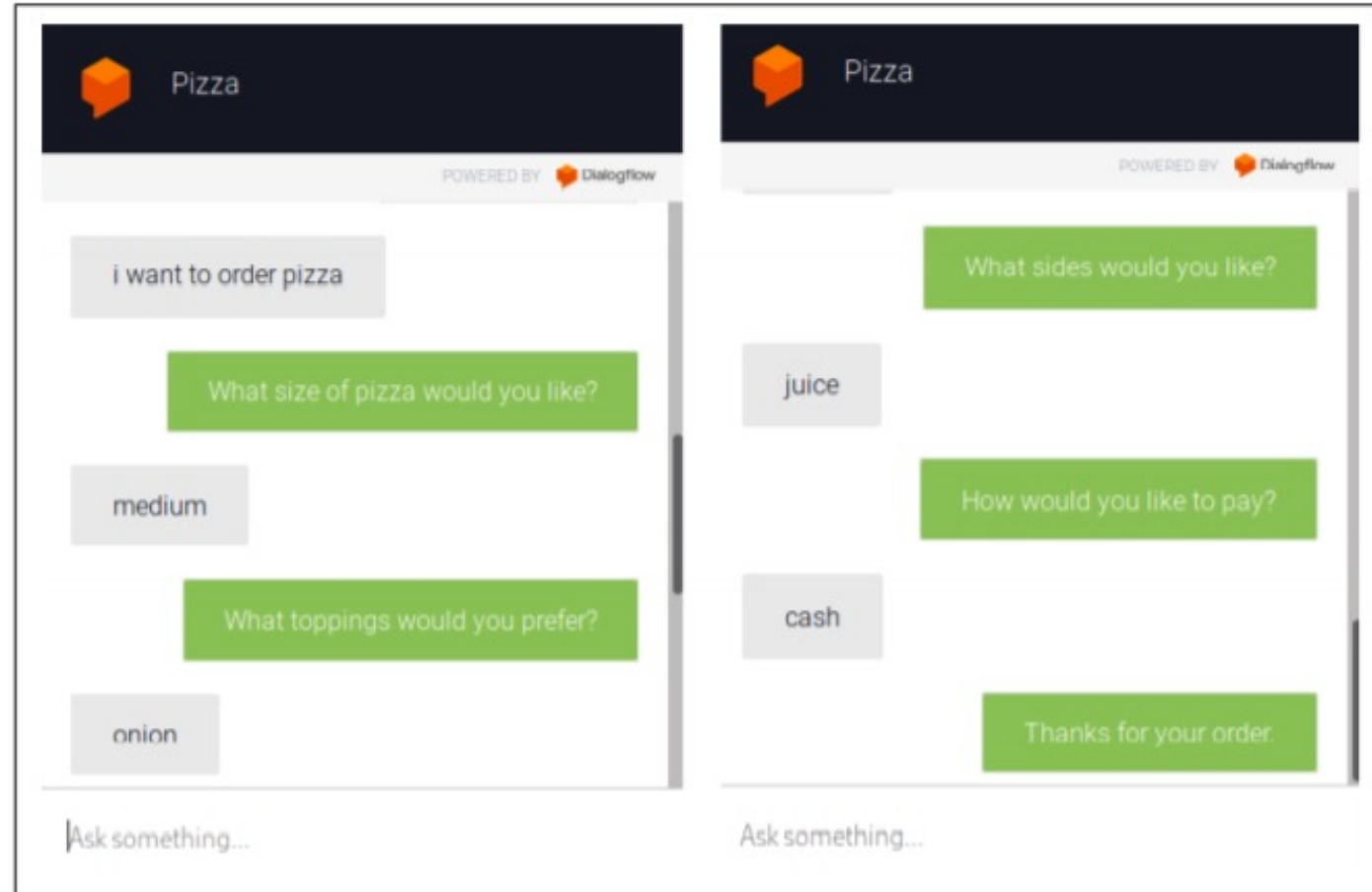
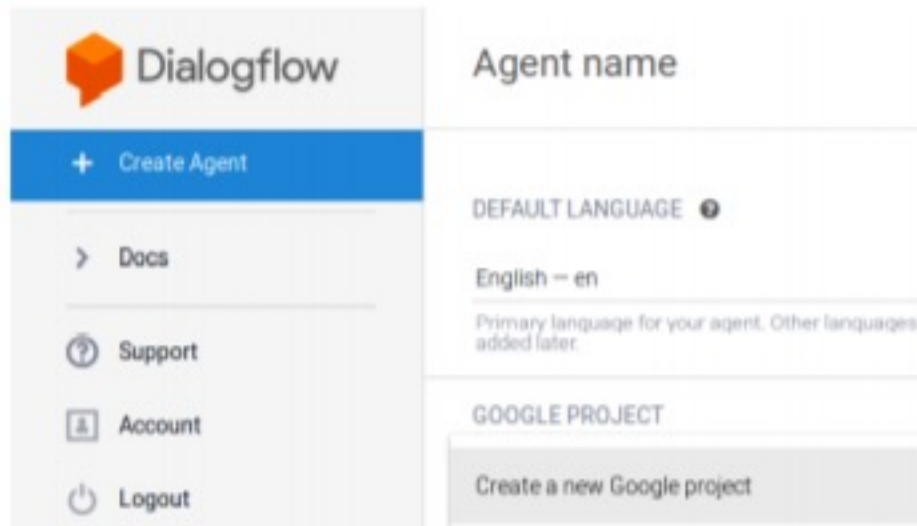


