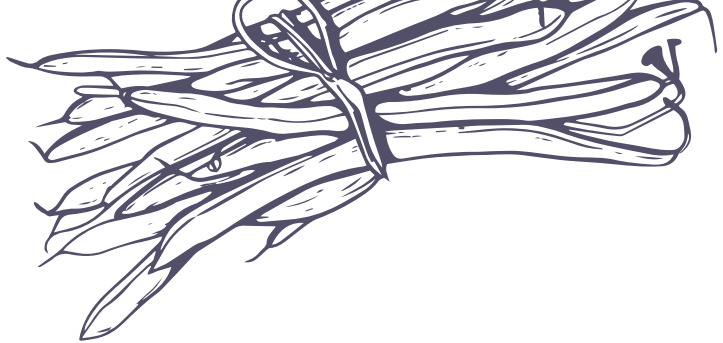
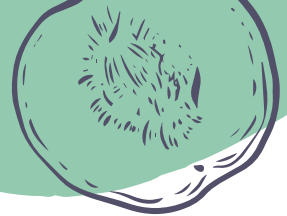
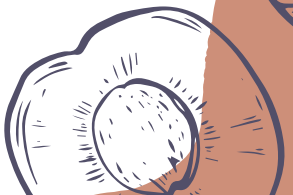













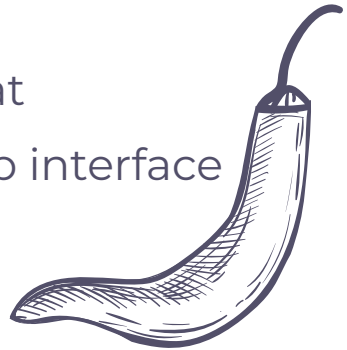
ByteBITES

Grace Guo, Yilin Qi, Victoria Tang

ML + Nutritional Science

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%

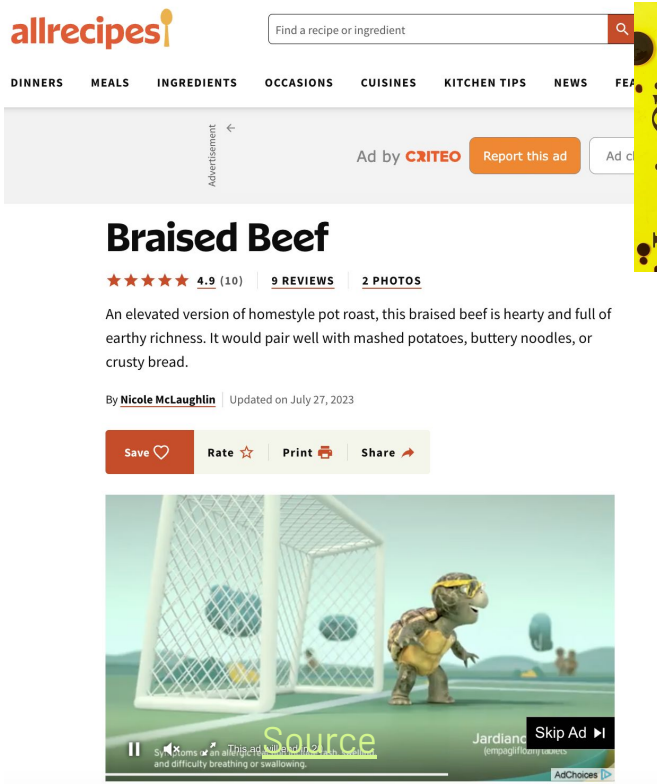
of Americans meal prep to save time

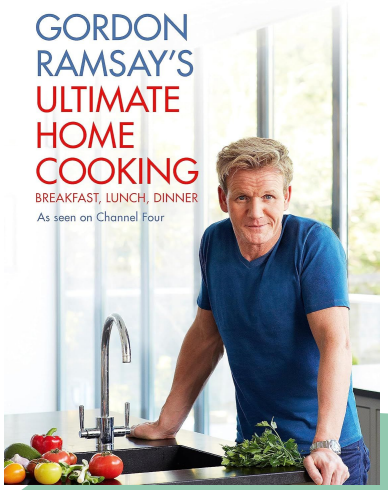
22.2%

of Americans meal prep to eat healthier

MyProtein Americans Meal Prepping Habits 2022 Study

Current cooking resources overlook user needs





inconvenient, time consuming

Little to no nutritional information

an Average American spends

$1300

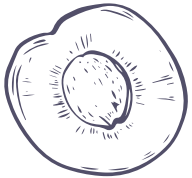
on food that end up being unused / discarded

