CONTENT

Product Background and User Scenarios

We explain the motivation behind our system and illustrate how different users interact with it.

Chieh-Yu TIEN (Jenny)
Information Management, NTPU

Product Background

Hard to Eat Right When Eating Out

- People care more about **healthy eating** and want to control **calories, protein, and sodium**.
- But **eating out lacks clear nutrition info**, making it hard to track intake.
- This drives demand for simple, nutrition-aware home recipes.

Recipes Lack Personalization

- Most platforms just show how to cook.
- They don't filter based on **health needs** like hypertension or nutrition goals.
- Users have to search and calculate nutrients on their own.
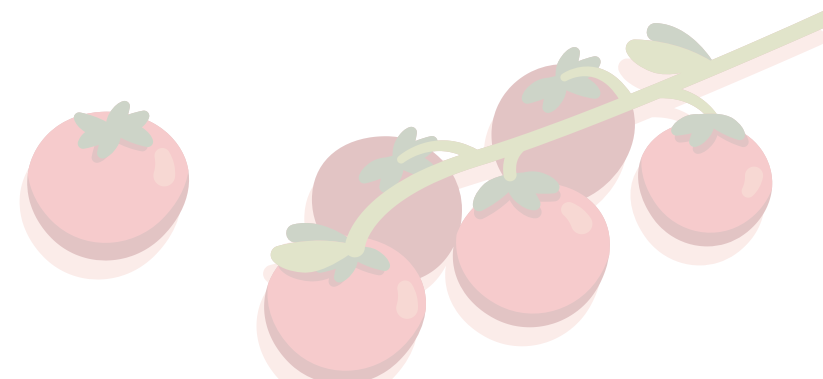
Mary
Age:55
Identity:
Housewife

Background

- Suffers from **hypertension**
- Primarily **cooks** meals **at home**
- **Not good with tech**, but knows how to **use Line**.

Objective

Hopes to improve health through diet and home cooking, and prefers **not to rely on medication** for control.

Challenges

- Doesn't know how to read **nutrition labels**.
- Afraid tech is too hard to use.

Scenario

When filling in her personal information, she selects the hypertension category. The system automatically filters suitable recipes for her, making it easy to understand and clear when choosing what to eat.

User Story

As a hypertension patient who isn't good with technology and often feels confused about how to cook healthily, I hope to have a simple tool that tells me what I can eat, so I can confidently manage my diet.

Ben
Age: 30
Identity: Office worker

Background

- Wants to **lose weight** due to obesity
- Plans to control diet by cooking at home
- Has **limited knowledge** about **nutrient**s required for weight loss

Objective

- Find simple, weight-loss-friendly recipes
- Quickly decide what to cook after work
- Build healthy habits and steadily lose weight

Challenges

- Lacks knowledge to choose the right foods
- Too busy to study calories and nutrients
- Overwhelmed by too many or unclear recipe options

Scenario

After work, he opens the LINE Bot and selects "Weight Loss." Based on his personal information, the system calculates and recommends suitable recipes with cooking steps and nutritional information, helping him prepare meals quickly and stay on track with his dietary goals.

User Story

As a busy office worker trying to lose weight, I **want quick recipe suggestions** that fit my needs, so I can eat healthy without extra effort.

STP Analysis , 4P Analysis and SWOT Analysis

This section shows how we apply STP, 4P and SWOT to better understand our target users and position our product.
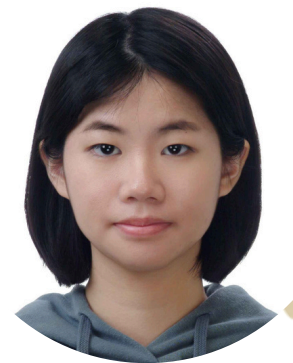
Jia-Ci WEN (Janet)
Information Management, NTPU

STP ANALYSIS

Segmentation

Body Condition: Normal weight / Overweight/ Obese

Medical History: No condition/ Hypertension / Diabetes

Health Goals: Maintain weight / Weight loss / Manage blood pressure

Physical Activity Level: Sedentary / Light / Moderate / Active / Very Active

Technology Usage Habits:LINE user / Health app user

Cooking Habits: Regular home cook / Occasional cook / Does not cook

Targeting

Overweight or obese LINE users with health goals (e.g., weight loss, blood pressure control) who cook at home , seeking simple and personalized dietary advice.

Positioning

"Your personal smart meal assistant on LINE — tailored to your body, habits, and goals."