Figure 6-17. Making a simple order using our agent

# Intent Detection

- Understanding context = understanding the user's intent and identifying corresponding entities for that particular intent

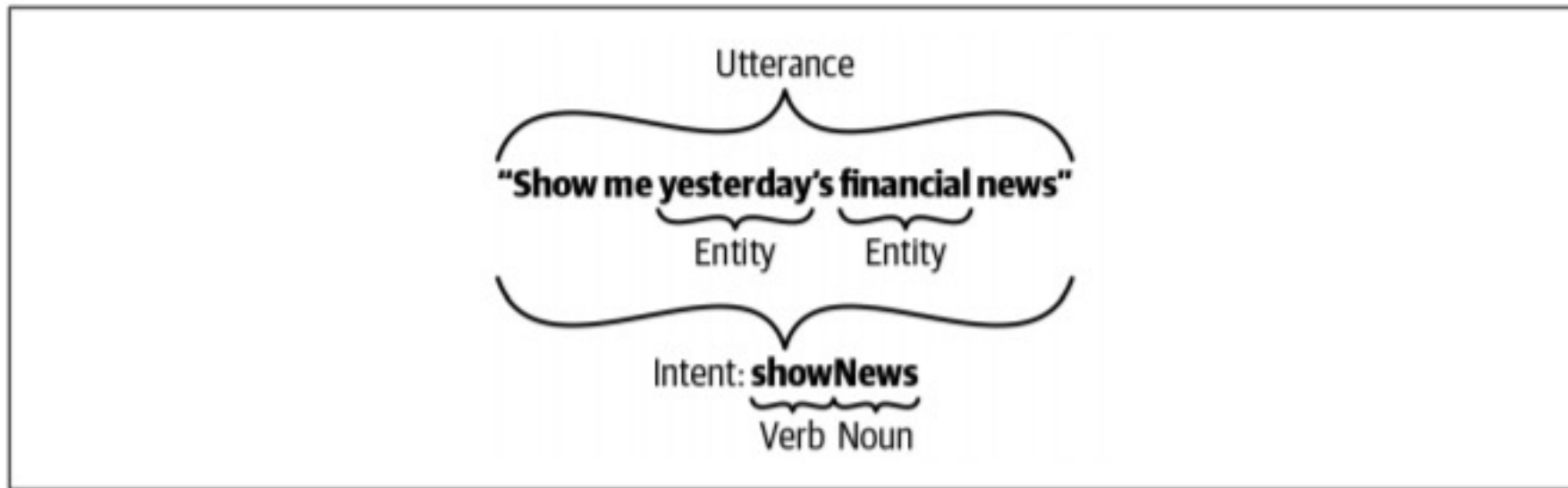


Figure 6-4. Example of different terminology used in chatbots

# Intent Detection

- Understanding context = understanding the user's intent and identifying corresponding entities for that particular intent

**User:** I'm looking for a cheaper restaurant  
`inform(price=cheap)`

**System:** Sure. What kind - and where?

**User:** Thai food, somewhere downtown  
`inform(price=cheap, food=Thai, area=centre)`

**System:** The House serves cheap Thai food

**User:** Where is it?  
`inform(price=cheap, food=Thai, area=centre); request(address)`

**System:** The House is at 106 Regent Street

Figure 6-20. Conversation about restaurant booking [11]

# Dialog Act Classification

- Example: identification of whether a question has a yes/no answer
- This can be reframed as a classification problem:
  - Given dialog utterances, classify dialog acts



# Slot Identification

- Once intent is identified, we can move on to extracting entities
- We can take a sequence labelling approach here (like we saw with the BIO labelling example – CH 5)

**Query text:** [Play, Magic, Sam, from, the, thirties]

**tokenized Slots:** [O, artist-1, artist-2, O, O, year-1]

```
# training
crf = CRF(algorithm='lbfgs', c1=0.1, c2=10, max_iterations=50)
# Fit on training data
crf.fit(X_train, Y_train)
```