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

- 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

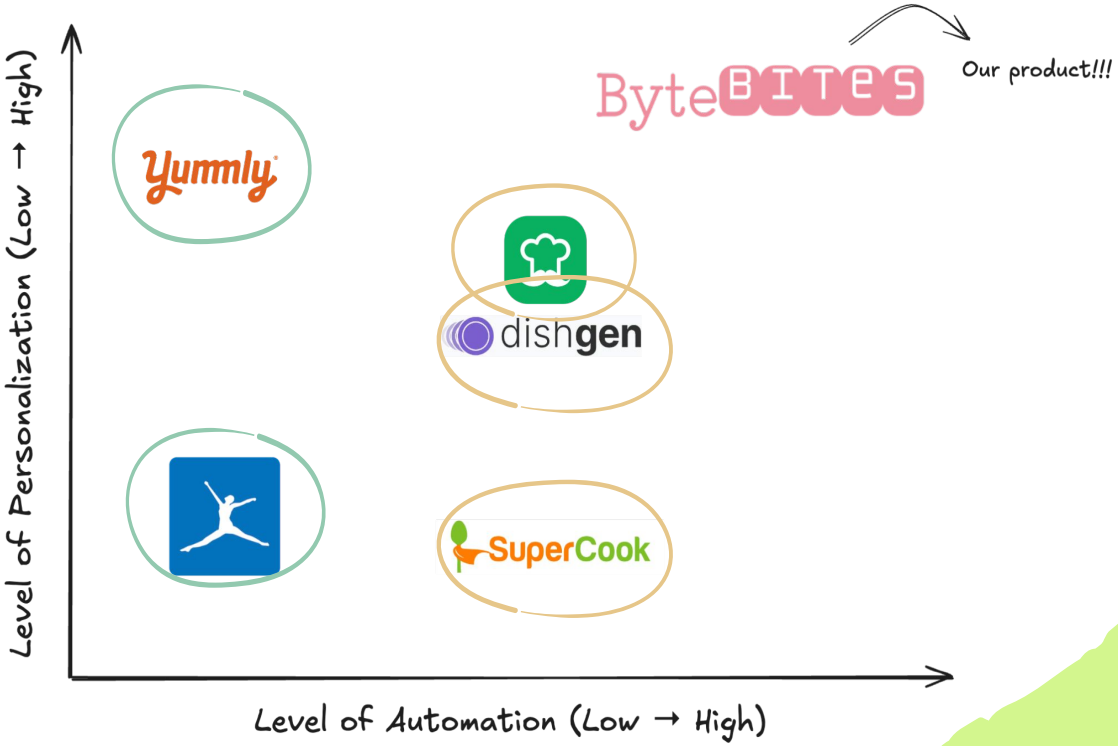
Monitor nutrients intake and provide insights on user's diet

04

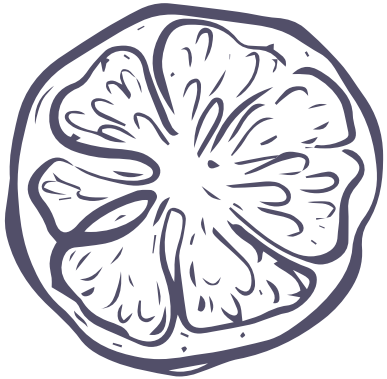
User-Driven Recipe Refinement

Incorporate user ratings with RLHF to improve recipe recommendation

Competitive Position



03



Bytebites Demo

04

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

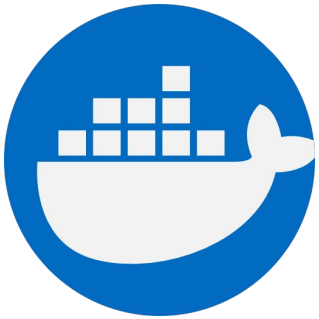
PEFT (LoRA)

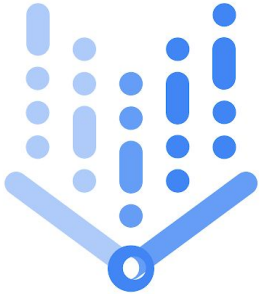
- Efficient Training

RLHF

- Tailored for user

Infrastructure Considerations



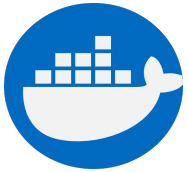


Model Optimization & Scalability

Fine-tuning

PEFT (LoRA)

