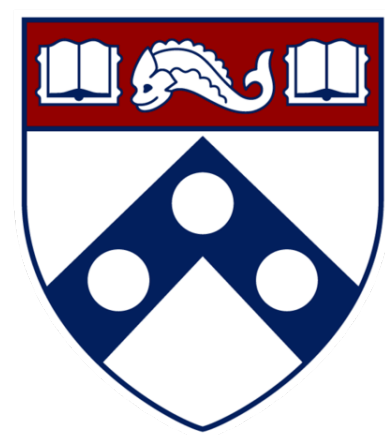


Rewriting the Script: Adapting Text Instructions for Voice Interaction

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There are over 2 billion voice assistants worldwide, but they are mostly used for simple applications like playing music or controlling IoT devices.

Our goal was to discover how **voice assistants** can provide effective guidance for **complex tasks**, like following recipes.



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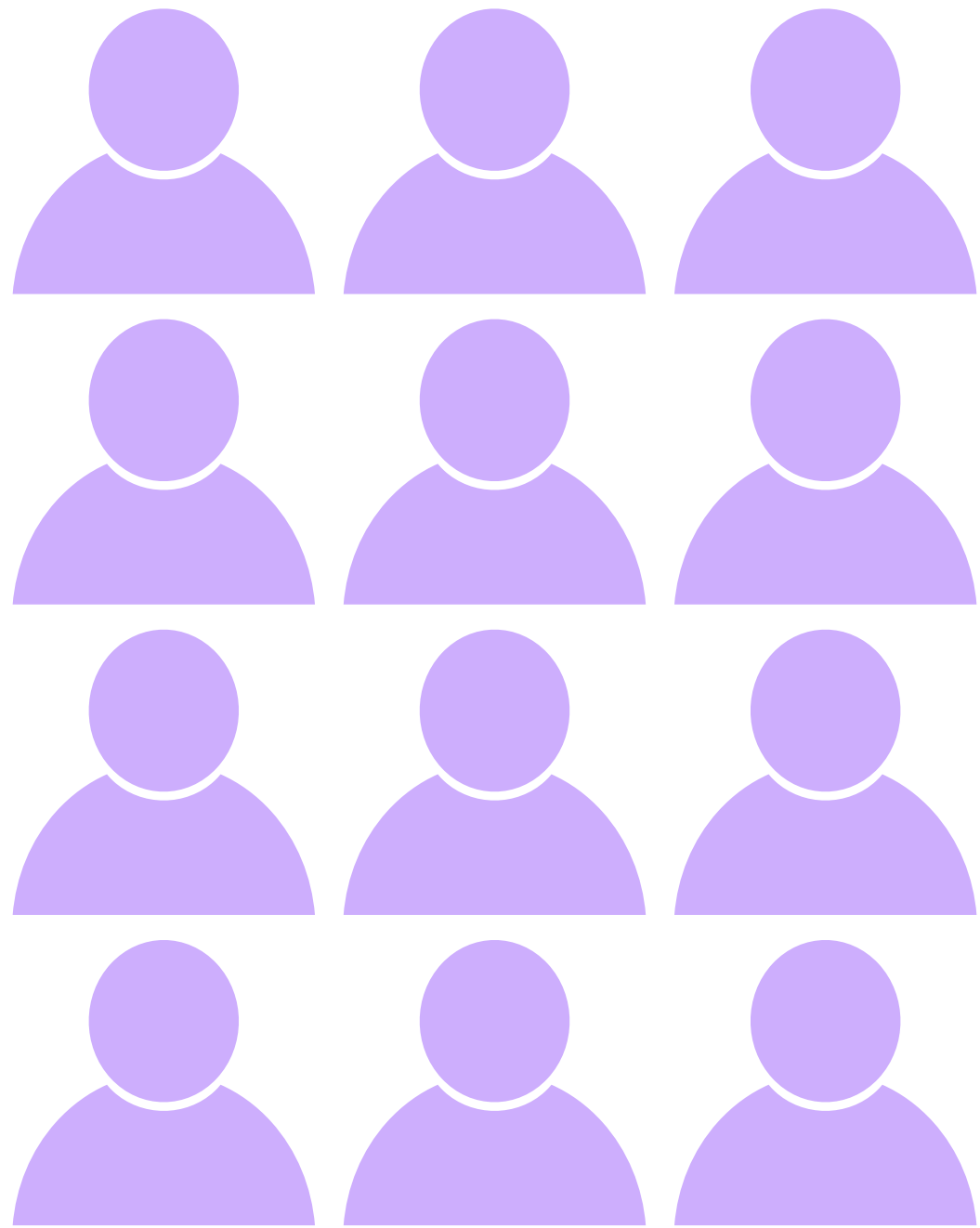
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Research Questions

RQ1. What challenges do users face when following instructions to perform complex tasks given by a contemporary, state-of-the-art voice assistant?

RQ2. What can be done to address these challenges in future voice assistants?