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4P ANALYSIS

PRODUCT

Core Features
- Daily calorie estimation (TDEE)
  - Smart recipe recommendations
  - Nutrition info & food comparison
  - Cooking tips and interactive guidance

PRICE

Short-term
Free basic features for all users

Long-term
Free basic features
&
feature-based unlock model

PLACE

LINE Bot

PROMOTION

Social media
LINE official account

Collaborative promotion
KOL & nutritionist

Offline promotion
(QR codes in clinics, gyms, markets)

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MARKETING
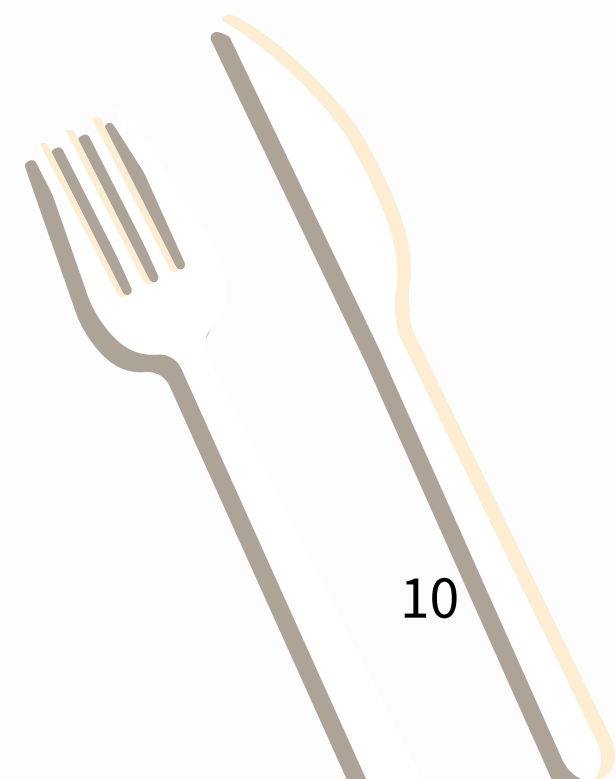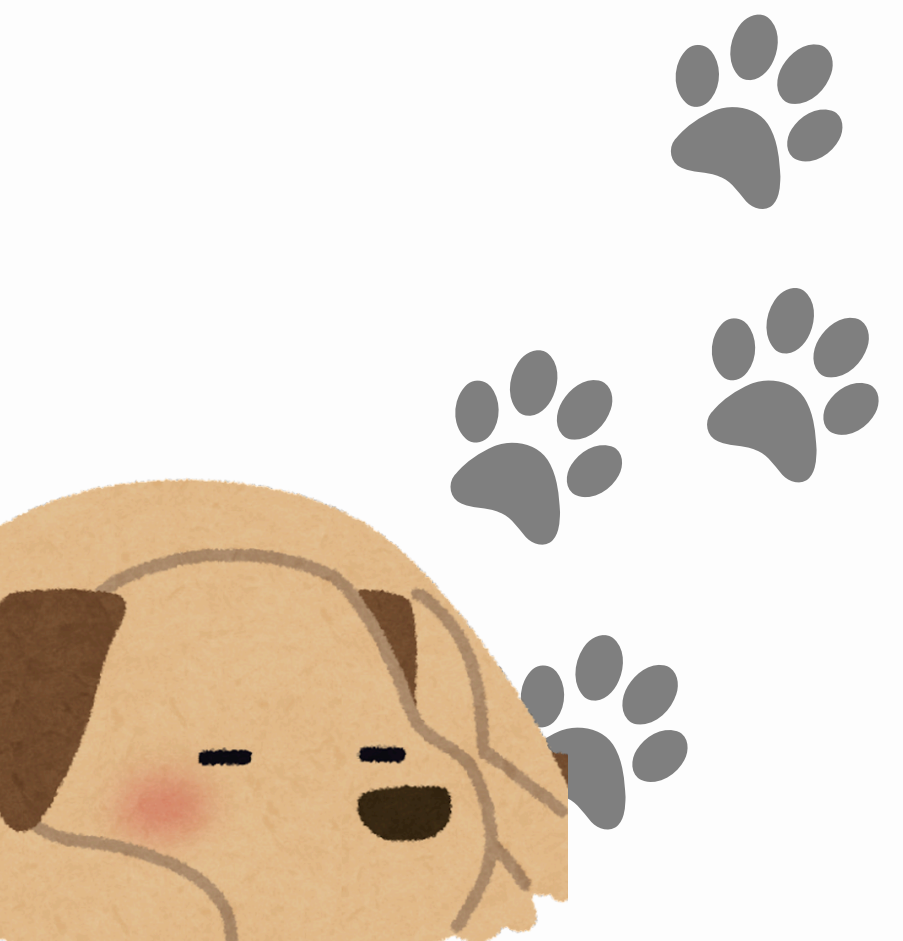
SWOT ANALYSIS

STRENGTHS

- **AI Tools**
Application of advanced technologies such as LLM and RAG.

