

The background of the slide is decorated with various hand-drawn food items in a sketchy style. In the top left, there are two tomatoes on a yellow background. In the top center, a bunch of green beans is tied together. In the top right, there is a whole green pepper and a slice of citrus fruit. On the left side, there is a whole avocado. In the bottom left, there is a green bell pepper. In the bottom center, there is a slice of citrus fruit, a small chili pepper, and a whole chili pepper. In the bottom right, there is a whole chili pepper, a slice of citrus fruit, and a whole chili pepper. The text 'ByteBITES' is centered in the middle of the slide, with 'Byte' in red and 'BITES' in white on a red background. Below the title, the names 'Grace Guo, Yilin Qi, Victoria Tang' are listed in a dark grey font.

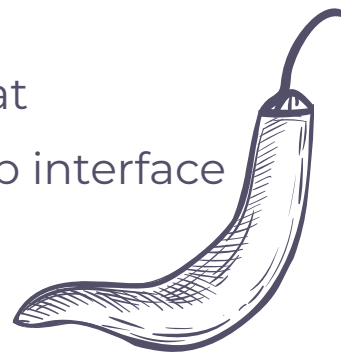
ByteBITES

Grace Guo, Yilin Qi, Victoria Tang



ByteBITEs

Generating **nutritious, personalized** recipes that
best **utilize user ingredients** through a user-friendly web interface





01

Problem Statement

Target Audience



44%

of Americans meal prep regularly

26.9%

of Americans meal prep to save time

22.2%

of Americans meal prep to eat healthier



[MyProtein Americans Meal Prepping Habits 2022 Study](#)

Current cooking resources overlook user needs

allrecipes

Find a recipe or ingredient

DINNERS MEALS INGREDIENTS OCCASIONS CUISINES KITCHEN TIPS NEWS FEATURES

Advertisement

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Jamie Oliver



Braised Beef

★★★★★ 4.9 (10) | 9 REVIEWS | 2 PHOTOS

An elevated version of homestyle pot roast, this braised beef is hearty and full of earthy richness. It would pair well with mashed potatoes, buttery noodles, or crusty bread.

By [Nicole McLaughlin](#) | Updated on July 27, 2023

Save

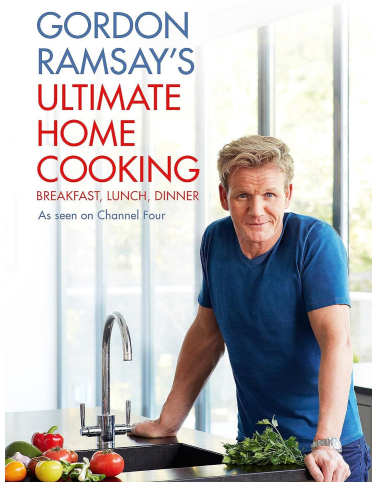
Rate

Print

Share



GORDON
RAMSAY'S
ULTIMATE
HOME
COOKING
BREAKFAST, LUNCH, DINNER
As seen on Channel Four



inconvenient, time consuming
Little to no nutritional information





an Average American spends

\$1300

on food that end up being unused / discarded

William & Mary 2020 food waste study

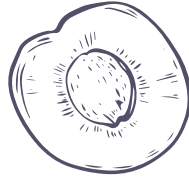


Problems that ByteBITEs addresses



Convenience

Our user can conveniently generate recipes with our user-friendly web app.



Nutrition

Recipes generated by ByteBites provide detailed nutritional facts to users.



Waste

ByteBites generates recipes that optimally utilize ingredients that the user has bought from their grocery store runs.

