CHATBOTS

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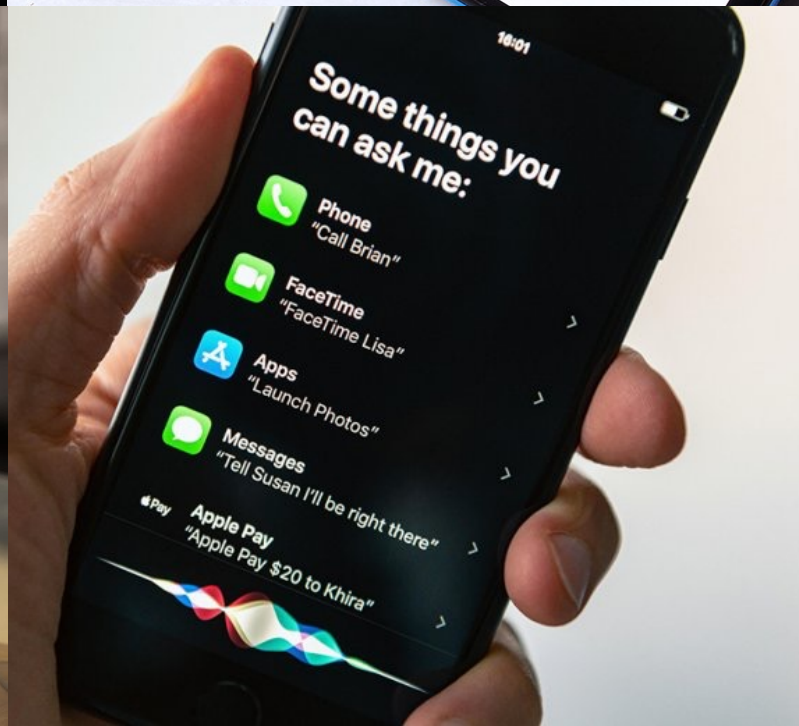
MOTIVATION

- Virtual assistants and chatbots attracted enormous attention over the past decade
- However, most utilizes a "retrieval-based" approach
- Instead, I want to build a "generative" chatbot that could generate new responses



DATA

- Cornell Movie Dialogues Corpus
  - Link: https://www.cs.cornell.edu/~cristian/Cornell_Movie-Dialogs_Corpus.html
  - 220,579 conversational exchanges from 617 movies
  - 304,713 utterances in total

EXAMPLES OF CONVERSATION

Person A: I figured you'd get to the good stuff eventually.

Person B: What good stuff?

Person A: The "real" you.

Person B: Like my fear of wearing pastels?

Person A: Hey, sweet cheeks

Person B: Hi Joey.

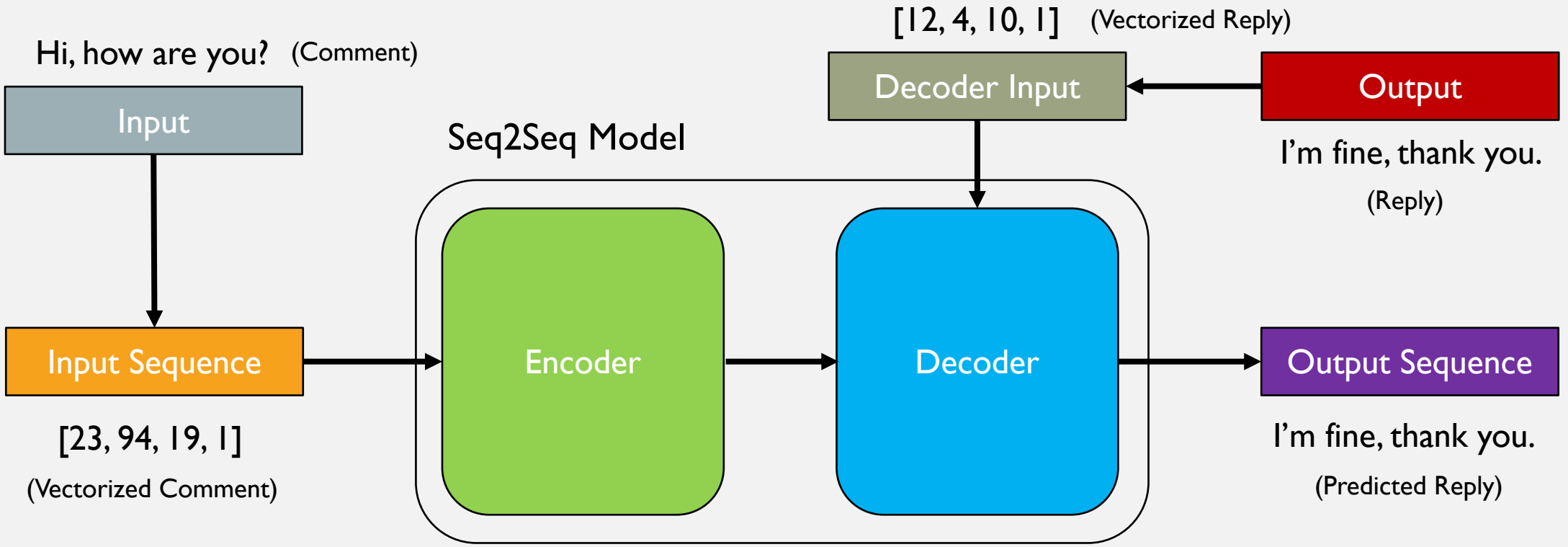
Person A: You're concentrating awfully hard considering it's gym class.