- **Line**
Leverages LINE, a widely-used and familiar platform

WEAKNESSES

- Users may doubt or hesitate to trust AI recommendations

OPPORTUNITIES

- Healthy Eating Market Growth

- Opportunities for cross-industry partnerships

THREATS

- Established competitors in the health and nutrition space

- Competitiors are easily to replicate

S W O T
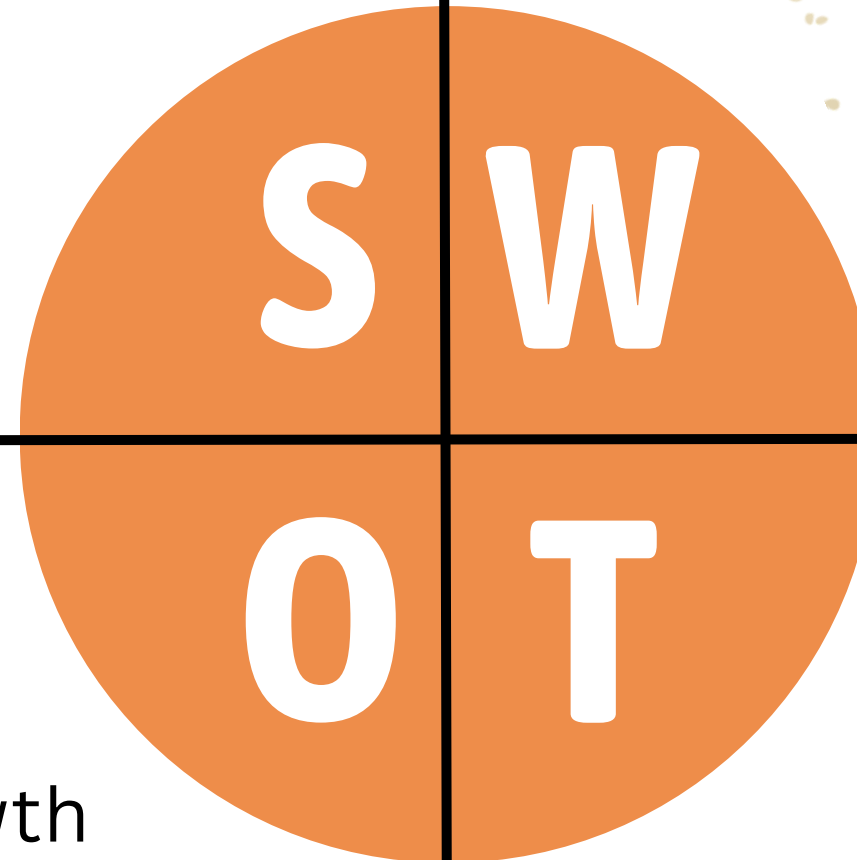
Product Development process

Hsin-Ting Lu (Bob)
Information Management,
NTPU

Our Team

Jenny

Janet

Bob

UI/UX Designer

- Message tone design
- Brand Icon Design

Product Manager

- Design recipe recommendation flow
- Task scheduling

Full-Stack Developer

- Data processing
- LINE API integration and deployment

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Development process

System Planning
and Conversation Flow Design

System Development

LINE Bot Integration
and Testing

🤖 Conducted initial discussion using Google Shared Documents
🤖 Defined main LINE Bot functions and response logic:
- Recipe keyword search
- Nutrition-based suggestions

🤖 Mapped out conversation flows
- User input methods
- System response logic

🤖 Team collaboration enabled rapid updates and improvements
- Real-time comments, edits, and idea alignment
- Shared documents improved collaboration efficiency

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Development process

System Development

We developed our system in Python, integrating RAG into a LINE Bot.

🤖Retrieval Module:
- Loads recipe data
- Splits it into chunks and builds a vector index

🤖Interaction Module:
- Receives user queries via LINE
- Retrieves relevant content and sends it to OpenAI API for generation
- Returns AI-generated answers through the LINE Bot API

