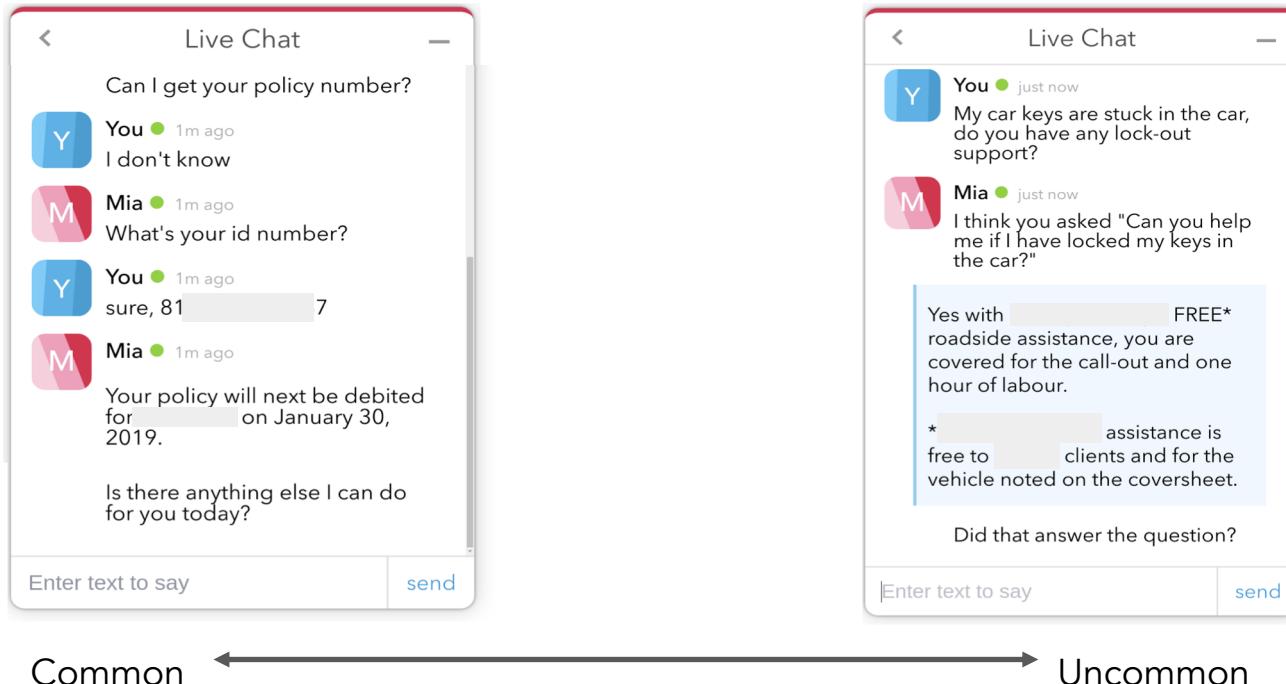


Mimic Rephrasals

Gabor Angeli



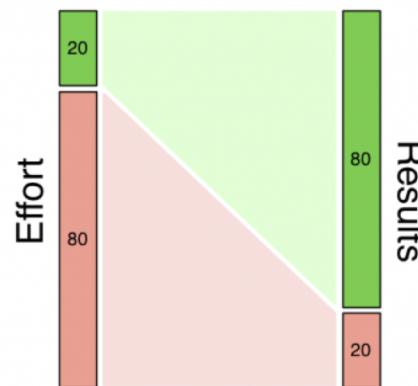
A day in the life of a customer service bot



We thought the 80-20 rule would hold

The 80-20 Rule

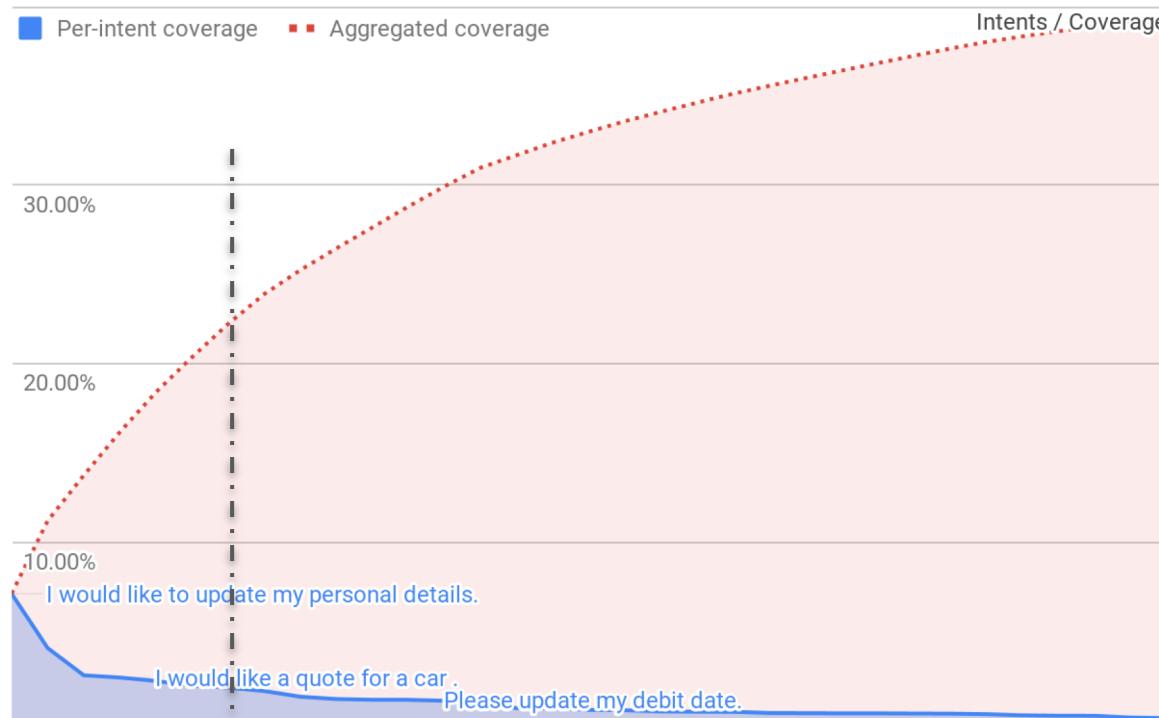
"For many events, roughly 80% of the effects come from 20% of the causes." - Pareto