Person A: Hey, since when do you play Thomas Edison? This looks like Sheila's.

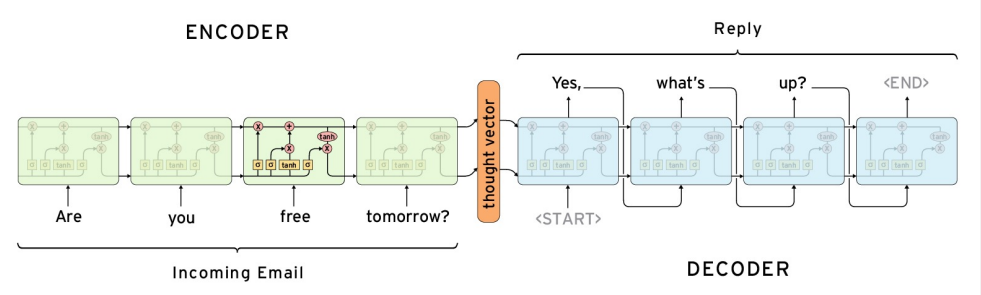
Person B: It is...was. It's a zapper, it might help me stay awake.

Person A: Yeah, or turn you into toast.

METHOD: SEQ2SEQ

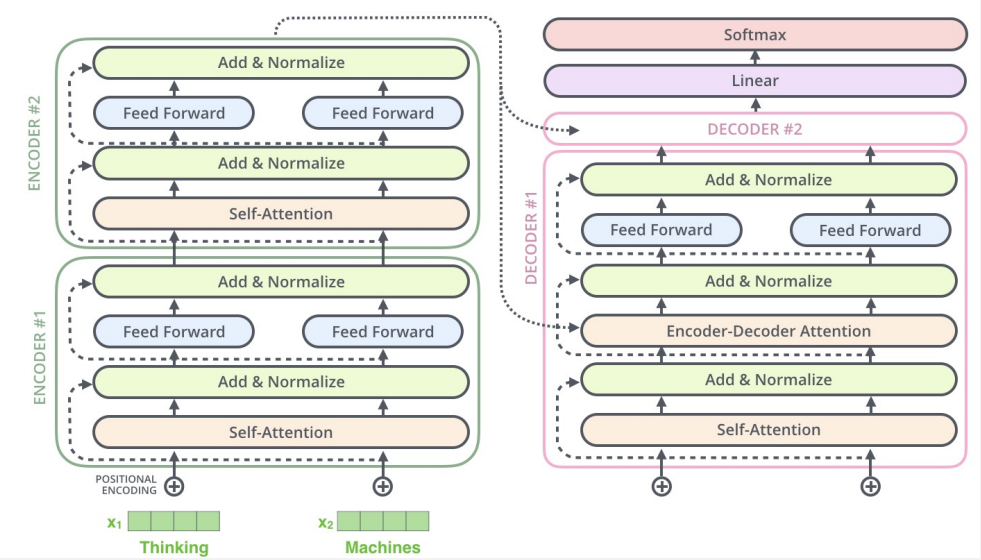


The idea is to train Seq2Seq Model to predict output sequence from inputs



LSTM Model

Source: https://suriyadeepan.github.io/2016-12-31-practical-seq2seq/



Transformer Model

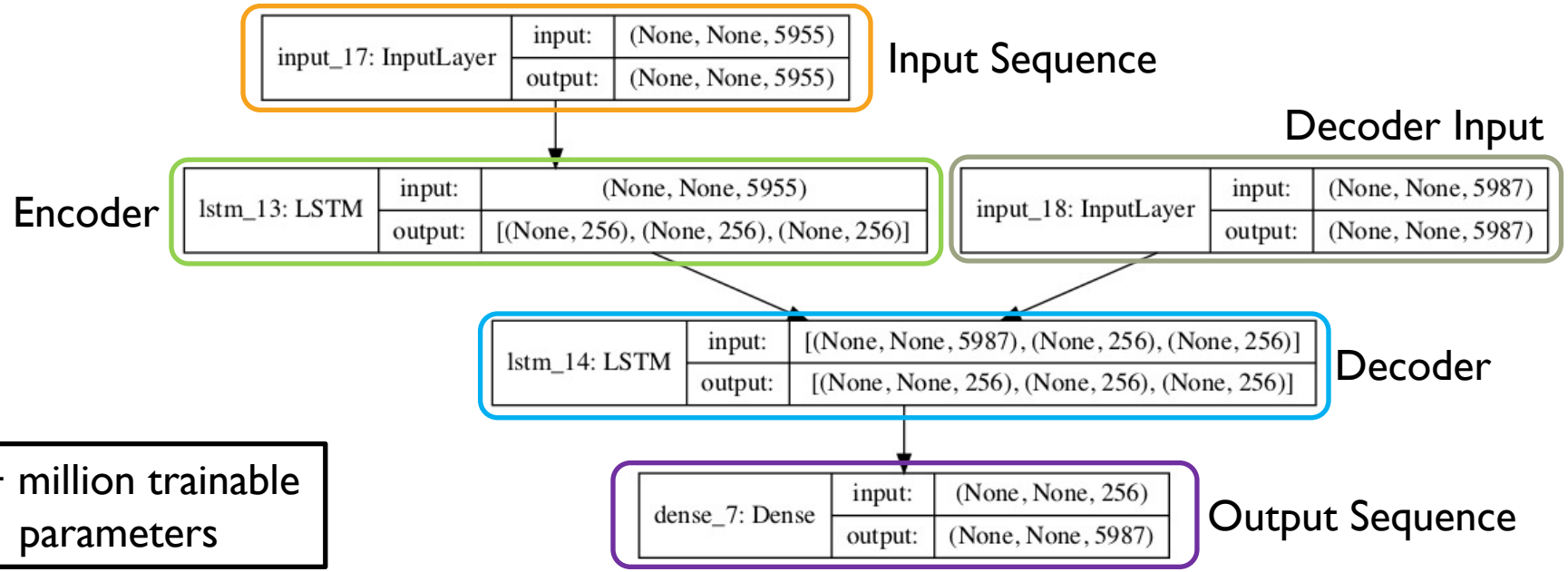
Source: http://jalammar.github.io/illustrated-transformer/

MODELS

2 types of neural network architectures used for Seq2Seq models:

- RNNs/LSTMs
  - Traditional approach to Seq2Seq problems
- Transformers
  - New, but powerful approach to sequential problems (e.g. BERT, GPT-3)

OUR LSTM MODEL



14+ million trainable parameters

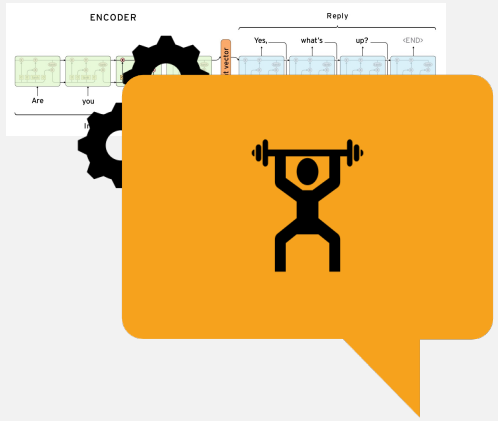
TRAINING

Only 6000 pairs were used

- Training size: 5400
- Validation size: 600

Even then, it takes 15 minutes per epoch!