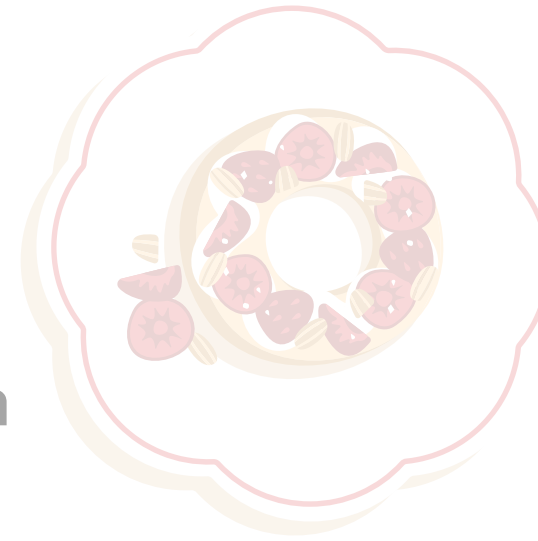This setup enables our bot to provide accurate, contextual answers to user questions about recipes and nutrition.

```python
56  ∨    def initialize_rag(partitions, model_name="intfloat/multilingual-e5-base"):
57          device     = "cuda" if faiss.get_num_gpus() > 0 else "cpu"
58          embed_model = SentenceTransformer(model_name, device=device)
59          indexes, segments_map = {}, {}
60          for sec, texts in partitions.items():
61              embs = embed_model.encode(texts, show_progress_bar=True)
62              dim  = embs.shape[1]
63              idx  = faiss.IndexFlatL2(dim)
64              idx.add(np.array(embs, dtype="float32"))
65              indexes[sec] = idx
66              segments_map[sec] = texts
67          return embed_model, indexes, segments_map
68
69  ∨    def query_rag(query, embed_model, indexes, segments_map, top_k=3, threshold=1.5):
70          q_emb = embed_model.encode([query])
71          results = []
72          for sec, idx in indexes.items():
73              dists, ids = idx.search(np.array(q_emb, dtype="float32"), k=top_k)
74              for dist, i in zip(dists[0], ids[0]):
75                  if i >= 0 and dist < threshold:
76                      results.append(segments_map[sec][i])
77          return results
```

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Development process

We integrated our system with LINE Bot API, enabling real-time interaction with users.

- Users send questions via LINE (e.g., calorie needs, dietary goals)
- Tested and refined response formats to improve clarity and user experience
- Ensured smooth message flow and logic with multiple test cases

This phase ensured our bot delivers helpful, accurate responses in a natural conversation flow.

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Software Architecture (1/2)

1. Send Message

3. Return Reply

Reply Message

LINE Platform

2. Webhook POST /callback

Cloud Infrastructure

Cloud run

Flask + line-bot-sdk

Store user replies

Firebase

Intent Detector (OpenAI SDK)