RLHF



Model Optimization & Scalability

Fine-tuning

Task specific

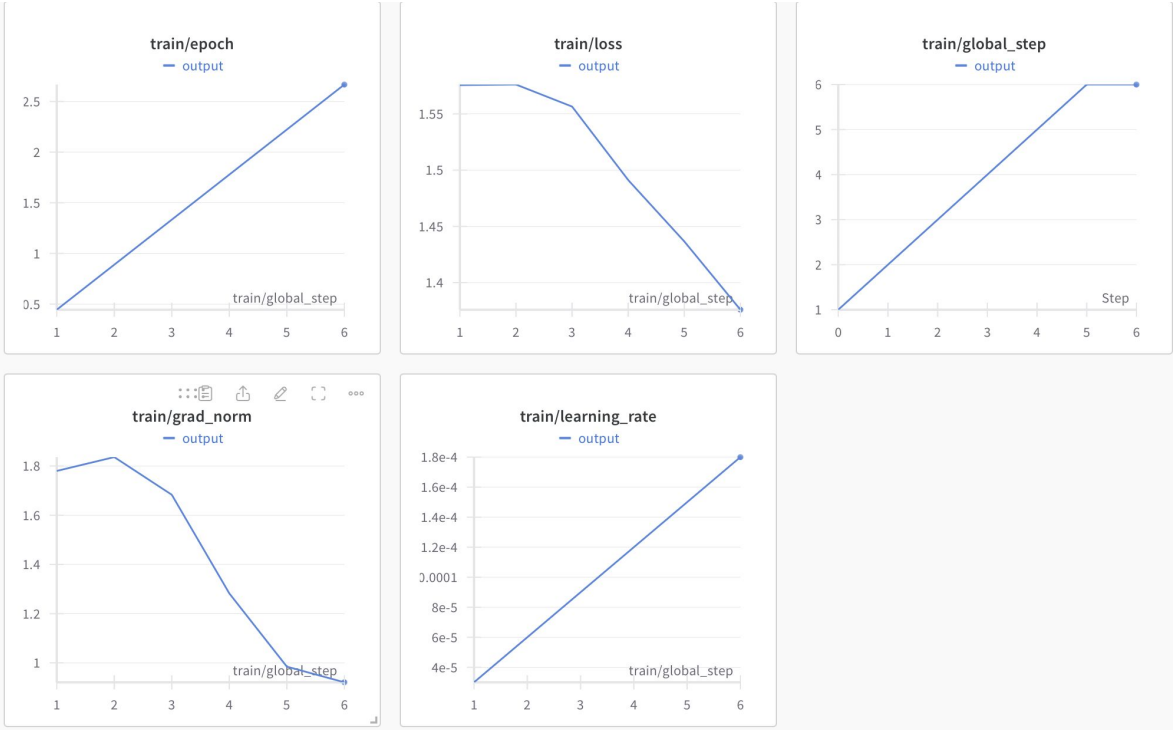
PEFT (LoRA)

Efficient Training

RLHF

Tailored for user

Performance Monitoring



HOW TO DEVELOP RECIPES

1

Research work

Venus is the second planet from the Sun

2

Test and taste

Jupiter is the biggest planet of them all

3

Make it better

Despite being red, Mars is actually cold

4

Write the recipe

Saturn is a gas giant and has several rings

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

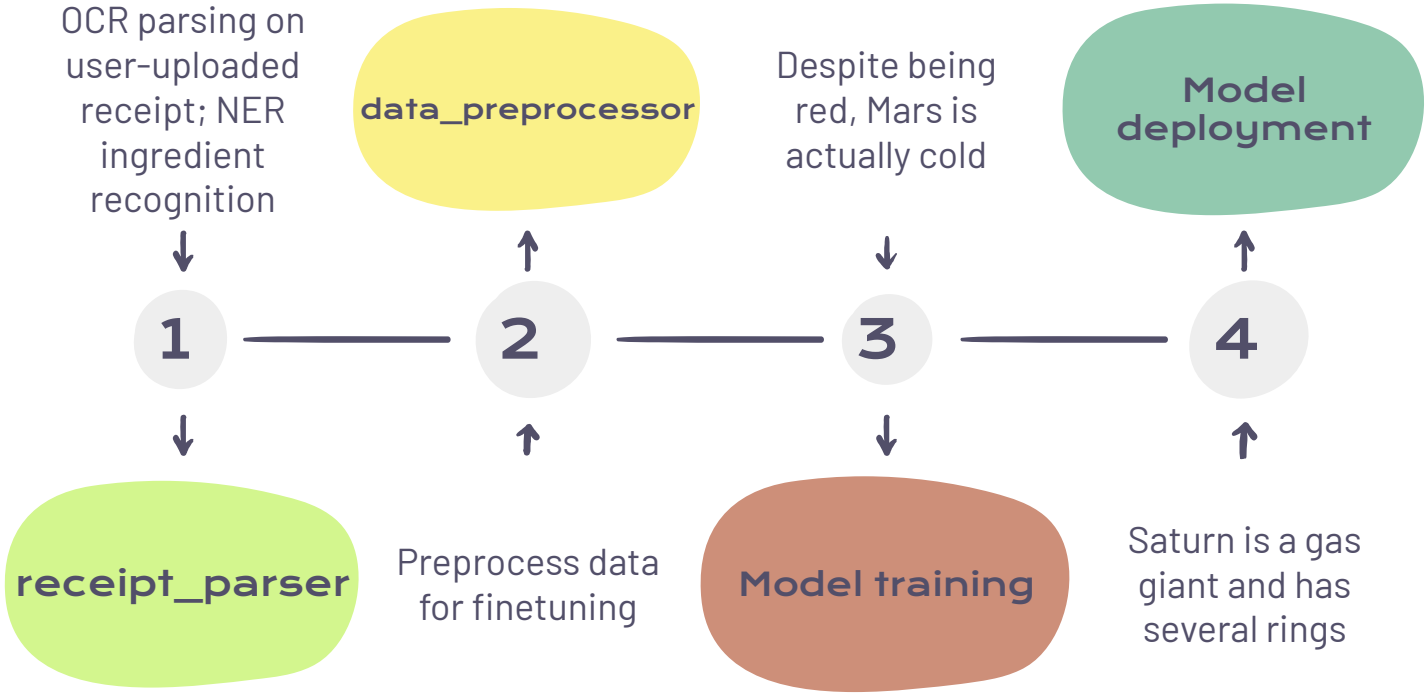
We will be using GCP services for robust cloud computing, storage, and ML model hosting.