Herb-Roasted Salmon with Tomato-Avocado Salsa



Recipe courtesy of Valerie Bertinelli

Show: Valerie's Home Cooking Episode: A Heart-y Valentine's Day

Level: Easy

Total: 45 min

Active: 20 min

Yield: 6 servings

Ingredients:

2 tablespoons olive oil, plus more for the baking sheet and salmon

1/3 cup finely chopped fresh dill

1/3 cup finely chopped fresh flat-leaf parsley

3 tablespoons finely chopped fresh chives

3 tablespoons finely chopped fresh basil

2 1/4 pounds center-cut salmon fillet, skin and bones removed

Kosher salt and freshly ground black pepper

2 large avocados

12 ounces mixed-colored cherry or grape tomatoes, halved or quartered if large

2 tablespoons fresh lemon juice

1 small shallot, minced

Directions:

1 Preheat the oven to 350 degrees F. Line a large rimmed baking sheet with parchment paper and brush it lightly with oil.

2 Mix together the dill, parsley, chives and basil in a small bowl. Reserve 2 tablespoons of the mixture for the salsa and set aside.

3 Put the salmon on the prepared baking sheet and sprinkle all over with salt and pepper. Drizzle the top lightly with oil, then top evenly with the herb mix. Bake until just cooked through, 20 to 25 minutes.

4 Meanwhile, halve and peel the avocados and cut them into 1/2-inch pieces. Put the avocados in a large bowl and gently toss with the tomatoes, lemon juice, shallots, 2 tablespoons oil, 1/2 teaspoon salt and the reserved herbs. Transfer to a serving bowl.

5 Serve the salmon with the salsa on the side.

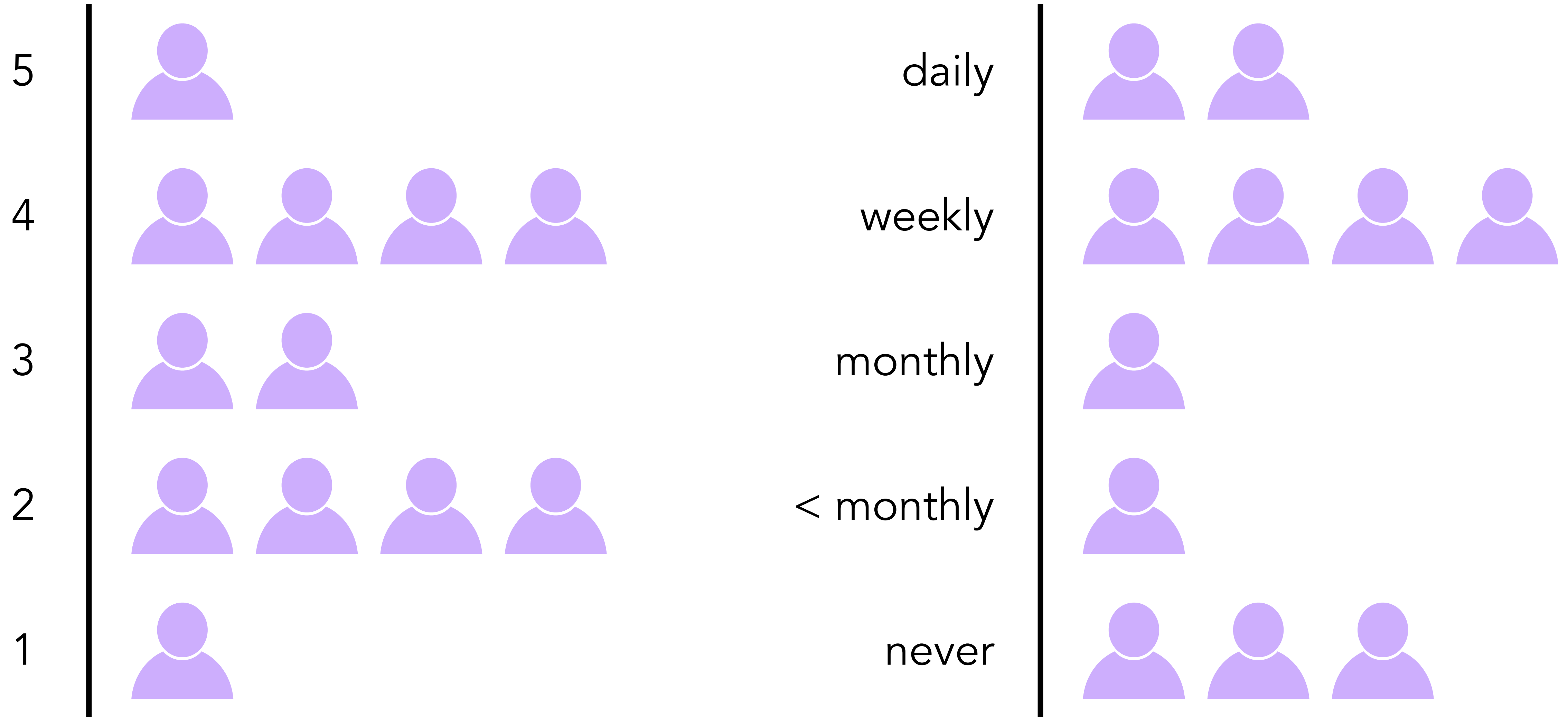


+ Q: do you remember the quantities or do you want me to ~~repeat~~ repeat them? (it takes time to do this!) maybe mention "let me know when you're ready to continue with the toppings" + Do you want me to start a timer? ←

+ "shall we go step by step?"
1. Start with the avocados...
2. Now time for the tomatoes...
3.