Intent = RAG

Intent = TDEE

OpenAI Chat API

Call

RAG Engine

TDEE Module

Recipe data
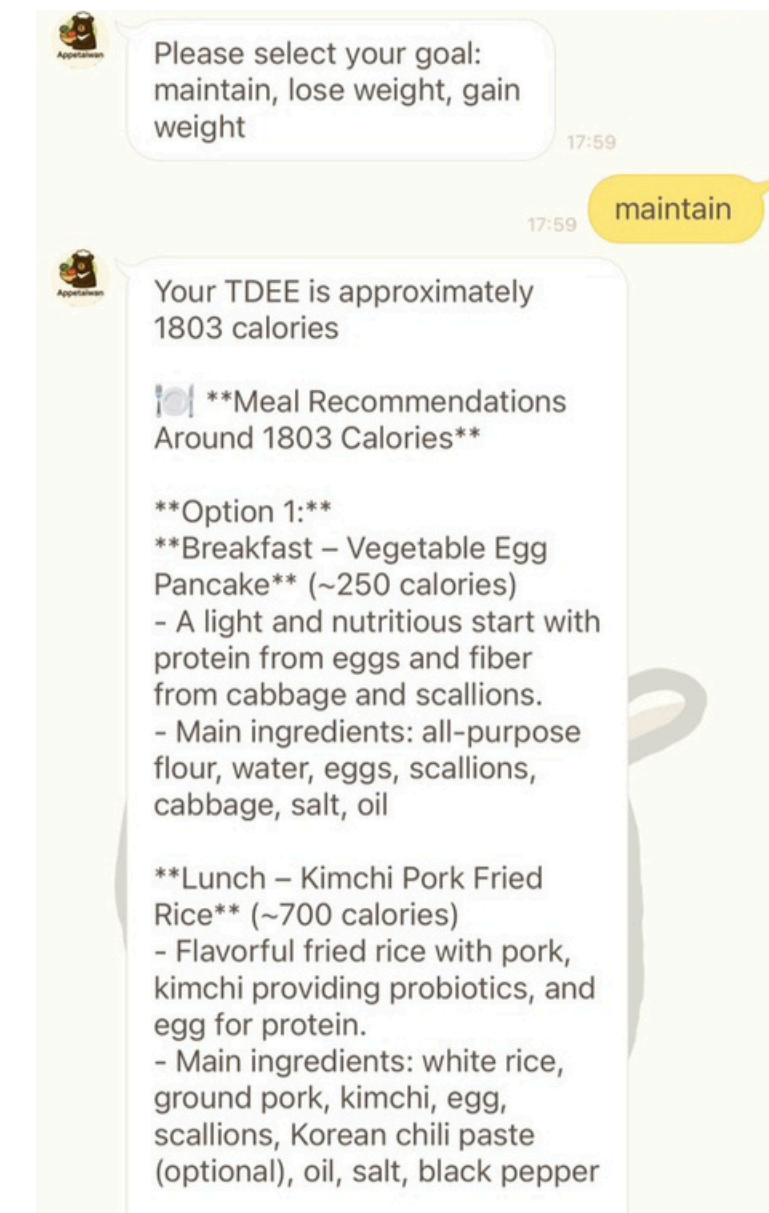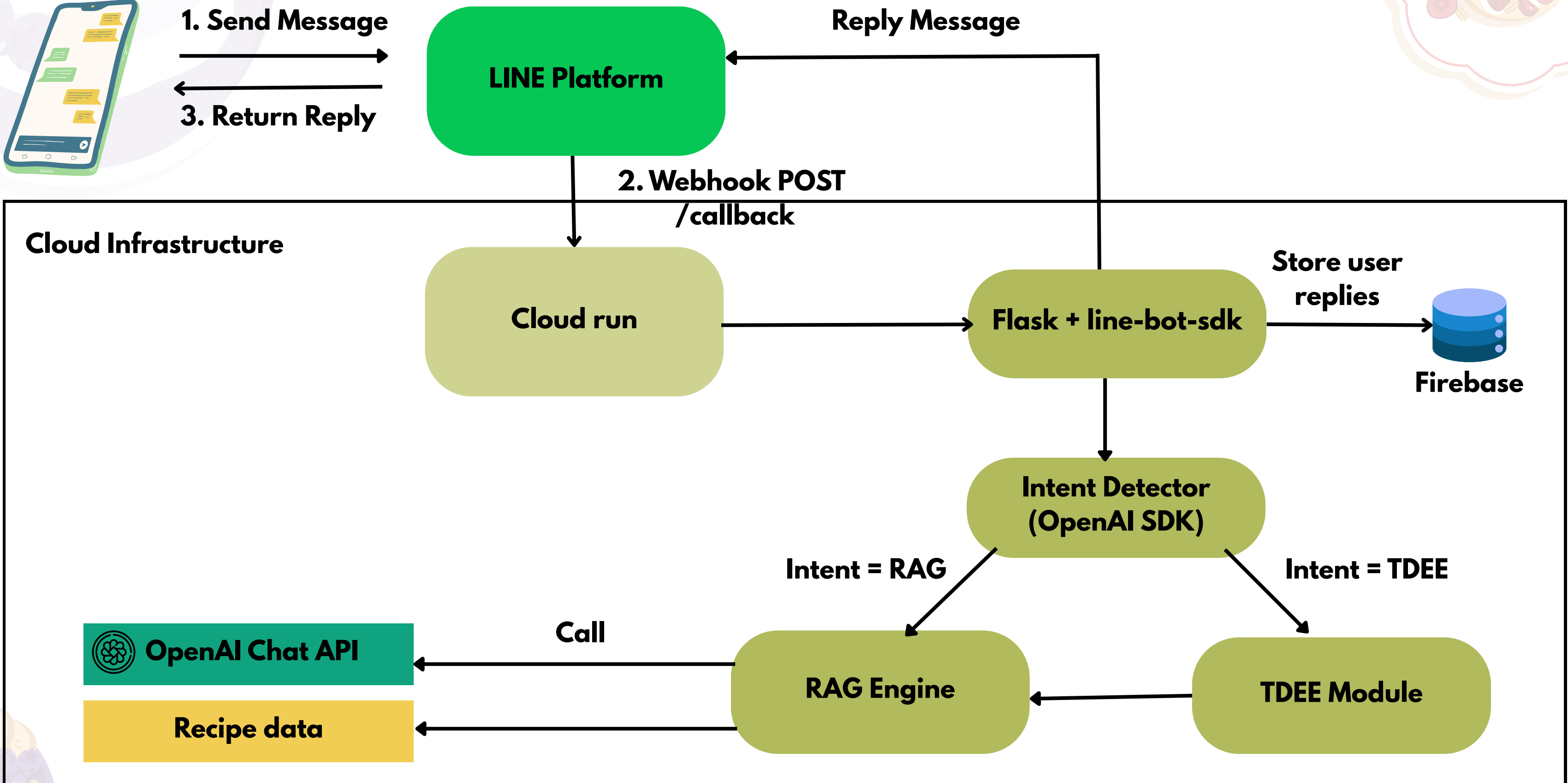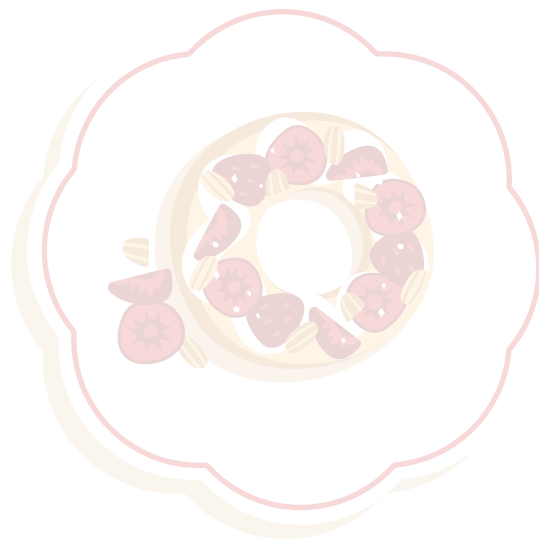
Software Architecture (2/2)