Therefore 20% of the effort produces 80% of the results but the last 20% of the results consumes 80% of the effort.

www.EndlesslyCurious.com

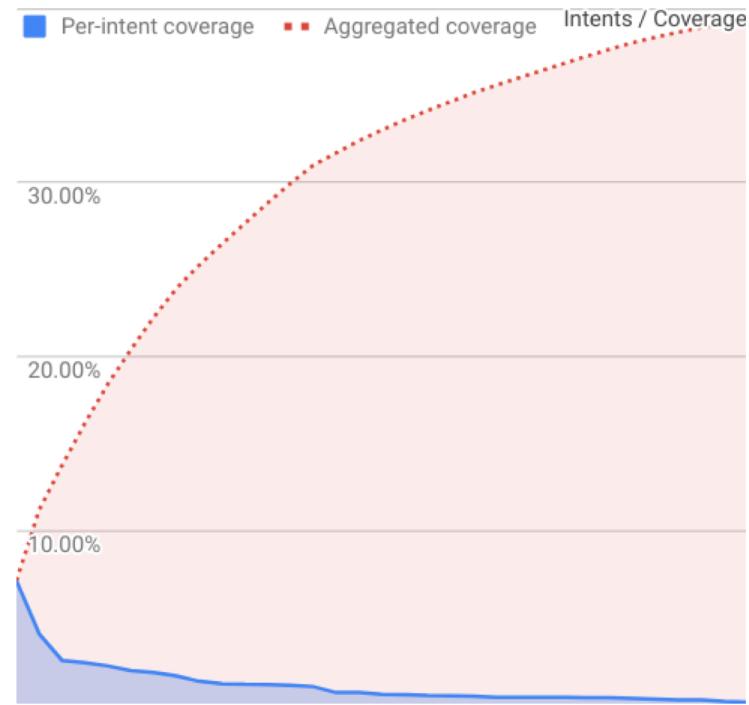
... but customer service requests are long tailed



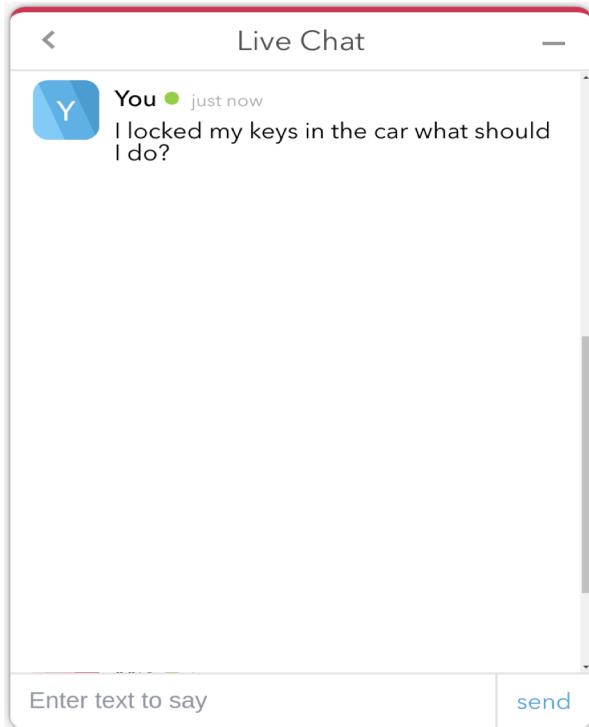
"20% of the effort" will get you... about ~20% of the way.

