A shopping cart is positioned in the lower-left foreground, facing towards the right. It is a standard metal wire cart with a single front wheel and two rear wheels. The background is a light-colored brick wall with a repeating pattern of rectangular bricks. The overall scene is brightly lit, suggesting an outdoor or well-lit indoor environment.

Enhancing Customer Engagement: Sentiment Analysis + Chatbot

Peng Gu, Mingchen Li, Annie Pates, Bhavana Rajan Nair

Introduction

1. A chatbot that handles
general customer requests
2. A convenient evaluation
method for the chatbot



Hi Smiles Davis,

Thanks for contacting Dropbox Support. Please take a moment to tell us how we did and what we could do better.

NO THANKS

How satisfied were you with the support you received?



Very dissatisfied

Very satisfied

Your feedback is valuable and will only take a few seconds. Click or tap the rating which best represents your experience.

All information you enter will be treated in accordance with the [Dropbox Privacy Policy](#). Dropbox will never ask you for your password or billing information via invitations to surveys or in surveys themselves.

User: Needs a little more work.....
Chatbot: Sorry to hear that. Please let us know how we can improve!
User: Please cancel.
Chatbot: Your request has been processed. Cancellation confirmed.

Data overview

Two sources of data used

- Downloaded 100,000+ Amazon Reviews of Digital Software Products from Kaggle
- From this, we used ChatGPT to generate 300 customer service answers for 300 negative Amazon reviews

Q: I think its complicated to use to be honest.

A: Feedback noted. We're working on simplifying the user experience.

Q: it wont download

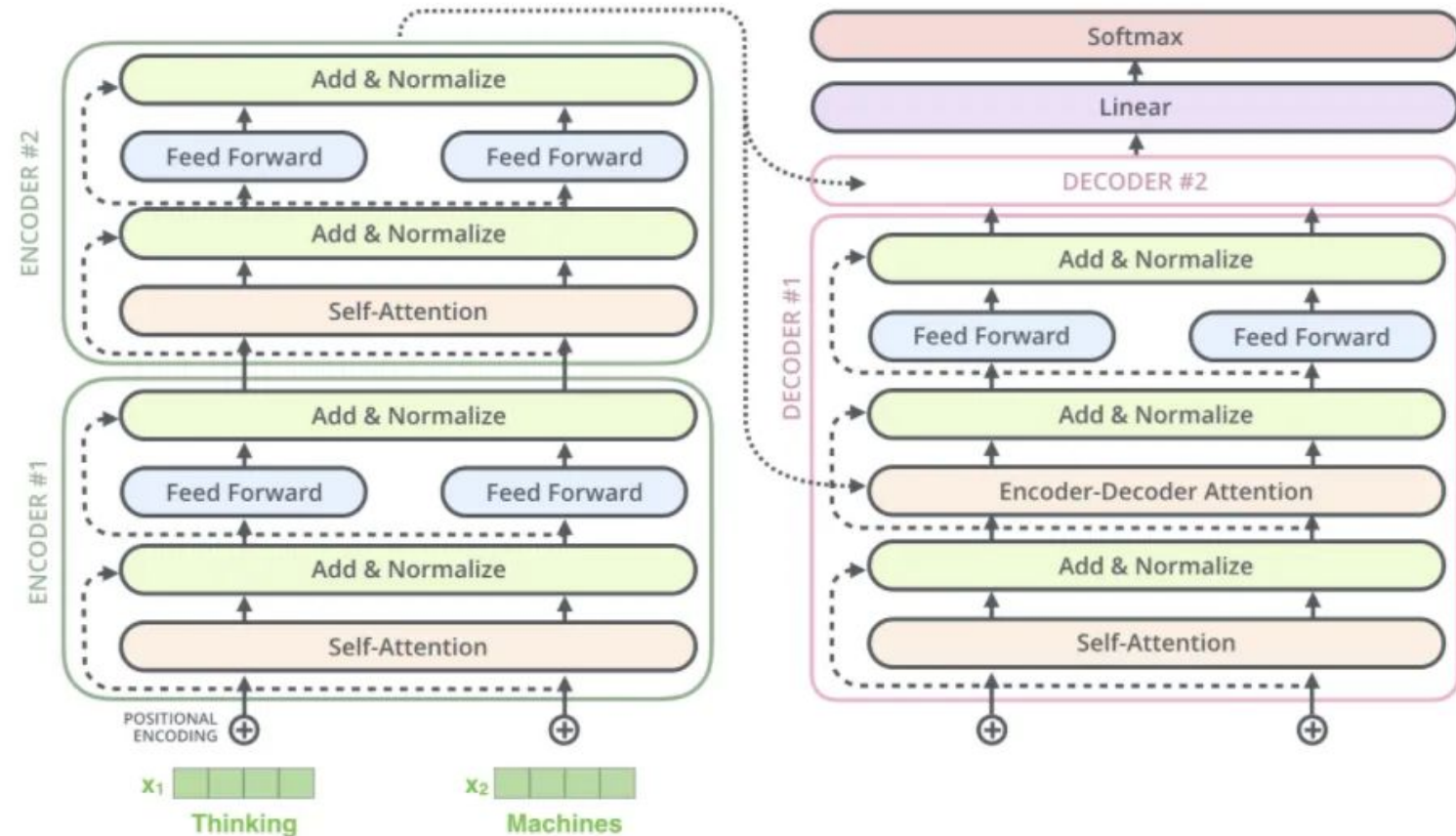
A: Sorry for the trouble. Let's troubleshoot or offer you a refund.

