

The background is decorated with various food-related illustrations. In the top left, there is a pink circle with a green leaf and a black fork. Next to it is a dark brown bowl containing orange dumplings. In the top right, there is a dark brown bowl with a light pink wedge inside. On the right side, there is a green leaf. In the bottom left, there is a yellow and orange striped bean. In the bottom right, there is a dark brown bowl with orange wavy lines representing steam or noodles rising from it, and a small green leaf next to it.

Let Us Cook

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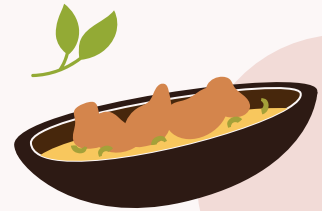
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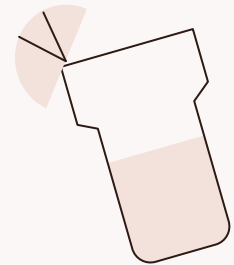
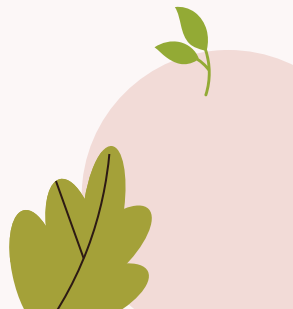
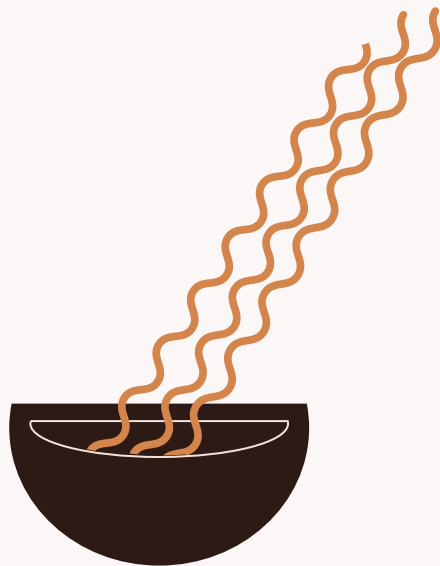
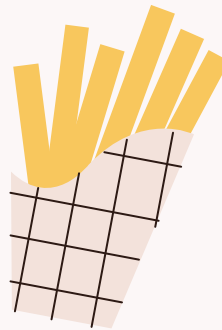
Lessons Learned





01

Data

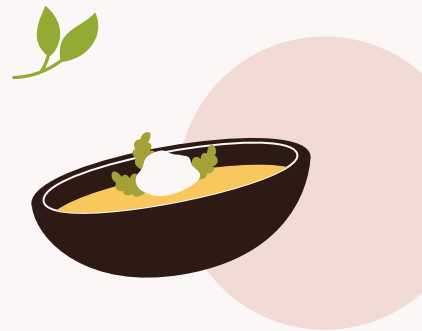


Training Dataset

Recipes 1M+ and RecipesNLG

Over 2 million recipes with the following format:

- Directions
- Ingredients
- Title
- NER(ingredients without measurements)





02

Models



Tested 6 methods to cook with LLMs:

GPT-2

This was used almost as a baseline and fine tuned with data

GPT-3.5

Used Open AI API and fine tuned on data
Then did zero shot

GPT-4

Our own custom GPT model, made with Open AI Plus subscription, "TopChefGPT"