Target Audience



College Students



Early Career
Individuals

- Looking for efficient, nutritious ways to prep meals
- Looking to optimally utilize ingredients to save costs
- High acceptance for AI-based applications



02

Unique
Value
Proposition

Our Uniqueness

01

Automated Ingredient Recognition

Use OCR model to identify ingredients from receipt

02

Personalized Meal Planning

Dietary restrictions, time constraints & meal types

03

Health and Wellness integration

Monitor nutrients intake and provide insights on user's diet

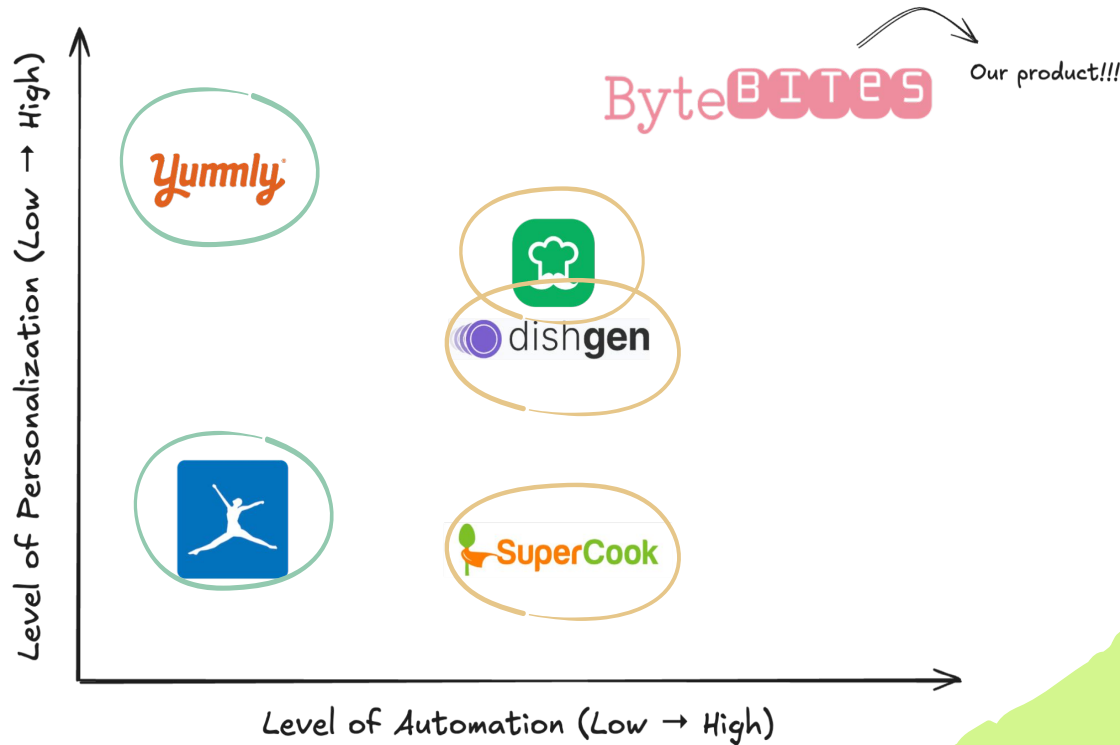
04

User-Driven Recipe Refinement

Incorporate user ratings with RLHF to improve recipe recommendation



Competitive Position



03



Bytebites Demo



O4

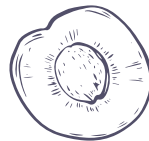
Scalability and Efficiency

Model & Optimization



Data

We use recipe data from food.com containing **180K recipes** and **700K reviews**, reflecting 18 years of user interactions and uploads.



Model

We finetune **facebook-opt-125m** model on the recipe dataset and we plan to use the **Llama3-8B** model in our final application.

Fine-tuning



Task specific

**PEFT
(LoRA)**



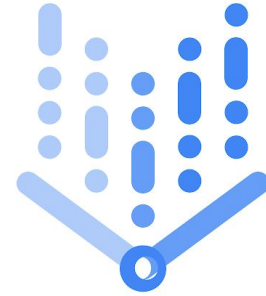
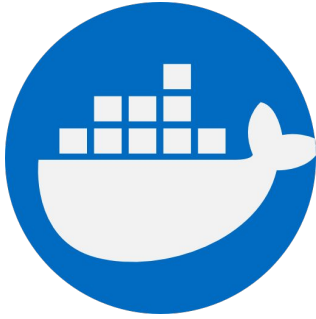
Efficient Training