Why ChatGPT

TODO: fill in text from another Kaggle dataset

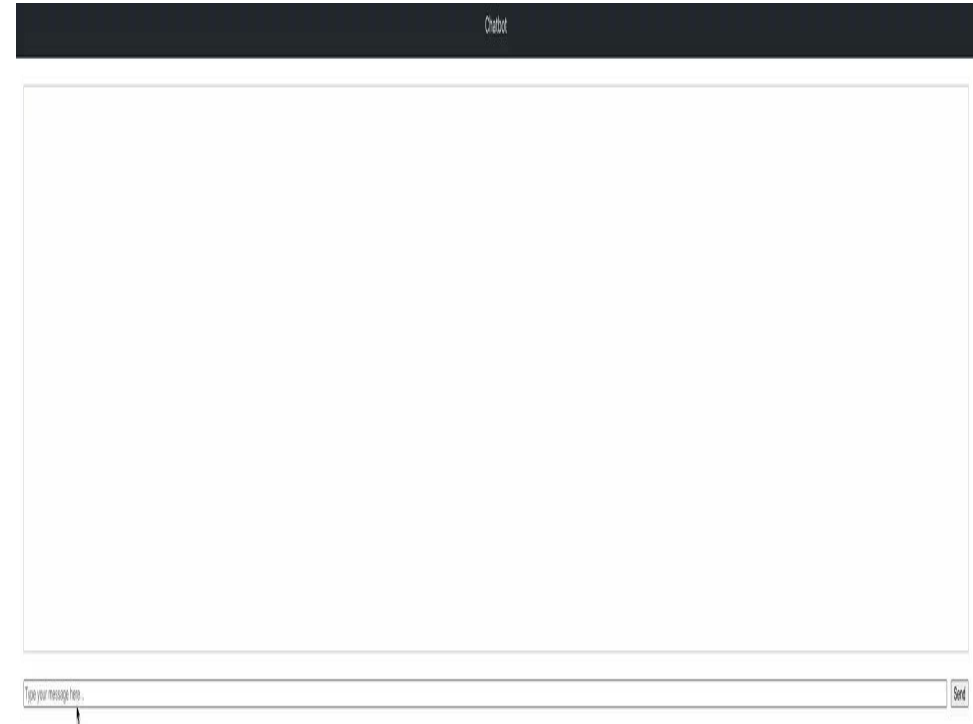
Our Customer Service Chatbot


- flan-t5-large from HuggingFace (780 million parameters, 1G memory)
- Trained on Google Colab and Discovery Cluster



Demo

- Chatbot = React + Flask





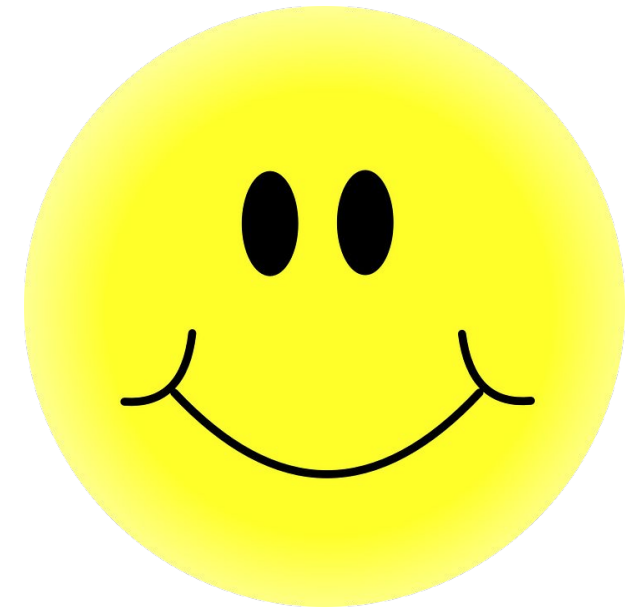
Attempting to Evaluate Chatbot

T5 Model Size	ROUGE-1 Score
Small	0.083
Large	0.332
XL	0.339

~~ROUGE~~ RAJ Score

$$Q_1 Neg \rightarrow Q_3 Pos$$

$$Q_1 Neg$$



RAJ Score

Sentiment Analysis Model:

- Overview
- Scores

RAJ Score for our model:

- Untrained
- 100%*

DO WE EVER DO THIS ?

