

Chatbot Q&A Encoding and Matching for Customer Service

Wenxi Chen
wchen@juji-inc.com
Juji, Inc.
<https://juji.io>

Background

- Chatbots for business
 - **Customer service**
 - Interview

Problem

- Answer user questions
 - How do business cover the questions and their variations?
 - How to update those questions and their answers

Michelle
I want to see a doctor, can you help me?

Clara
Certainly. Let me get some quick info from you first so I can best route your request to my human teammate.

Clara
Do you have a fever now?

Michelle
I just changed my insurance, could you check if you accept my insurance?

Clara
Hold on, let me check.

Clara
What kind of insurance do you have now?

Michelle
Now I have Athena PPO plan

Clara
We accept all PPO plans. So we are good.

Clara
Okay. I'd still love to know...

Clara
Do you have a fever now?

Goal

- State-of-the-art AI to democratize AI
 - Non-IT professionals can use
 - Faster to build
- Leverage cutting-edge hardware and software
 - Deep learning + expert system
 - NVIDIA GPUs
- Automatic chatbot Q&A generation
 - vs. Writing code to update chatbot Q&A

Solution

A process to evolve the chatbot's Q&As that:

- utilizes the state-of-the-art sentence encoding;
- refines deep learning models with NVIDIA GPUs;
- updates Q&As in real-time by businesses.

MAIN CHAT FLOW

Q&A BOARD¹

CHATBOT SETTINGS

Download CSV

Upload CSV

Set up chatbot to answer user questions/comments (1)

You can add or edit user questions and corresponding chatbot responses in the table below and then submit them.

Alternatively, you can download a CSV template, add/edit Q&A pairs in the CSV, and then upload the file.

Submit

	User Questions/Comments		Chatbot Responses	
1	Could you check if you accept PPO insurance?		Hold on, let me check.	<input type="checkbox"/>

Johnny

How may I help you today? Anytime during our chat, you can

- Text a question, e.g., How does Activity Studio help me?
- Text HELP to find out what I can help with
- Text RESTART to start our chat again from very beginning

Michelle

I don't have any questions

Johnny

No worries. I'm always here to help. Ask me anything anytime and I'll do my best to help.

If you have a couple of minutes, may I ask you a few quick questions about teaching tools you use so I can learn and help more teachers like you?

☒ Sure, please ask away

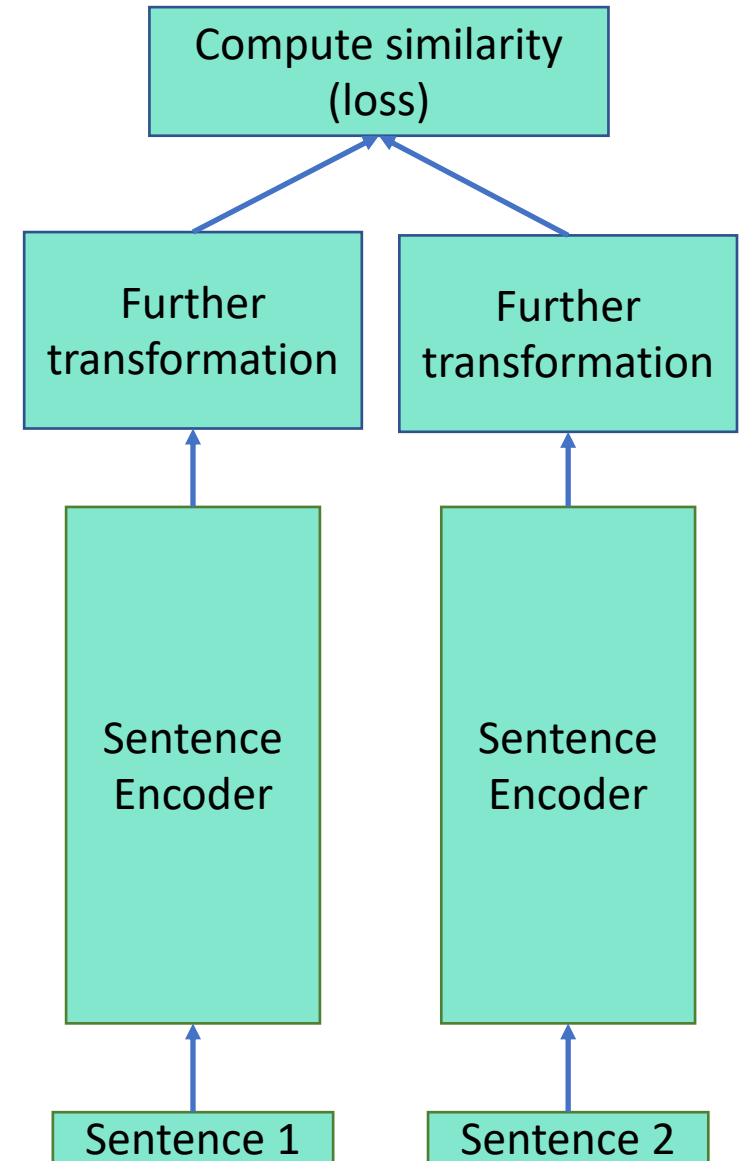
☐ No, not at this time

State-of-the-art sentence encoding

- Deep learning models:
 - Bidirectional Encoder Representations from Transformers (BERT)
 - Universal Sentence Encoder (USE)
 - InferSent
- They capture semantics, and perform well in evaluations
- However, public tasks are different from domain specific customer service scenarios
 - E.g. a statement with its negation can have highly similar encoding

Siamese Network Finetune

- Identify criteria for domain specific customer service
 - Negation
 - Alternative expression
- Real world conversation data
- Encode sentence pairs to compute pair similarity loss



NVIDIA GPU to Speed up the process

- Training time reduction
 - Fast iteration
 - Continuous update
- 30x increase in # sentences per second
 - Make powerful deep learning model possible in production
 - Stable performance

Deep learning in customer chatbot

- Jennifer for COVID-19 resource
 - <https://www.newvoicesnasem.org/jennifer-ai-chatbot>
- Jumpstart for education
 - <https://activity.jumpstart.com/#/jsaactivity>
- And more
 - <https://juji.io/gallery/>