RLHF



Tailored for user

Infrastructure Considerations



Model Optimization & Scalability

Fine-tuning

PEFT
(LoRA)

RLHF



Model Optimization & Scalability



Fine-tuning

The diagram consists of three rounded rectangular nodes arranged horizontally. The first node is yellow and contains the text 'Fine-tuning'. The second node is teal and contains the text 'PEFT (LoRA)'. The third node is light green and contains the text 'RLHF'. Below each node is a descriptive phrase: 'Task specific' for Fine-tuning, 'Efficient Training' for PEFT (LoRA), and 'Tailored for user' for RLHF. A decorative green shape is visible on the left side of the slide.

Task specific

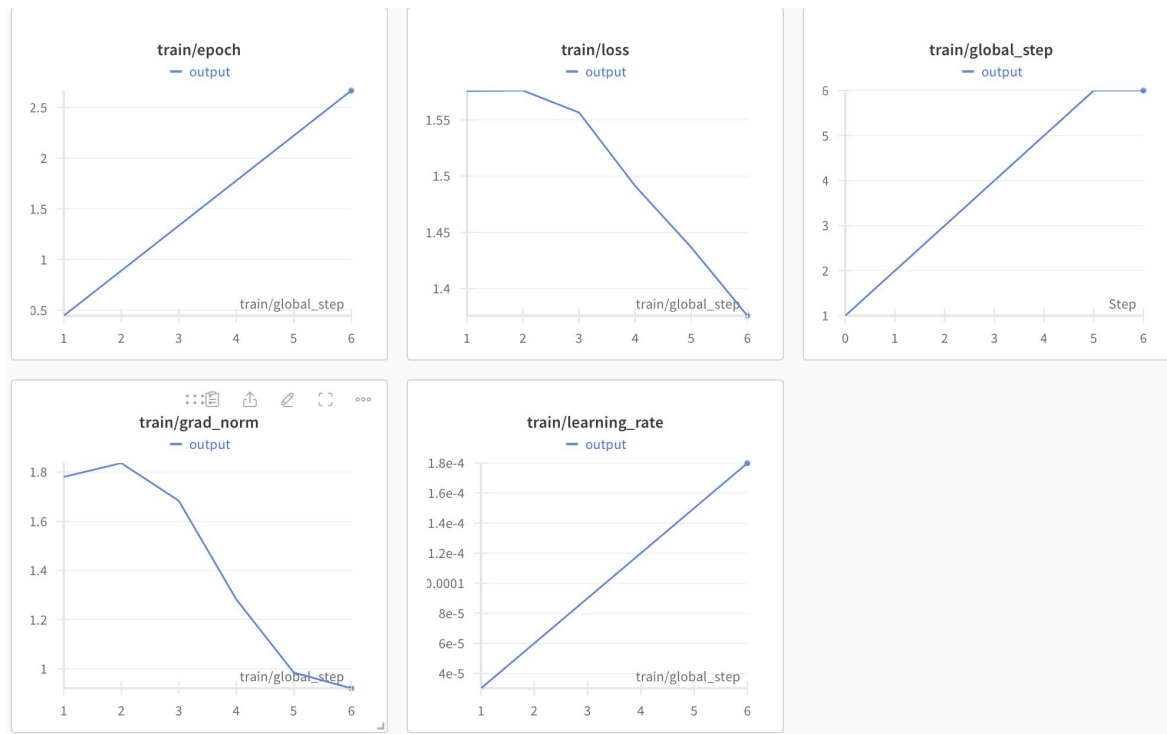
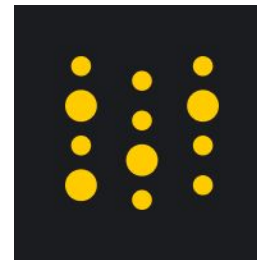
**PEFT
(LoRA)**