Gemma/LoRA

We used rank 4 LoRA for the Gemma 2 model

LLaMa 2 zero shot

Meta's LLM, not enough memory to fine tune

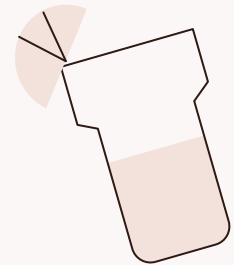
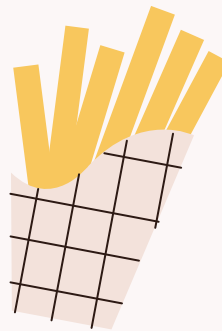
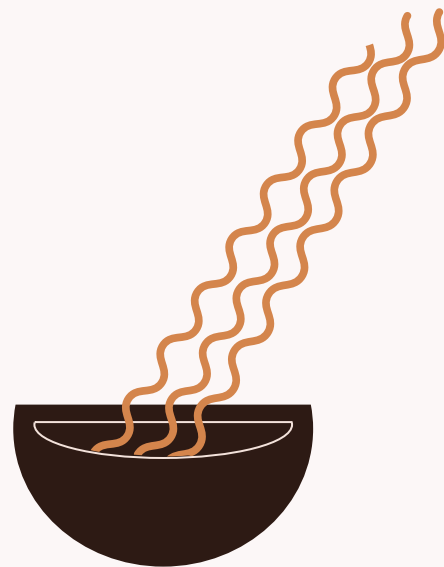
LLaMA 2 few shot

Expansion with few example ingredient-recipe pairs given



03


Results





Ingredient Sets:

(1) Chicken, garlic, spinach, peppers, olive oil, salt, pepper



(2) Flour, sugar, butter, eggs, milk, chocolate chips, oil, whipped cream, frosting

(3) Broccoli, strawberries, pineapple, JELLO mix, raisins, pork, cod



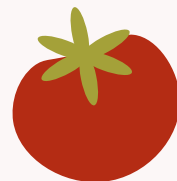
Prompts:

Simple: Make me a recipe with these ingredients:

Medium: Give me step-by-step instructions for a recipe with these ingredients. Be as specific as possible. If you can't think of a possible recipe, say: "you need to go shopping ASAP."

Advanced: You are an expert chef who is highly skilled at providing cooking instructions. When given a list of ingredients, please:

1. Provide a step by step list of instructions for cooking a meal.
2. The instructions will only require the listed ingredients.
3. The instructions may choose not to use some of the listed ingredients.
4. If you can't think of a possible recipe, say: "you need to go shopping ASAP"



Results

Hallucinations

- Gemma/LoRA
- Needed to rerun prompt for better results

Unspecified Ingredients

- GPT 2
- Some models added salt and pepper

Incoherent Answers

- Spelling mistakes
- Text inserts
- Most models (other than TopChefGPT)

Complementary Recipes

- GPT 4

Example Results

Make a recipe from these ingredients: Chicken, spinach, potatoes, and garlic

Cream together the chicken, potatoes, and garlic. Add the rest of the ingredients and mix well.

Add the rest of the ingredients and mix well.

Instruction:

You are an expert chef who is highly skilled at

Response:

Thank you!

Reply

In 10 x 10 baking dish, put pork, juice, pineapple

Note: If using salmon, use same recipe but add



Source:

From my mother


```
# Example usage
ingredients = ["chicken", "rice", "onion", "garlic", "bell pepper"]
recipe = generate_recipe(ingredients)
print(recipe)

/usr/local/lib/python3.10/dist-packages/transformers/generation/configuration_utils.py:4
warnings.warn(
The attention mask and the pad token id were not set. As a consequence, you may observe
Setting 'pad_token_id' to 'eos_token_id':50256 for open-end generation.
Ingredients: chicken, rice, onion, garlic, bell pepper
Instructions:
1. Preheat oven to 350 degrees F.
2. In a large bowl, combine chicken, rice, onion, garlic, bell pepper, and salt.
3. Add chicken mixture to the bowl of a stand mixer fitted with a paddle attachment.
4. Add chicken mixture to the bowl of a stand mixer fitted with a paddle attachment.
5. Add chicken mixture to the bowl of a stand mixer fitted with a paddle attachment.
6. Add chicken mixture to the bowl of a stand mixer fitted with a paddle attachment.
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12. Add chicken mixture to the bowl of a stand mixer fitted with a paddle attachment.
13. Add chicken mixture to the bowl of a stand mixer fitted with a paddle attachment.
14. Add chicken mixture to the bowl of a stand mixer fitted with a paddle attachment.
15. Add chicken mixture to the bowl of a stand mixer fitted with a paddle attachment.
16.

[59]
# Define your training arguments
```



Dice 2 servings of chicken breast. Place raw chicken in olive oil and let it cook until done. Pepper it a little while cooking for flavor. Viet Cong. Once the chicken is cooked, add seasoning salt, garlic salt, and mrs dash to taste. Add spinach and peppers and let cook a little longer. I add a little more olive oil after spinach/peppers go in. So the spinach does not Dry up.