RAG Engine

- Converts recipe text into a searchable vector database
- Finds the most relevant context for user queries
- Builds the knowledge base for GPT

OpenAI Chat API

- Uses RAG output as context
- Generates fluent, user-friendly responses
- Blends retrieved facts with GPT's language skills
- Delivers accurate and engaging answers

RAG provides the facts, GPT delivers them naturally

together, they power Appetaiwan, our smart recipe & nutrition bot.

Product Functions and Demo

Jia-Ci WEN (Janet)
Information Management,
NTPU

PRODUCT FUNCTIONS

TDEE CALCULATION

- Calculate **daily calorie** requirements
- **Personalized basal metabolic rate** analysis
- **Goal-adjusted calorie recommendations**

RECIPE QUERIES

- Various **cooking methods**
- Detailed **step-by-step instructions**
- **Cooking tips and tricks**

FOOD CALORIE QUERIES

- Check **specific food calories**
- **Nutritional content analysis**
- Food **comparison suggestions**

PERSONALIZED MEAL RECOMMENDATIONS

- Meal suggestions based on **calorie needs**
- **Customized dietary advice**
- **Weight loss/gain meal**

Friendly interactive conversations

PRODUCT FUNCTIONS
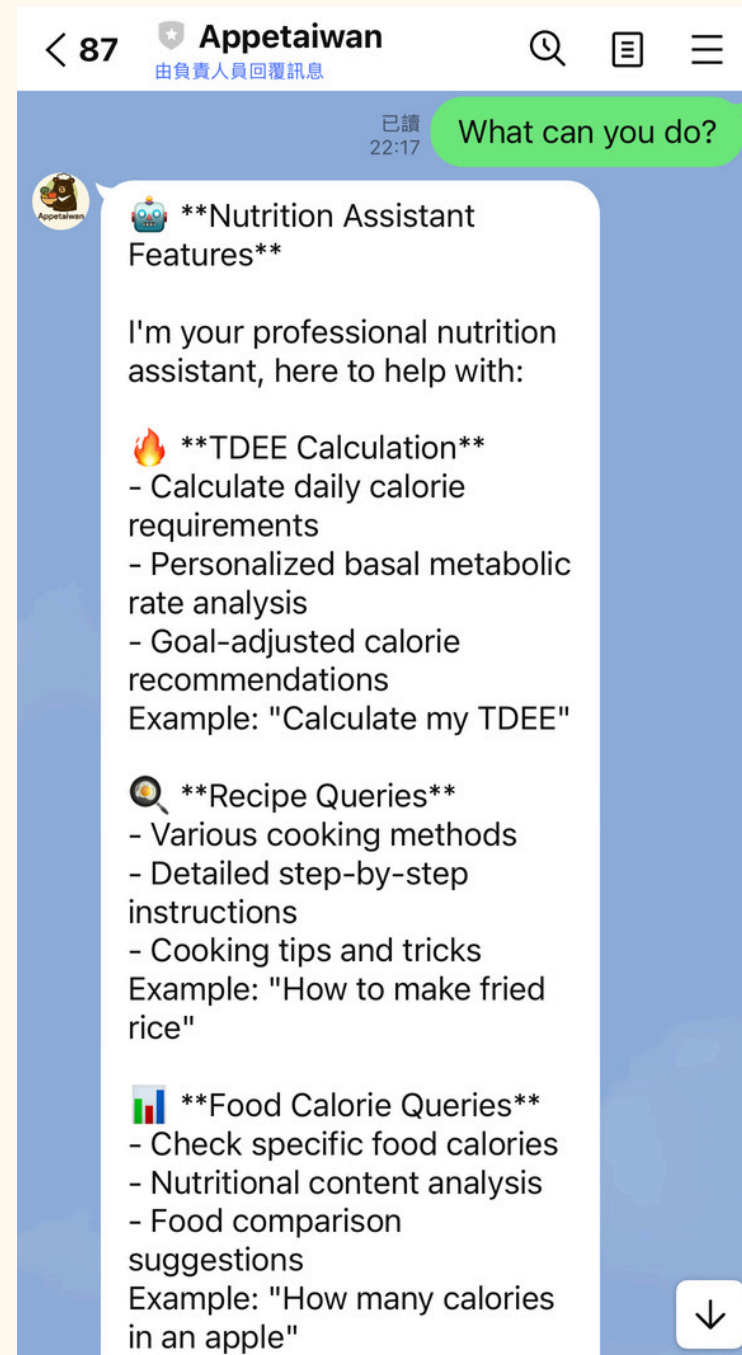
If you're not sure what Appetaiwan can do, you can simply ask about its features.