Efficient Training

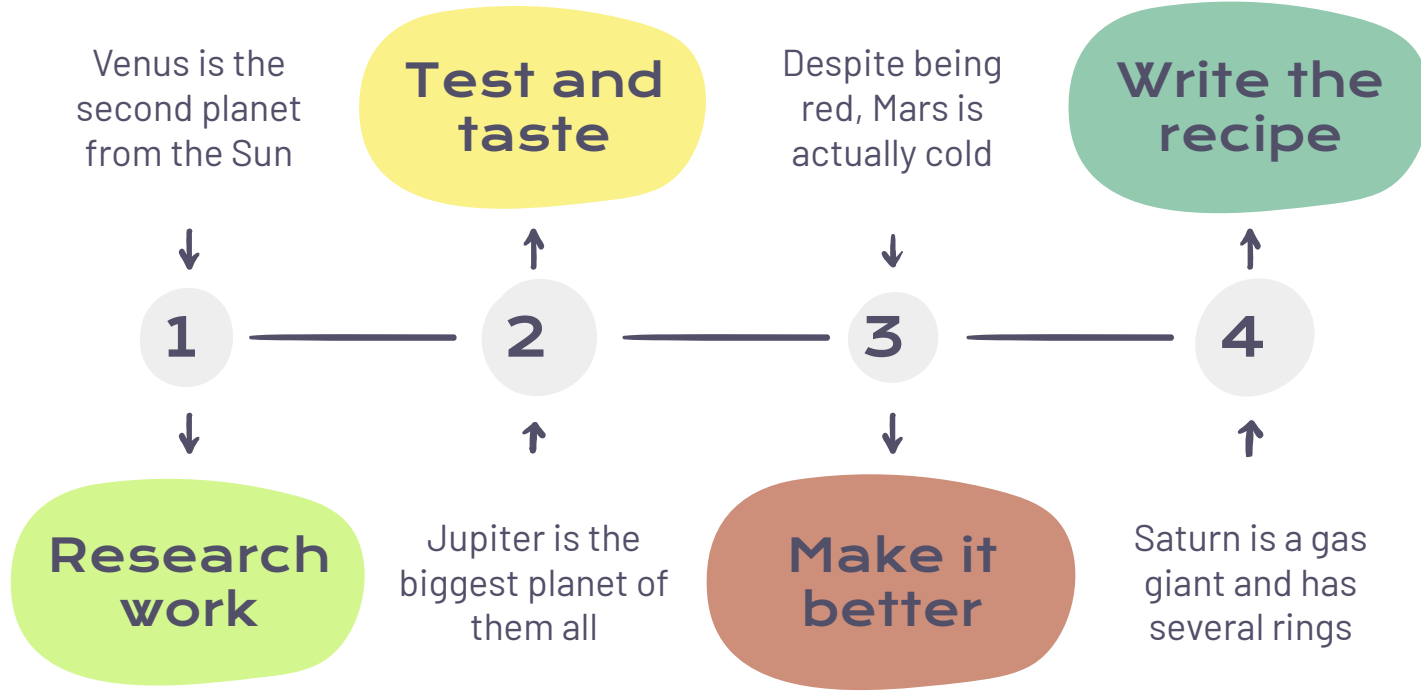
RLHF

Tailored for user

Performance Monitoring



HOW TO DEVELOP RECIPES



Technical Scalability

Discuss how your application can scale to meet growing demands.

1. GCP infrastructure: dynamically adjust our resources
2. architecture including cloud storage and computing solutions - support data-intensive processes like OCR and large language model (LLM) operations
3. Containerized deployment via docker.
4. Vertex AI: automatically scales for real-time ML workloads, ensuring high availability for our users



Performance Optimization

Explain any optimizations implemented for efficiency (e.g., fine-tuning, infrastructure choices).

To reduce training costs, we select a medium-sized ML model as our base model. For optimized performance, we have fine-tuned the language model to specialize in ecipe generation. We use PEFT (LoRA) to optimize for efficient fine-tuning. We save the fine-tuned model weights so that the model can be loaded and directly deployed on Vertex AI for our application. This targeted fine-tuning enhances model accuracy and reduces latency, making interactions faster and more relevant to user needs.