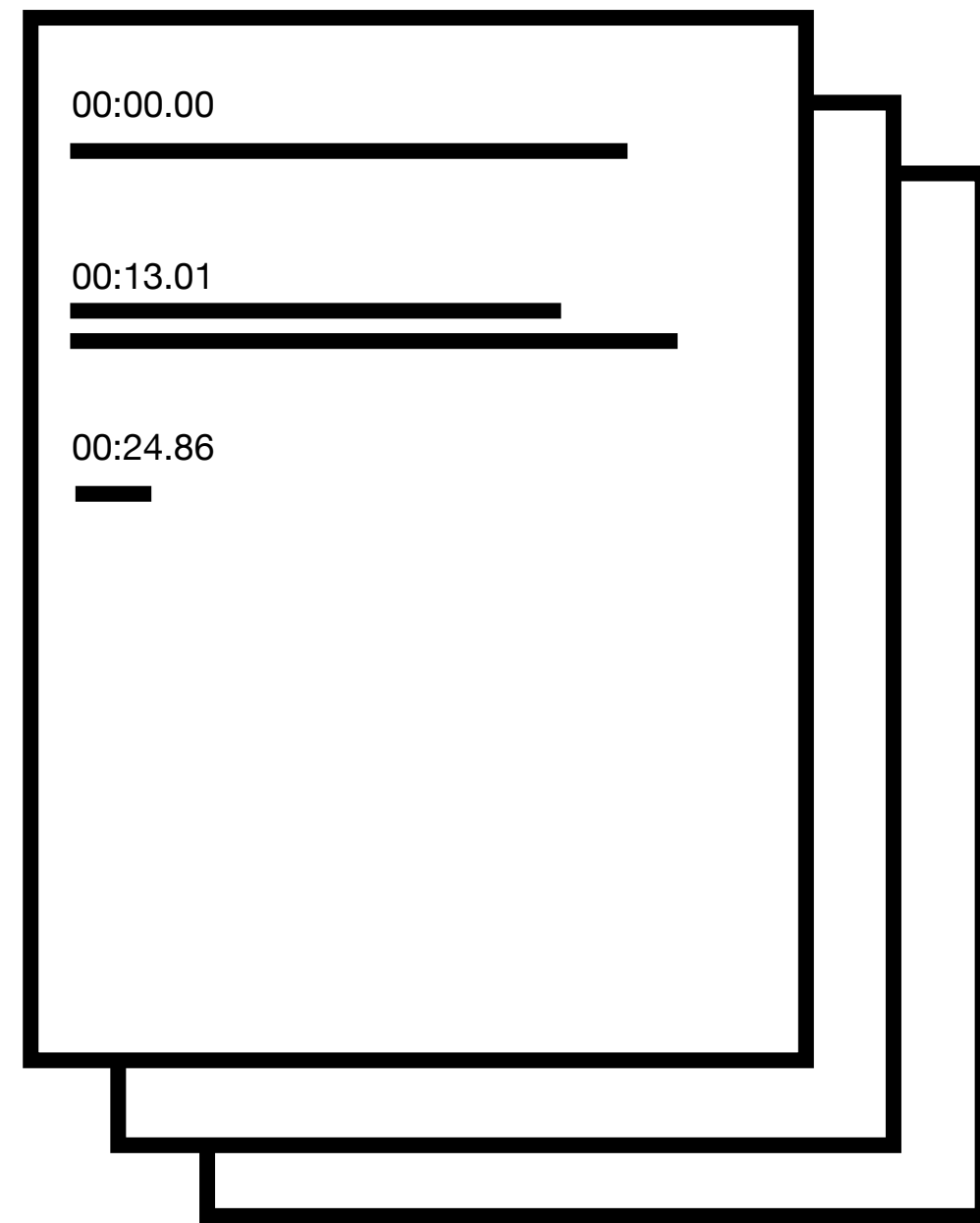
Self-Reported Cooking Skill

Prior Voice Assistant Use

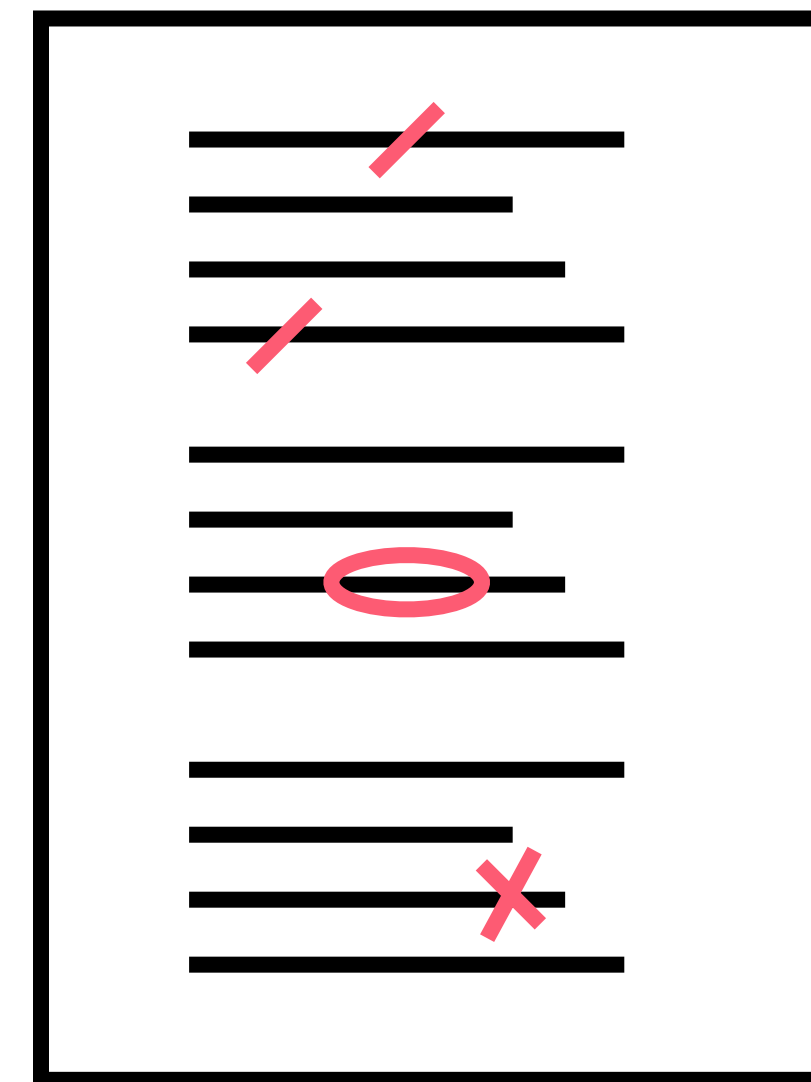




Data from Observation Sessions

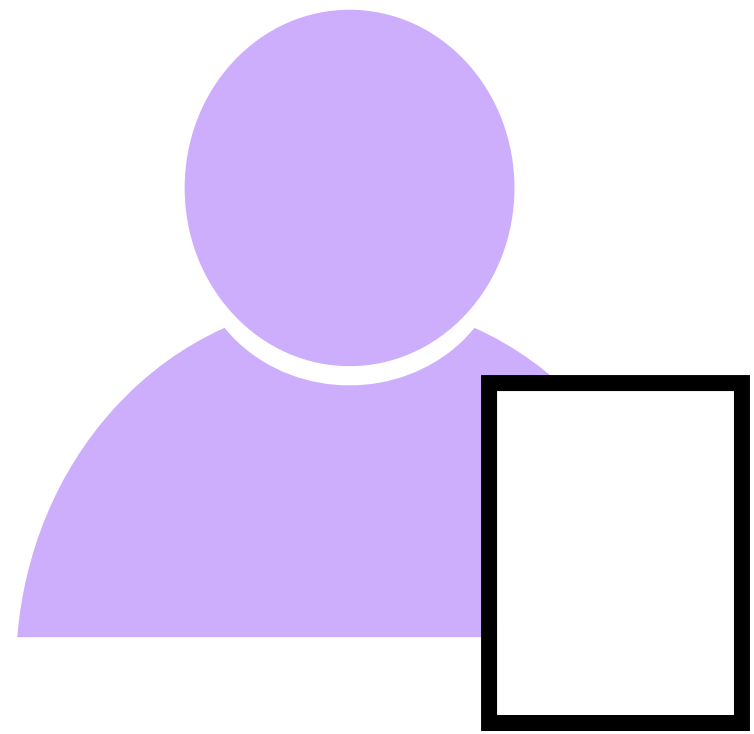