# Response Generation

- Fixed responses (FAQ bots)
- Use of templates:
  - “The house serves cheap Thai food.”  
⇒<name>serves<price-value><food-value>food.
- Automatic generation
  - Conditional generative models

# Seq-2-seq models

**Machine:** *is it a windows machine?*

**Machine:** *we have linux on your machine.*

**Machine:** *is it windows xp or windows 7?*

**Human:** *i am using linux*

**Machine:** *let me take a remote of your machine and check if issue has been pushed properly.*

**Human:** *ok*

**Machine:** *please open terminal and run the below commands in one computer:*

**Machine:** *sudo apt - get update*

**Machine:** *sudo apt - get upgrade*

**Machine:** *sudo <COMMAND> - updaterr*

**Human:** *done*

**Machine:** *let me try connecting now*

**Human:** *ok*

**Machine:** *it's done*

**Browser Tech Support**

**Human:** *what is the purpose of life?*

**Machine:** *to serve the greater good.*

**Human:** *what is the purpose of living?*

**Machine:** *to live forever.*

**Human:** *what is the purpose of existence?*

**Machine:** *to find out what happens when we get to the planet earth.*

**Human:** *where are you now?*

**Machine:** *i 'm in the middle of nowhere.*

**Human:** *what is the purpose of dying?*

**Machine:** *to have a life.*

**Human:** *what is the purpose of being intelligent?*

**Machine:** *to find out what it is.*

**Human:** *what is the purpose of emotions?*

**Machine:** *i don't know.*

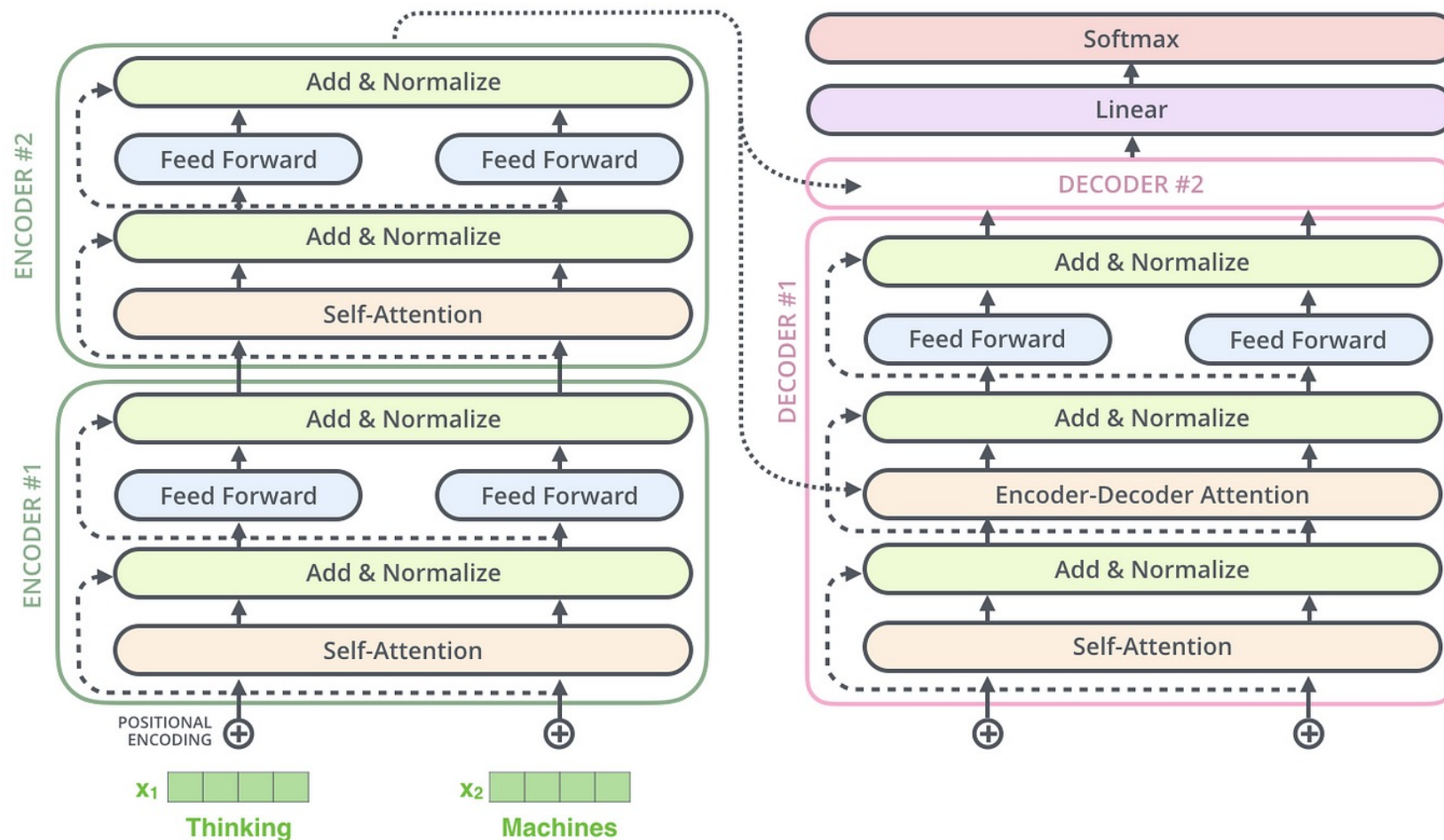