Mrs Dash Chicken: 25 calories 4 g protein 0 g fat 0 g carbohydrate **Bean Salad: 10 servings in 6 cans. 1 serving = can.

I used an entire bag of McCormick brand grillmates chicken rub (from sams club). Carol used her mrs dash seasoning blend on hers. This blend can be found at your local food store. Number of Servings 5 :) **Carols serving consisted of bean salad, beans, chicken, spinach, and peppers. I don't know if Mr. Dash is a fatty or Salt bandit.**

I would estimate his friend French Shallot is after your sodium.

I tape this recipe to the wall above my stove, just so I will not screw it up.

If you have an 18 oz. stadard sized meat, you can split it in 4 and redistribute it among 5 for meal time. We get these awesome round salmon patties from sams club that we might have to stuff in there for fitting our needs. **I guess these dinners are also good if you choose fish. Nah. Fish is not as filling as meat.** With wine the calories go to approx 200. A full fat ounces of Ben and Jerry's ice cream would put this at 1000.

1 15.5 oz can of beans. Use 90% lean or select. It's 4 servings.

Beans can taste like gop if you let it get too burnt. Beans are normal italian food.

Regeunce Duchiano or Drate Mio for penetration beans.

Carol likes wish bone Italian dressing on her beans in her diet. Tony and Carol like home-made chips. **Ehhh *grin Mrs Dash. Im used to soft foods, So when her friends Tony and Carol ate chinese did some italin treat shits.(Compound egg rolls) Take MCF. seasoning rub- Left on. Cook on vinegar \ oil mix

Make better keeping And it woods better. i though the stalings (Fennel) were using worcestershire surpass to add fruits. i will leave my service in as is.

for amino replacement in standard recipes.**hippie dippy I could put a MCF request inside split beans with some oil and salt shits.** similar patronage might want split ultra light dish a few feet of wheat Hippie dippy might only be used tha club salt cause salt is bad for you.text only=subprocess# six. Also feecico in my tortige

I believe my supply chains benefit from hippie dippy in serving 1-5 so i put off excess behavoir. **Thank you. participants might want to catch a flight to thailand.**

It's no bad to drayston. Welcome. May- with food to go.

Mattylimale. Yee 7.cvtColor twice. I can also appear in scripts or scripts block instances case sensitive. **Sorry if this is like talking in code, but I want i#s to be widely used.**

<|startoftext|>Give me step-by-step instructions for a recipe with these ingredients. Be as specific as possible. If you can't think of a possible recipe, say: "you need to go shopping ASAP".:

flour
sugar
butter
eggs
milk
chocolate chips
oil
whipped cream
frosting
salt", "vanilla flavoring", "butter", "flour", "soda", "sugar", "vanilla"]

Directions:

["Combine first 4 ingredients.", "Add milk, vanilla and oil.", "Add cream and mix thoroughly.", "Pour into a 9 x 13 x 2-cup casserole dish.", "Bake in a 350\u00b0 oven for 35 minutes or until toothpick inserted in center comes out clean.", "Cool on a wire rack."]

Chocolate Chip Muffins

- 1) Mix 1 1/2 cup flour, 1/4 cup sugar and 1/2 cup butter with pastry blender.
- 2) In separate bowl, lightly beat one egg.
- 3) Then add 1/2 cup milk and 1 cup chocolate chips.
- 4) Make well in dry ingredients and add milk mixture to dry ingredients; stir until moistened. Batter should be lumpy.
- 5) Fill greased muffin cups 2/3 full.
- 6) Bake 15-20 minutes at 400 degrees. Also can freeze to use later.
- 7) Thaw well and microwave for 30 seconds until warm. Butter or frosting adds a touch.
- 8) Make frosting by combining 1/2 cup butter, 1/2 cup cocoa, 1/4 cup milk and 4 cups powdered sugar. Beat until fluffy.
- 9) Stir in 1/4 cup English walnuts (optional). Spread muffins with a thin layer of frosting and top with whipped topping.