STEPS TO USE APPETAIWAN

STEP 1

Add as a Friend
Search:Appetaiwan

STEP 2

Start the Chat
Input Your Info
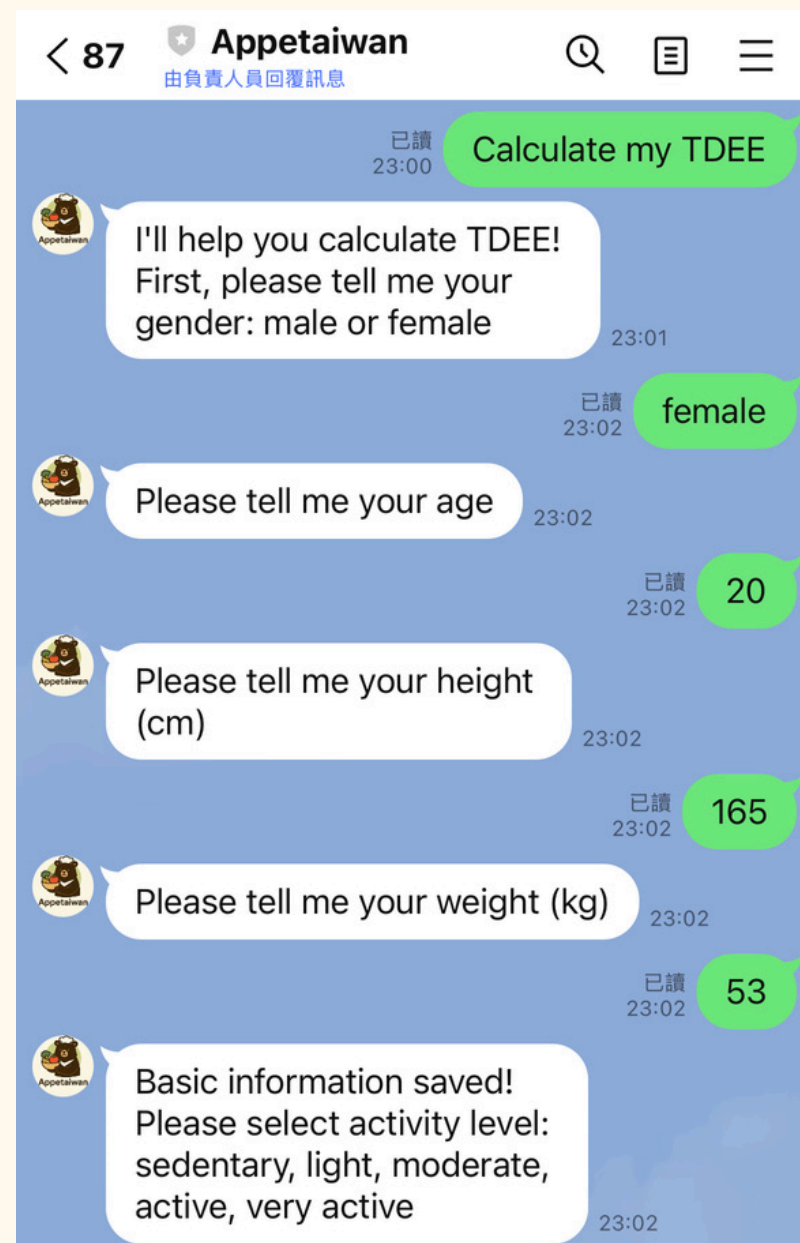
STEP 3

Get TDEE and Meal
Suggestions

STEP 4

View Full Recipe
Details

Business Model

Chieh-Yu TIEN (Jenny)
Information Management,
NTPU

Key Partners

- **Marketing partners**
- **Restaurant**

Key Activities

- **Expand the food database**
- **User analysis**
- **Continue developing system features**
- **Enhance user experience flow**