**Philosophical Discussion**

Figure 6-21. Example of work done by Google on seq2seq models [18]

# Adapting a language model to a dialog task



- DialoGPT is a fine-tuned version of GPT-2



# What should the data look like to make a chatbot?

- Open-ended - dialog
  - Padding
  - Tokens

[illegible]

# Challenges

- Synonyms, homonyms, slang
- Misspellings
- Abbreviations
- Complex punctuation rules
- Accents, dialects and speech differences with the age and other issues of humans. (for eg. lisps, drawls, etc)



# The Chatbot Envisioned



# Our Chatbot



# Activity for the next 2 classes

**Step 1:** Choose a movie character with dialog available on ISMDB or elsewhere.

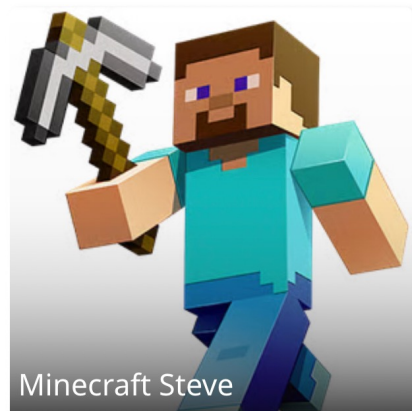
**Step 2:** Fine-tune a model with your character's dialog.

**Step 3:** Set up the model as a chatbot a human can talk to. Compare to the generic DialoGPT pre-trained model to see if we are improving (or changing) anything.

**Step 4:** Find someone in the class to share your chatbot model with and get them to have a conversation. Can they guess the character they are talking to?

# Example: character bots

- <https://beta.character.ai>

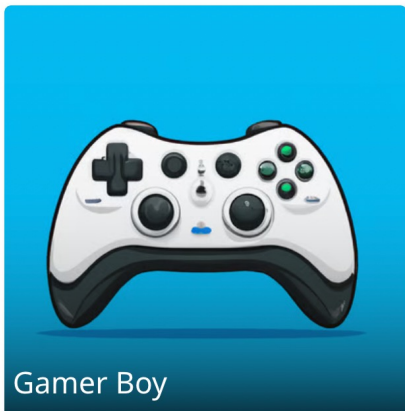


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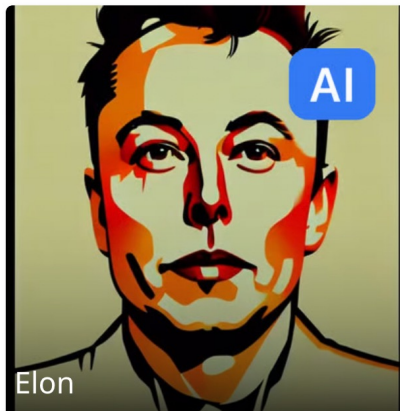


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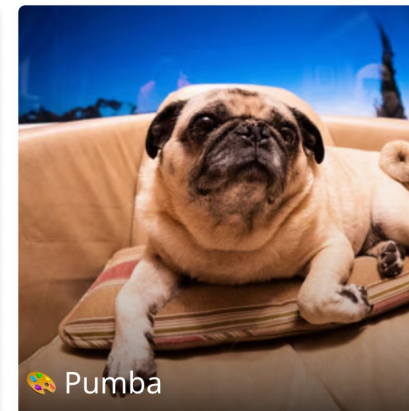


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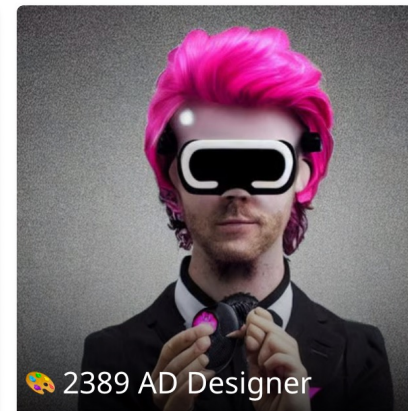


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