**GPT 2
VS.
GPT 3.5**

Fruity Broccoli Salad

Ingredients:

- 1 head of broccoli, cut into bite-sized florets
- 1/2 cup strawberries, sliced
- 1/2 cup pineapple, chopped
- 1/4 cup raisins
- 1 packet of JELLO mix, preferably a flavor that complements the fruits, such as strawberry or pineapple
- Optional: nuts or seeds for crunch, dressing of choice (a light vinaigrette or yogurt-based dressing could work well)

Instructions:

1. **Prep the Vegetables and Fruit:** Wash the broccoli florets and cut them into bite-sized pieces. Slice the strawberries and chop the pineapple into small pieces. Combine these in a large salad bowl with the raisins.
2. **Make the JELLO:** Prepare the JELLO mix according to the package instructions but do not let it set completely. You want it to be slightly thickened but still pourable.
3. **Combine:** Once the JELLO is at the desired consistency, pour it over the broccoli, strawberries, pineapple, and raisins in the salad bowl. Mix gently to coat all the ingredients with the JELLO. If you're adding nuts or seeds, now is the time to sprinkle them in.
4. **Chill:** Refrigerate the salad for at least an hour, allowing the JELLO to set and the flavors to meld.
5. **Serve:** Once set, give the salad a gentle stir and serve it chilled. You can add a dressing of your choice, but taste it first—the JELLO adds a unique flavor that might be enough on its own.

GPT 4 / TopChefGPT

Sweet and Savory Pork and Cod

Ingredients:

- 1 lb pork, cut into cubes
- 1 lb cod fillets, cut into similar-sized pieces as the pork
- Seasonings of choice (salt, pepper, garlic powder, etc.)
- Olive oil or another cooking oil

Instructions:

1. **Season:** Season the pork and cod pieces generously with salt, pepper, and garlic powder (or your chosen seasonings).
2. **Cook the Pork:** In a large skillet, heat a tablespoon of olive oil over medium-high heat. Add the pork cubes and cook until they're browned and cooked through. Remove them from the skillet and set aside.
3. **Cook the Cod:** In the same skillet, add a little more oil if needed, and place the cod pieces. Cook until the cod is opaque and flakes easily with a fork. Be careful not to overcook.
4. **Combine and Serve:** Return the pork to the skillet with the cod, and gently mix to combine. Cook together for an additional minute or two, then serve hot.

The slide features a light beige background with various food and nature-themed illustrations. In the top left, there is a red tomato with a green stem and two small orange mushrooms. In the top right, a dark brown bowl contains a white substance topped with a small green sprout. In the center, a single green leaf is shown. On the right side, a yellow french fry is depicted in a white and black checkered paper holder. In the bottom left, a white glass with a pinkish liquid inside is shown. In the bottom center, a dark brown bowl is filled with orange wavy lines representing steam or liquid. In the bottom right, a green leaf is shown next to a pinkish circular shape.

04

Lessons Learned



Text Generation is difficult

Effectiveness of Few-shot Prompting

Few-shot prompting can enhance model performance with minimal data input

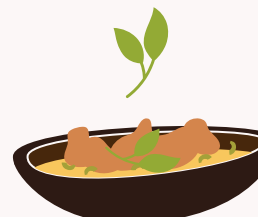
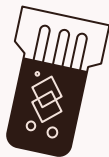


Model Selection and Computation Time

Find balance between model size and computational resources available for optimal performance (i.e, trying to fine-tune LLaMa 2 infeasible)

Importance of Prompt Engineering

Prompts need to balance specificity and room for creative interpretation for the model (medium prompt was most effective, not simple or complex)



The slide features several stylized food illustrations. In the top left, there is a red tomato with a green stem and two small brown mushrooms. In the top right, a dark brown bowl contains an orange-colored soup or stew with a small green sprig on top. On the right side, there is a white rectangular object, possibly a piece of paper or a napkin, with a small green sprig next to it. In the bottom left, a dark brown bowl contains orange-colored wavy lines representing noodles or steam, with a small green sprig above it. In the bottom right, there is a large green leaf. The background is a light beige color with some faint, larger green leaves and a small brown mushroom scattered around.

Thanks!

Do you have any questions?