- 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

Future Development Roadmap

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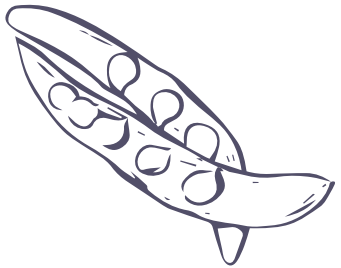

Future Development Roadmap

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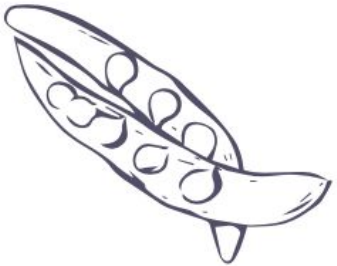

Integration

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Future Development Roadmap

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Integration

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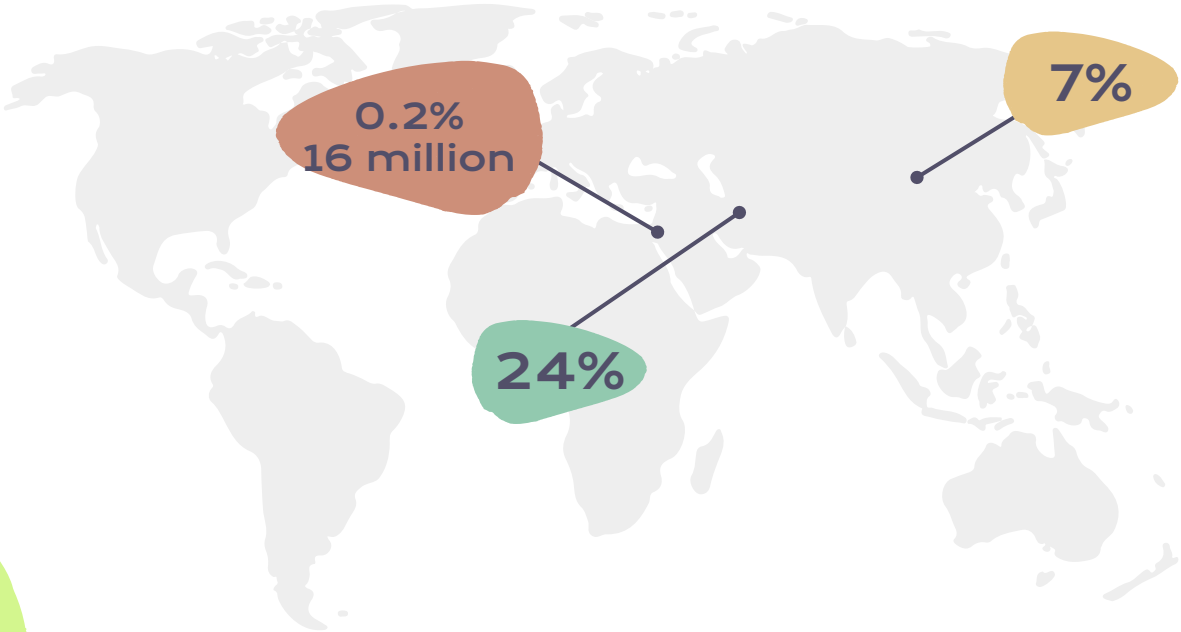
Community

Foster a community of cooking enthusiasts and encourage social interaction.

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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