Additionally, the application uses RAG (Retrieval-Augmented Generation) to handle complex queries and provide highly contextualized responses, significantly improving efficiency in generating personalized meal plans. We're also implementing caching mechanisms for frequently requested data and pre-computing certain steps in the recipe design pipeline to minimize runtime and improve response times.



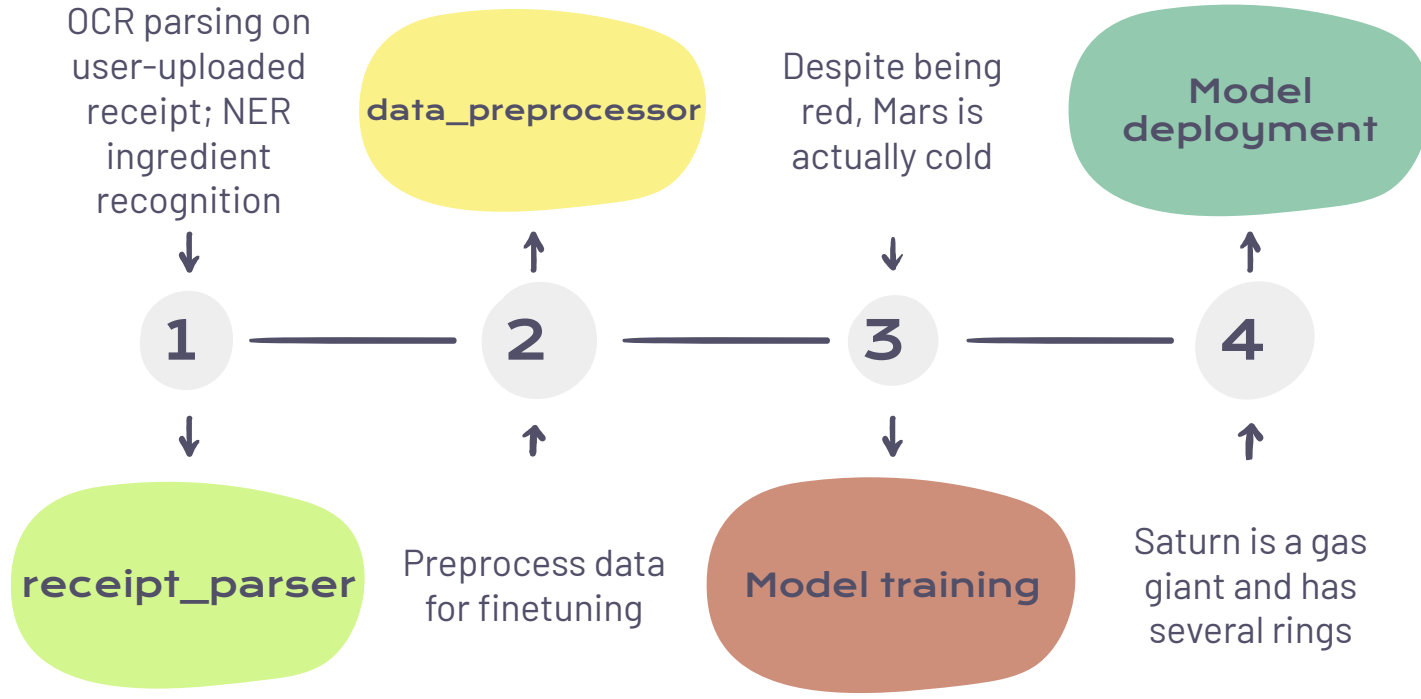
Infrastructure considerations

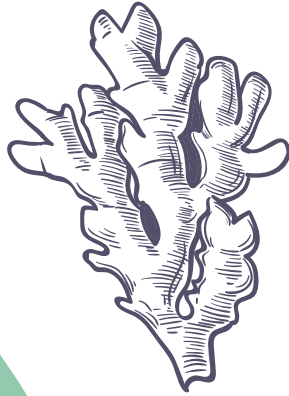
We will be using GCP services for robust cloud computing, storage, and ML model hosting.