Transcripts

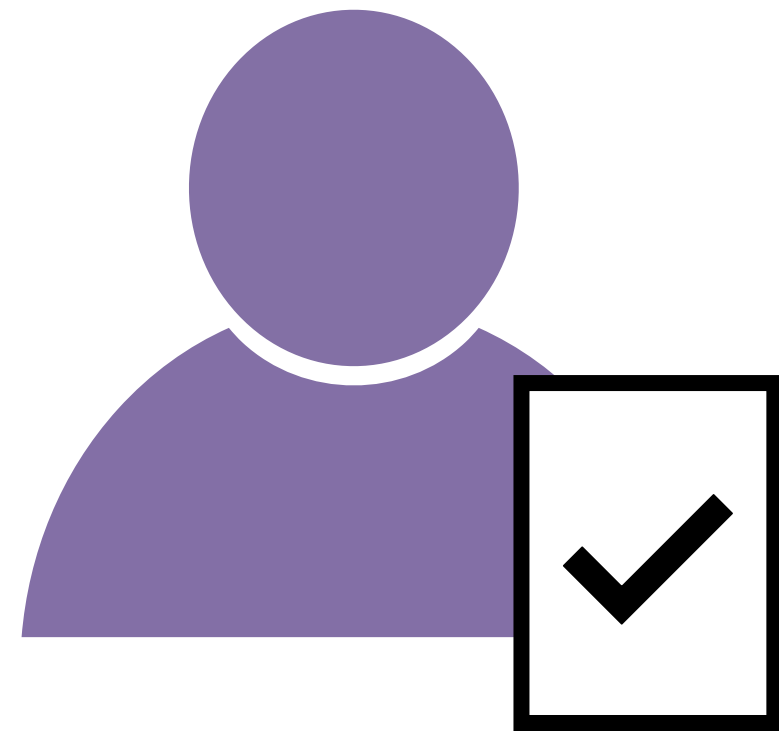


Annotations

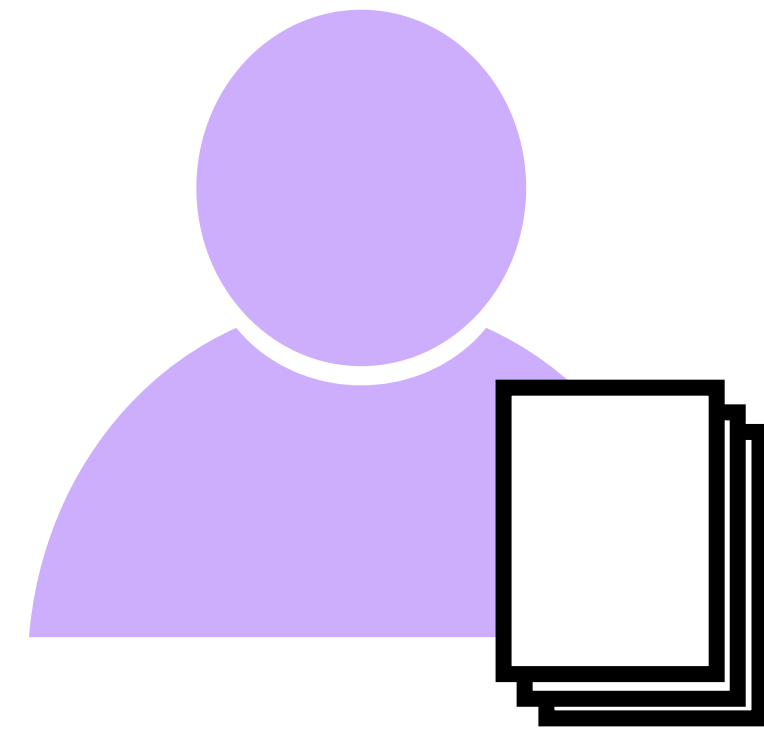
Thematic Analysis



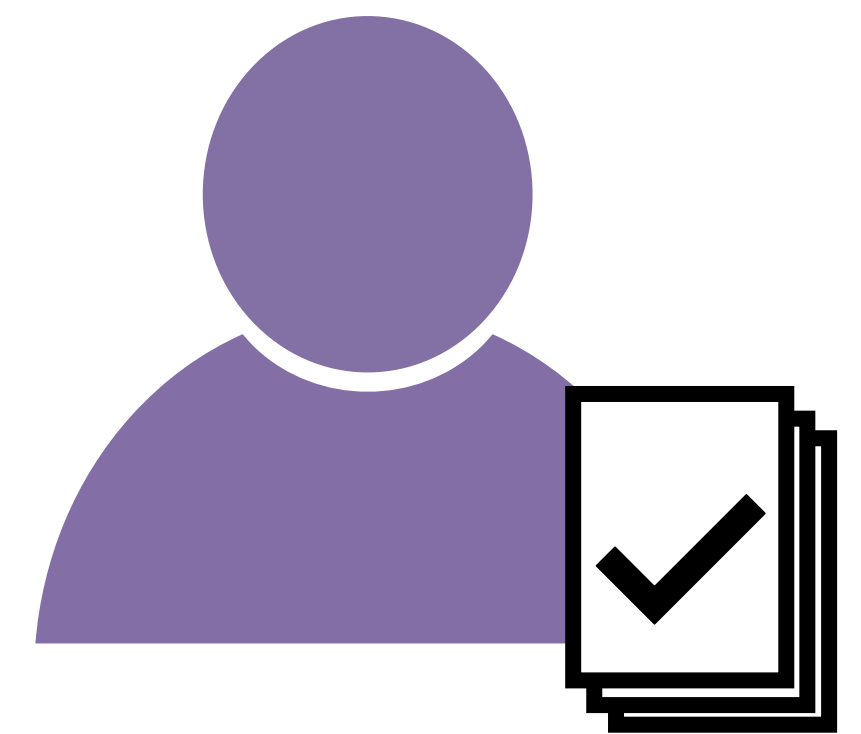
1. Open Coding



2. Validation

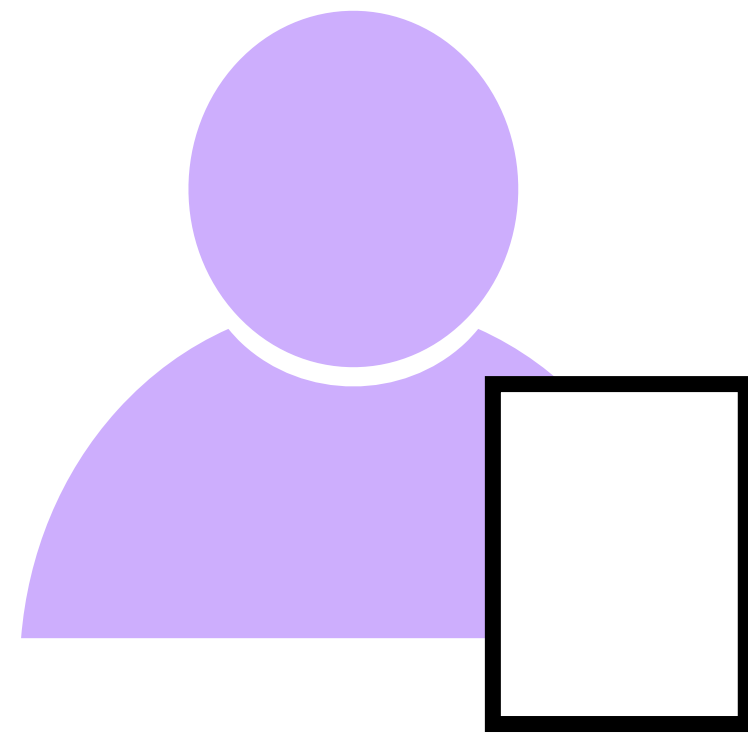