How would you rate our services on a scale of 1 to 5?

587

1 ★

2 ★

3 ★

4 ★

5 ★

+ Add Quick Reply

HAPPY USERS



MORE CUSTOMERS

SCORE 1

User: "Needs a little more work....."

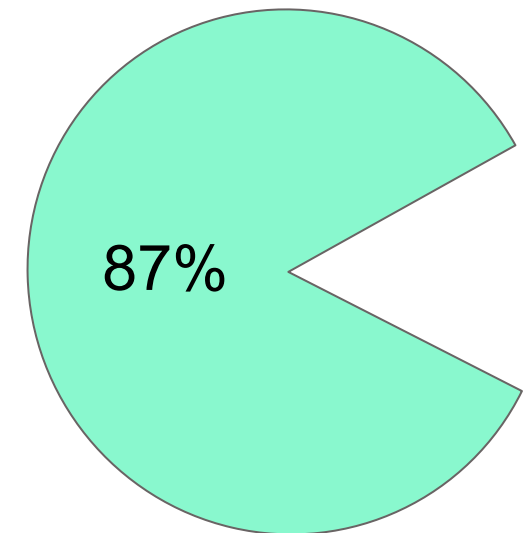
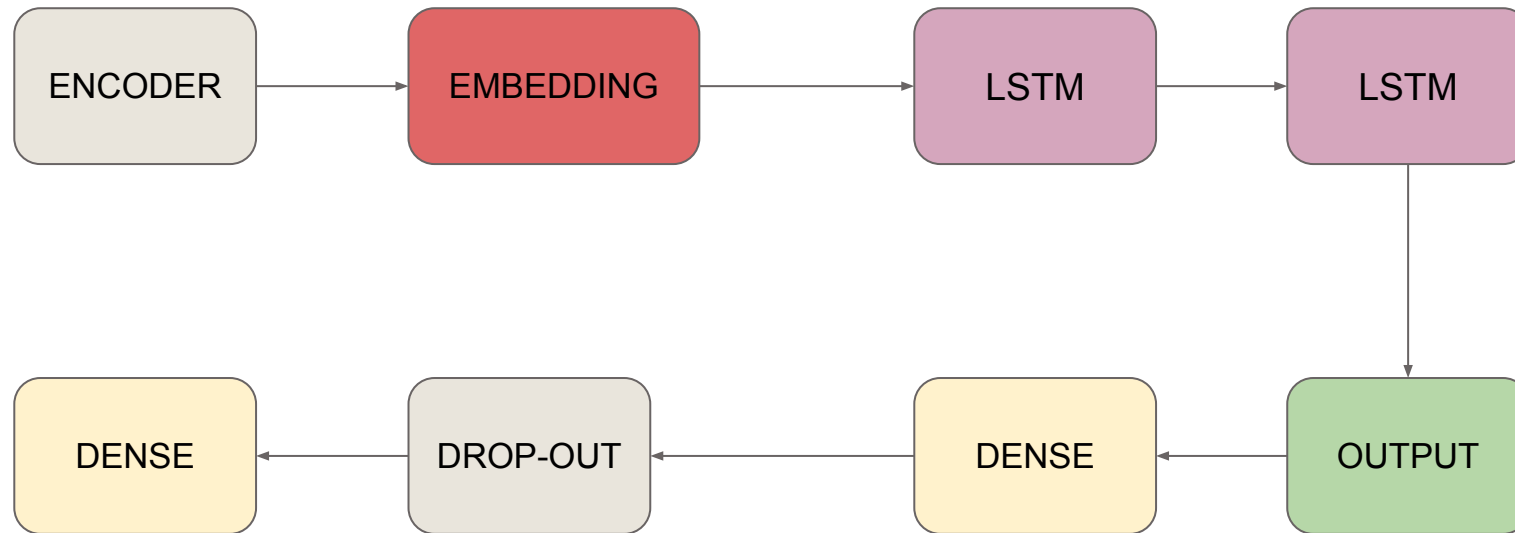
Chatbot: "We're working on improving the experience.

Please let us know how we can help."

SCORE 2

User: "Thanks for the update. Could you specify what improvements are planned?"

SENTIMENT ANALYZER



RAJ SCORE

RAW MODEL

0.2

OUR FINE-TUNED MODEL

0.8



Future Work

- Real user study
- More labels for customer issues
- More chatbot UI features