- GCP Cloud Storage for secure data handling and version control
- Vertex AI for streamlined machine learning deployment, and Vertex AI Pipelines for efficient ML workflow management
- Docker for containerization, ensuring consistent and rapid deployment across environments



ByteBites pipeline





04

Future Development & Growth Potential

05

Future Development
& Growth Potential



Future Development Roadmap

Personalization

Improve recipe suggestions based on individual tastes, dietary restrictions, and past behavior

Community

Foster a community of cooking enthusiasts and encourage social interaction.

Integration

Seamless interaction between the app and smart kitchen appliances.

FAMILY

Saturn is a gas giant and has several rings

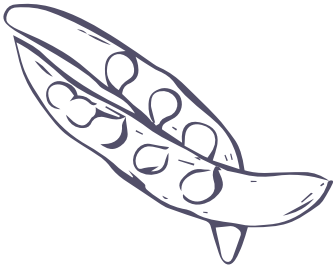
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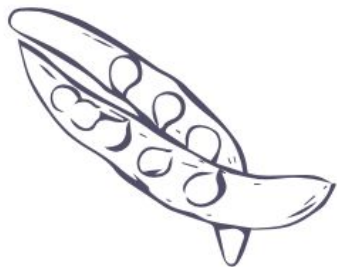
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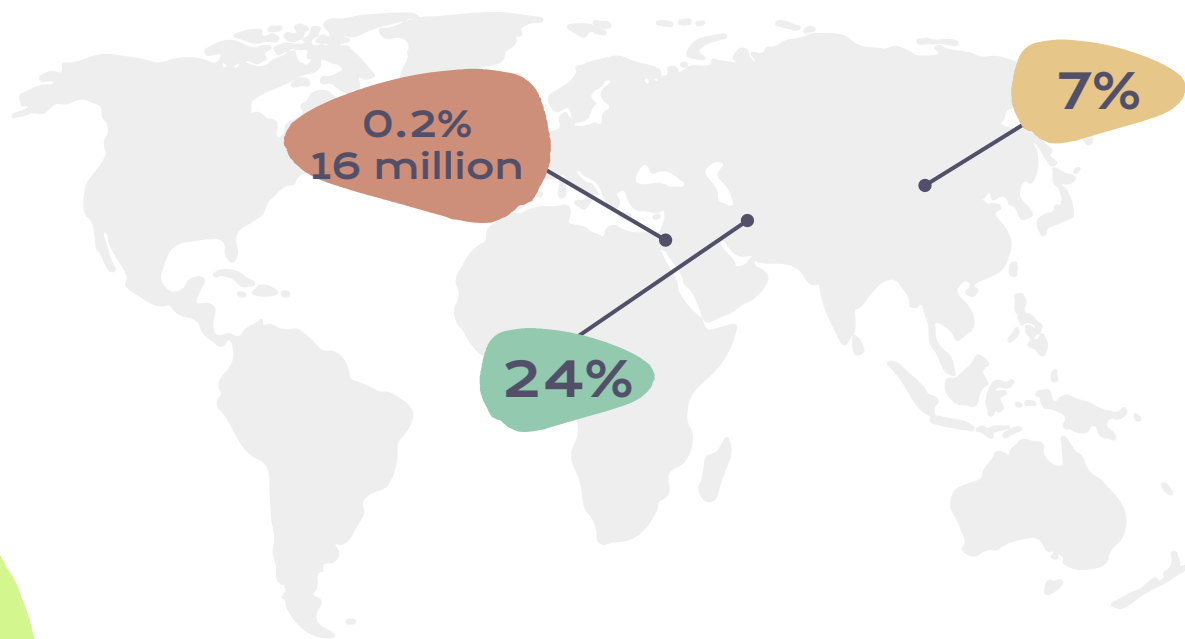
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Expanding Globally Through Localization

Objective: To attract international users by tailoring the app's content to various languages and regional culinary preferences.



Islam

Halal food: no alcohol, cblood, pork

Buddhism

Vegetarianism

Judaism

Kosher food: no port and shellfish

Retail Partnership

Objective: Integrate with grocery retailers to enable direct ordering from the app, making shopping seamless and convenient.





THANKS

DO YOU HAVE ANY QUESTIONS?

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