3. Axial Coding

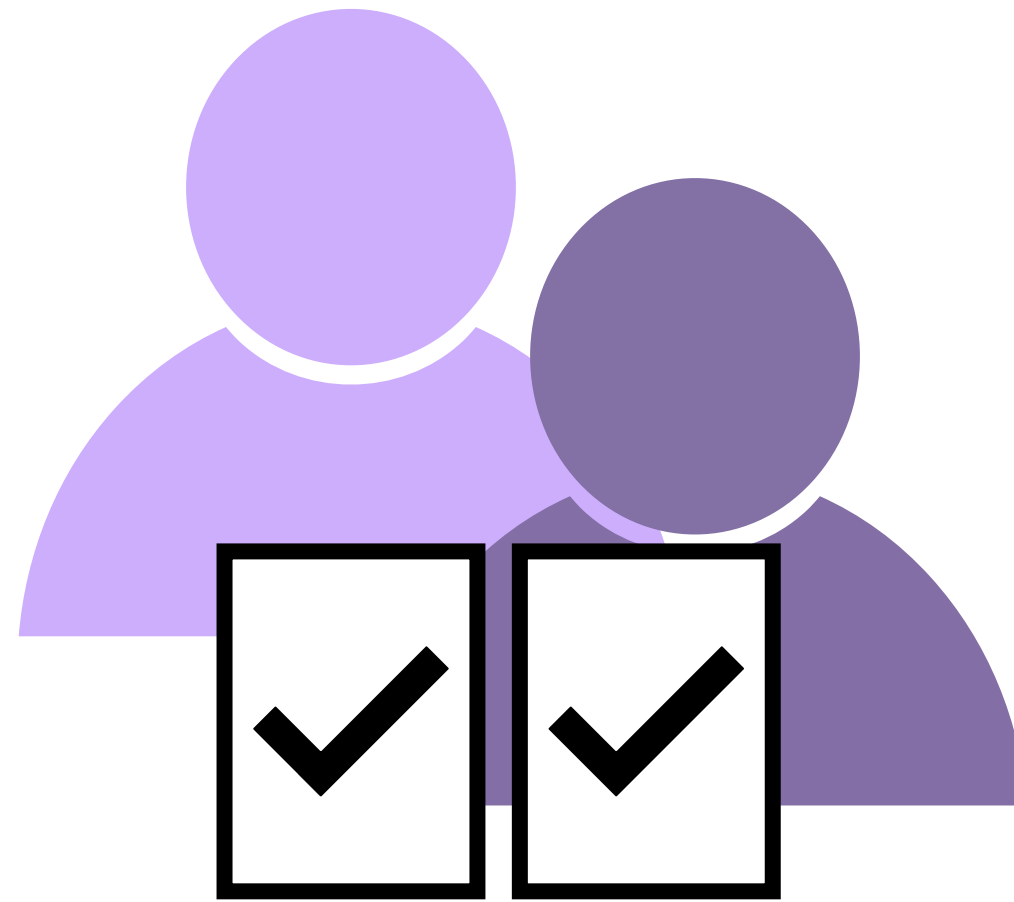


4. Validation

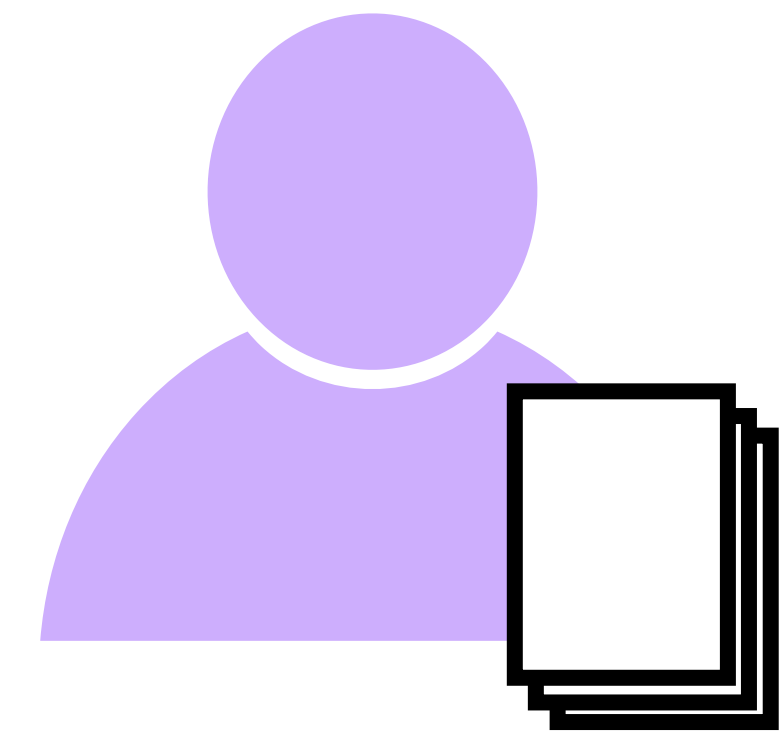
Conversation Coding



1. Create codes



2. Code two transcripts



3. Code all transcripts

Challenges & Solutions



Whisk the eggs, 1/2 teaspoon sesame oil, and a pinch each of salt and pepper in a second dish. If you want me to repeat this step, or list the ingredients for the step, just let me know.