Key Resources

- **Food Database**
- **User Database**
- **Platform Tools**
- **Research and Development Team**

Value Proposition

- **Provide AI-powered meal recommendations based on users' health conditions and goals**

- **No need to download an app, easy and instant access**
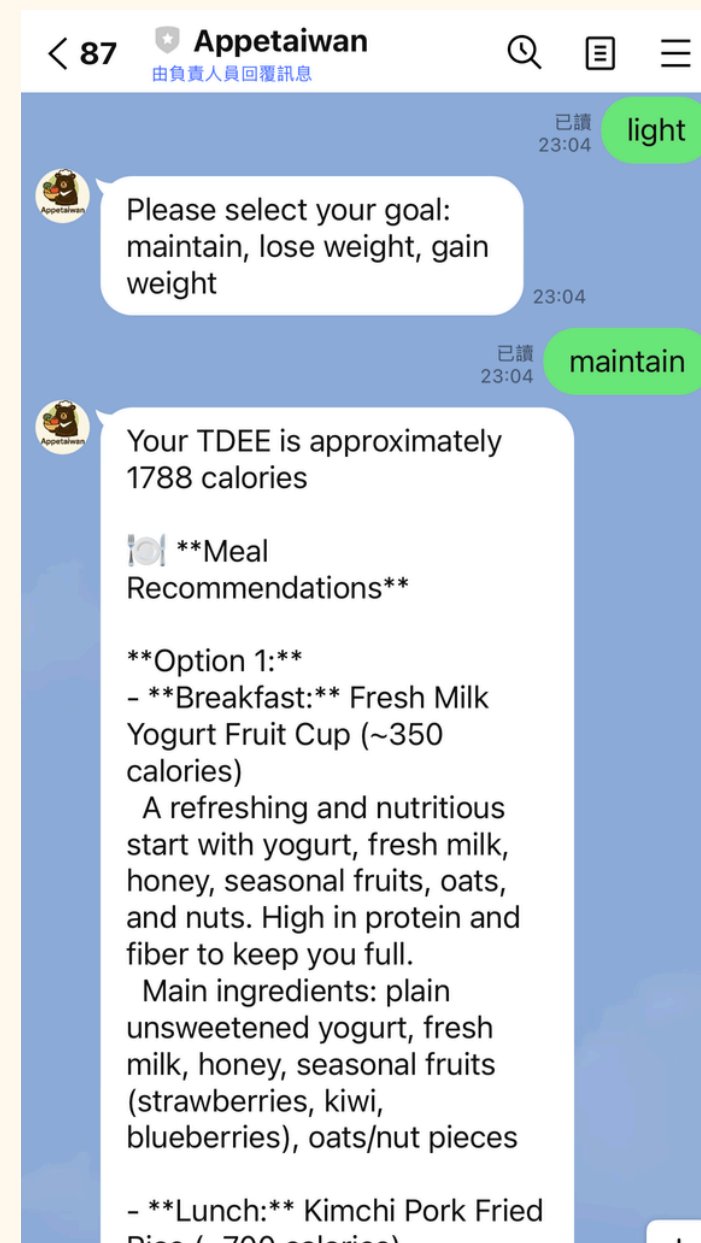
- **Support various use cases such as chronic disease management, weight loss, and nutrition tracking**

- **Users receive personalized recipes and dietary suggestions via LINE conversations**

Customer Relationship

- **LINE push notifications for regular follow-up**

- **AI chatbot for meal Q&A**

Channels

- **Social Media(Line Chatbot)**

- **Health-related Community**

Customer Segments

- **Health-focused adults who are overweight, obese, or managing chronic conditions**

- **LINE users who cook at home regularly or occasionally**

- **Individuals seeking personalized dietary advice for weight control, blood pressure management, or healthy living**

Cost Structure

- **AI model hosting and API integration fees**
- **LINE Official Account and push message limits**
- **System development and maintenance**
- **Data update and maintenance**
- **Ads**

Revenue Streams

- **Advertising**
- **Partner Income**
- **Premium features**

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Q&A
appetAIwan
(APPETITE + AI + TAIWAN)
GROUP 3

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Information Management,
NTPU

Jia-Ci Wen (Janet)
Information Management,
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國立臺北大學
National Taipei University

SOFTWARE ENGINEERING MIDTERM
WEBSITE: HTTPS://APPETAIWAN.GITHUB.IO/
INSTRUCTOR: MIN YUH DAY

DATE : JUNE. 04, 2025