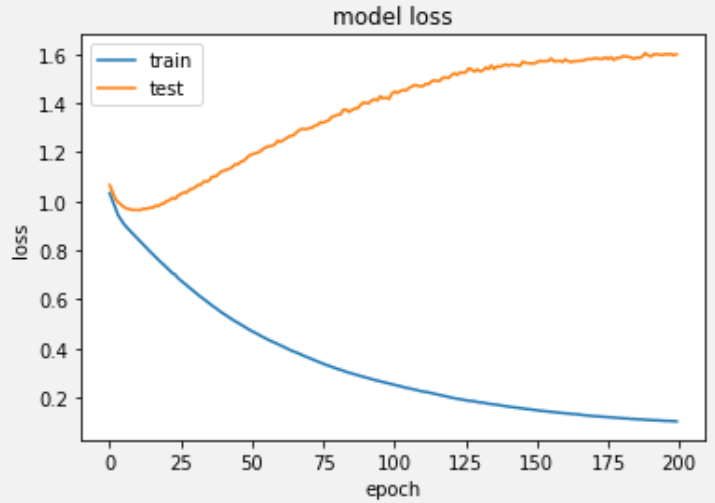
- Total training time over 2 days

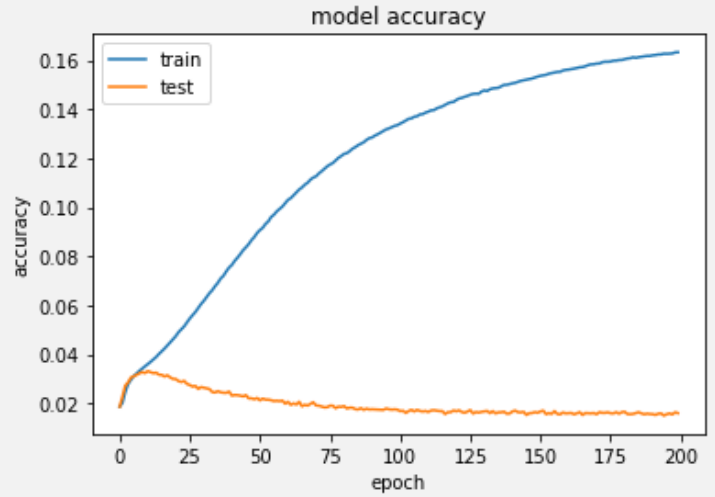


RESULTS

- Final accuracy: 16.32% (training), 1.60% (validation)
- Final Loss: 0.10 (training), 1.60 (validation)
- Overfitting is quite apparent
- However, we did manage to make the chatbot "talk"

```
Chatbot: Hi, I'm a Chatbot, a chatbot trained on random dialogs. Would you like to chat with
me?
hey chatbot sure
Chatbot: i know something but what do you have to do i
what do you know
Chatbot: and if you do not know about all i will have do you think i would
interesting thing to say
Chatbot: so it be time to go home
already? alright then, good bye
Chatbot: Ok, have a great day!
```

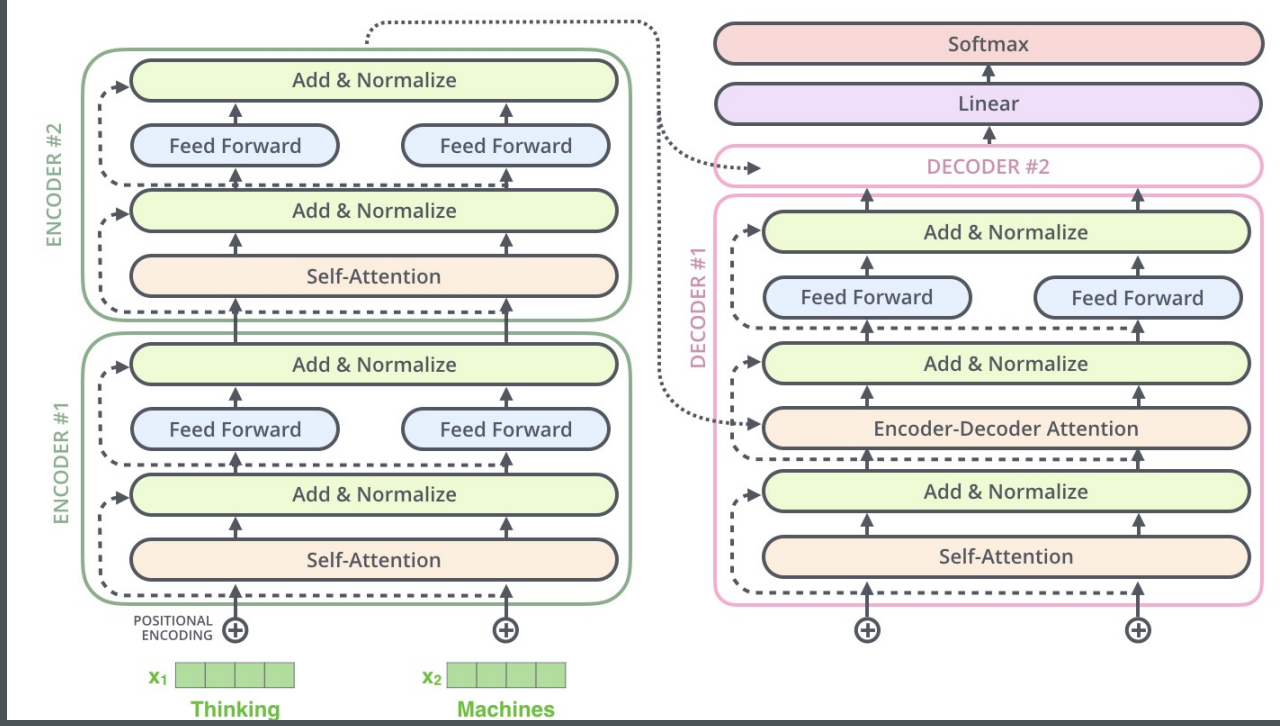




CONCLUSION

Chatbot could do better, perhaps with more data

Training neural networks could be quite expensive computationally



FUTURE DIRECTION

- Increase training and validation sets (given enough computing power)
- Try a different architecture (i.e. transformers)