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Preparation

- 1** ^{Put in start} Cook sausage over medium-high until lightly browned, about 5-7 minutes, being sure to break up the meat into a fine mince.
- 2** Remove cooked sausage from pan and wipe away excess fat with a paper towel.
- 3** Add onion and sauté until softened and translucent, about 2 to 3 minutes. Add mushrooms, salt, and pepper and continue to cook for an additional 2-3 minutes.
- 4** Add chopped spinach and cook until wilted and no extra liquid has accumulated in the bottom of the pan.
N/A I used frozen ^{chopped} spinach
- 5** ~~NOTE: Do your best to use the excessive moisture of the spinach and mushrooms to deglaze the bottom of the pan, scraping away any browned bits from cooking the sausage earlier.~~
→ Not needed
- 6** Preheat oven to 350°F (180°C).
- 7** Once cooked, remove the spinach and mushroom mixture from the pan and combine it with the reserved cooked sausage. Stir to mix evenly.
- 8** Combine eggs and milk. Lightly whisk until just combined.

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- 3 Add onion and sauté until softened and translucent, about 2 to 3 minutes. Add mince.
- 4 *Put in start*
4 Add the reserved cooked sausage to the mixture.
- 5 *Put in start*
5 No need to sauté the sausage.
- 6 Preheat oven to 350°F (180°C).**
- 7 Once cooked, remove the spinach and mushroom mixture from the pan and combine it with the reserved cooked sausage. Stir to mix evenly.
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rewriting the script: adapting
written sources for spoken
communication before
delivering them

Put the diced avocados in a large bowl. Gently toss with halved tomatoes, lemon juice, 2 tbsp. oil, 1/2 tsp. salt, and the reserved herbs. Transfer to a large bowl.

summarize

Prepare the tomato-avocado salsa.

Put the diced avocados in a large bowl. Gently toss with halved tomatoes, lemon juice, 2 tbsp. oil, 1/2 tsp. salt, and the reserved herbs. Transfer to a large bowl.

Prepare the tomato-avocado salsa.

split

Put the diced avocados in a large bowl.

Gently toss with halved tomatoes, 2
tbsp. lemon juice, 2 tbsp. oil, 1/2 tsp.
salt, and the reserved herbs.

Transfer to a large bowl.

Prepare the tomato-avocado salsa.

reorder

Dice the avocados and halve the cherry tomatoes.

Put the diced avocados in a large bowl.

Gently toss with halved tomatoes, 2 tbsp. lemon juice, 2 tbsp. oil, 1/2 tsp. salt, and the reserved herbs.

Transfer to a large bowl.

Prepare the tomato-avocado salsa.

redistribute

Dice 2 avocados and halve 12 ounces of cherry tomatoes.

Put the diced avocados in a large bowl.

Gently toss with halved tomatoes, 2 tbsp. lemon juice, 2 tbsp. oil, 1/2 tsp. salt, and the reserved herbs.

Transfer to a large bowl.

Prepare the tomato-avocado salsa.

Dice 2 avocados and halve 12 ounces of cherry tomatoes.

Put the diced avocados in a large bowl.

Gently toss with halved tomatoes, 2
tbsp. lemon juice, 2 tbsp. oil, 1/2 tsp.
salt, and the reserved herbs from step 1.

elaborate

Transfer to a large bowl.

Prepare the tomato-avocado salsa.

visualize

Dice 2 avocados and halve 12 ounces of cherry tomatoes into bite-sized pieces.

Put the diced avocados in a large bowl.

Gently toss with halved tomatoes, 2 tbsp. lemon juice, 2 tbsp. oil, 1/2 tsp. salt, and the reserved herbs from step 1.

Transfer to a large bowl.

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volunteer

Want me to repeat that?

Transfer to a large bowl.

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Put the diced avocados in a large bowl.

Gently toss with halved tomatoes, 2 tbsp. lemon juice, 2 tbsp. oil, 1/2 tsp. salt, and the reserved herbs from step 1.
Want me to repeat that?

signpost

Transfer to a large bowl until the end.

summarize

Prepare the tomato-avocado salsa.

reorder

Dice 2 avocados and halve 12 ounces of cherry tomatoes into bite-sized pieces.

redistribute

visualize

Put the diced avocados in a large bowl.

split

Gently toss with halved tomatoes, 2 tbsp. lemon juice, 2 tbsp. oil, 1/2 tsp. salt, and the reserved herbs from step 1.

elaborate

volunteer

Want me to repeat that?