Eloquent has two big challenges

1. Quickly build and support a large number of intents
2. Do something with the remaining tail

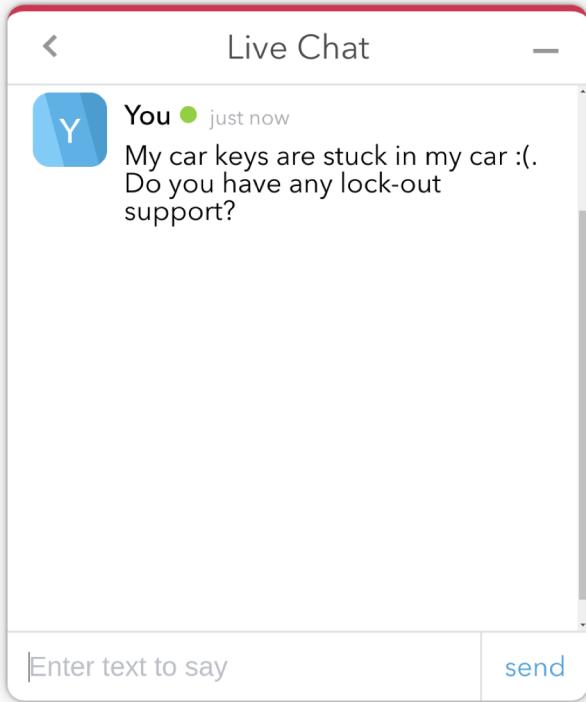


Saying you didn't understand isn't enough



"It feels a little cyclical when it's just a de facto answer. The old tech support hell on the phone."

Make the user *feel heard*



Do you have any lock-out support?



I do not know if we have any lock-out support.

(Rogers, 1951)

Mimic rephrasal is surprisingly complex

- “Do you have lock-out support?”
 - I don’t know if we have lock-out support.
- “What is your return policy”
 - I don’t know what **is** our return policy?
 - I don’t know what our return policy **is**?
- “I’m a policyholder, can you help me with a lockout situation?”
 - I am unable to help you with a lockout situation.
- “If my keys are stuck in my car, do you have help?”
 - I don’t know **if we can help**.
 - I don’t know **if we can help if your keys are stuck in your car**.

What makes a good mimic rephrasal?

- **Specificity:** How much detail from the input prompt is captured?
- **Conciseness:** How long is the response?
- **Appropriateness:** Did the response include the topic of interest in the rephrasal?
- **Fluency** Is the response grammatical?

Alex:

My cat died and I've been crying and so upset because of it.

I've been crying non-stop since I got a rejection letter from Northwestern.

My aunt's cat died.

None or more than one of the above apply.

Blue:

I am sad your cat died.

Sentence

Alex: If I'm flying to Hawaii, do I need to bring a passport?

Blue: I don't know if you are flying to Hawaii.

Datasets



Tian Wang

IDONTKNOW

Prompt: I am legally resident in Northern Ireland, where can I apply for an Irish visa

Mimic Rephrasal: I do not know where you can apply for an Irish visa

P: When I register a domain, do I receive a website and a web hosting space

MR: I do not know if you receive a website and a web hosting space when you register a domain

P: I'm having difficulty signing up. Whom can I contact

MR: I do not know who you can contact about your difficulty signing up

EMOTIVE

P: My unit got downsized this week

MR (short): I am sorry about the downsizing

MR (long): I am sad your unit got downsized this week

P: I finally believe I have a future

MR (short): Good to hear about your future

MR (long): I am glad to hear you believe in your future

P: My phone fell into the toilet and it's ruined now.

MR (short): I am sorry your phone broke when it fell into the toilet

MR (long): I am sorry that your phone fell into the toilet and it's now ruined



Model: Constrained neural generation

Do you have any lock-out support?



BiLSTM + Attention + Copying

I do not know if we have any lock-out support.

- Use a simple BiLSTM architecture.
- Train on pairs of mimic rephrasals.
- Copying is key for generalization.
- *Tricks: Modified beam search to prefer generations of average length (Huang et al., 2017)



Angel Chang

Examples

IDONTKNOW

Prompt If I win my case, what am I entitled to?
Human I do not know what you are entitled to



Examples

EMOTIVE

Prompt

I was walking my dog in the park last night and
found a \$ 20 bill on the ground

Human

i am glad to hear you found a \$ 20 bill

Angel Chang

Evaluation

- Evaluators specify a preference for model output, or the gold human response: 50% is perfect
- Used 305 examples from test set
- Five raters per example

A/B test user study



Observations in deployment

- Deployment with 13K conversations, 5.7% times where IDK used
- Generalizes well in practice
- Actually manages to stop users from continuously rephrasing the same question and moving on.

Examples

- **P:** hi I want to change the location of delivery
- **R:** I apologize, I am not able to change the location of delivery.
- **P:** are you artificial?
- **R:** I'm really sorry, I am not able to tell you if we are artificial.
- **P:** Who's going to win the Stanley Cup?
- **R:** I do not know who is going to win the Stanley Cup.

Observations in deployment: errors

Misspellings and bad grammar;
currently copied:

- P: When will come my Parsel?
- R: I do not know when your Parsel will come.
- P: What campany sent to me have letters and number
- R: I do not know what campany sent to you have letters and number.

Too much copying:

- P: The phone message said they needed to have more information for clearance
- R: I am not able to have the phone message said they needed to have more information for clearance.



Questions?