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signpost

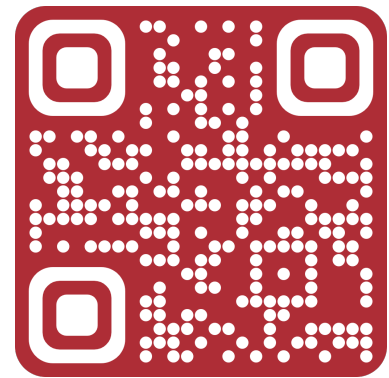
rewriting the script can
motivate new work in
human-centered NLP.

Future Work: Senior Design Project

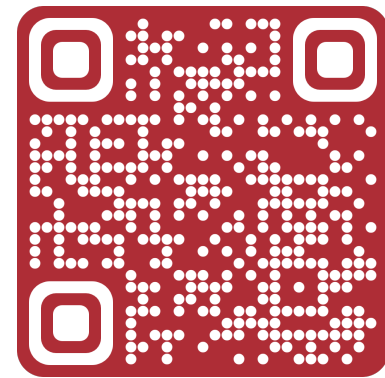


Future Work: Kani

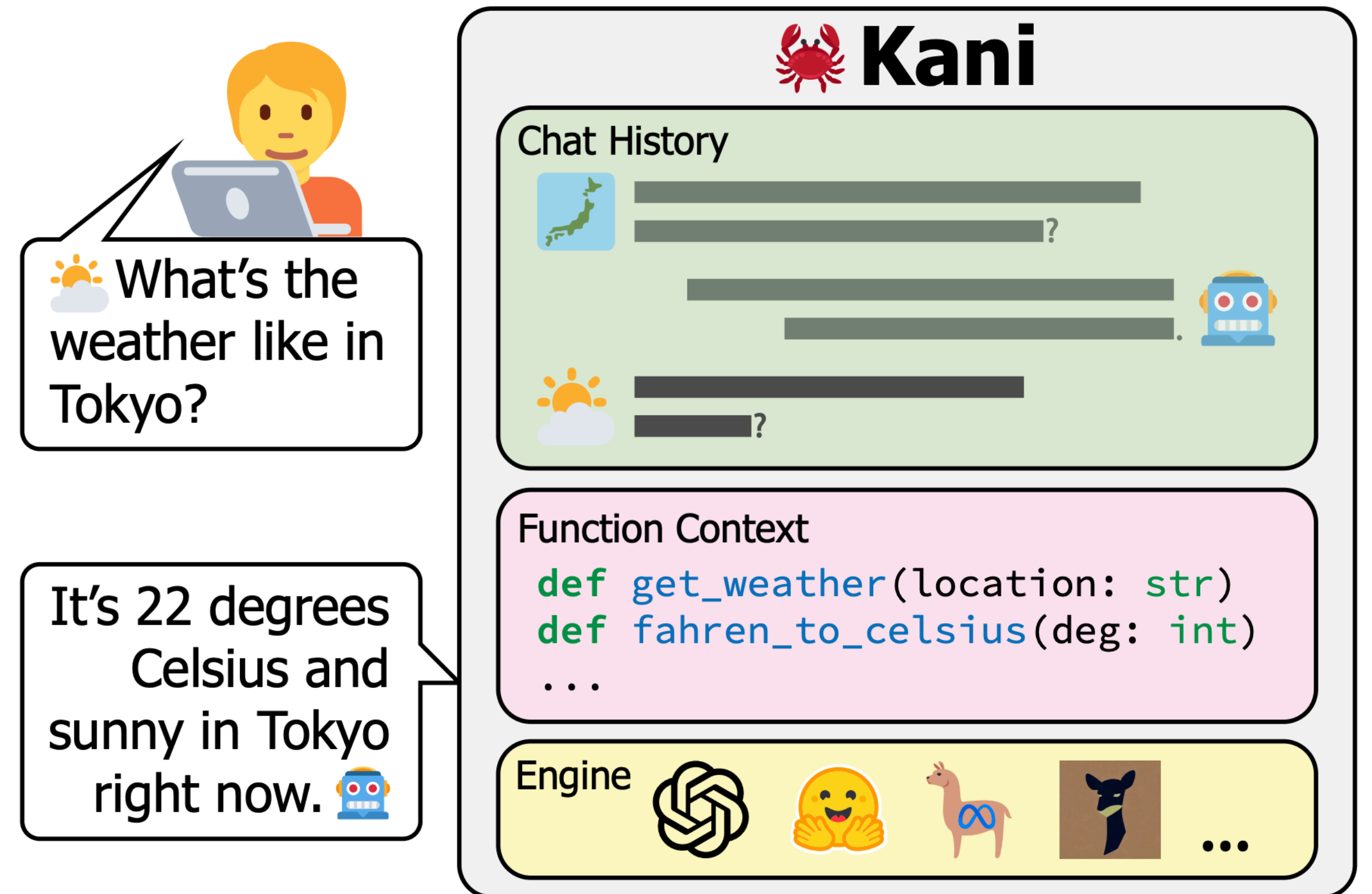
*Lightweight, flexible,
model-agnostic **framework**
for building language
model **applications***



arXiv pre-print
arxiv.org/abs/2309.05542



GitHub Repository
github.com/zhudotexe/kani



Future Work: Audio “Skimming”

Go back to
the *last*
paragraph...



Thank you! Questions?



Paper

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