

FitU

An AI-powered Comprehensive Dietary Guidance Mobile Application

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Scenario

Designing and prototyping a new ubicomp system

Meet Alex, a 35-year-old professional interested in maintaining a rigorous fitness regimen alongside a demanding career. Alex strives to follow a low-carb diet to support weight loss and muscle building but finds it challenging to manage meal planning and nutritional tracking among a busy schedule.

Here's where FitU comes into play. After downloading FitU, Alex inputs his health goals, dietary preferences, and available ingredients. Utilizing advanced AI algorithms, FitU instantly generates a personalized meal plan that aligns with Alex's low-carb diet and busy lifestyle. The app simplifies grocery shopping by providing a tailored shopping list and even adapts meal plans when Alex opts to dine out or has limited ingredients at home.

Significance of the FitU App

Enhancing Personalized Nutrition

- **AI-driven Customization:** Tailors dietary recommendations using AI, based on users' health data, preferences, and fitness goals.
- **Real-Time Adjustments:** Utilizes real-time data to adapt meal plans instantly, enhancing dietary effectiveness.

Addressing Key Dietary Challenges

- **Simplifies Meal Planning:** Automatically generates shopping lists and meal plans, reducing the time and complexity of meal preparation.
- **Supports Varied Dietary Needs:** FitU provides diverse options for different health goals and restrictions.

Improving Health Outcomes

- **Evidence-Based:** Integrates the latest research in nutritional science to ensure that the meal suggestions are personalized and health-oriented.
- **Engagement and Motivation:** Incorporates gamification elements to keep users engaged and motivated.

EXPLORATORY RESEARCH QUESTIONS

What are the primary challenges and limitations faced by users of existing dietary management apps?

How will an AI-powered dietary app tailor recommendations to users' health data, preferences, and fitness levels, and adapt to their nutritional knowledge and stages?

Methodolgy

Goal was to address...

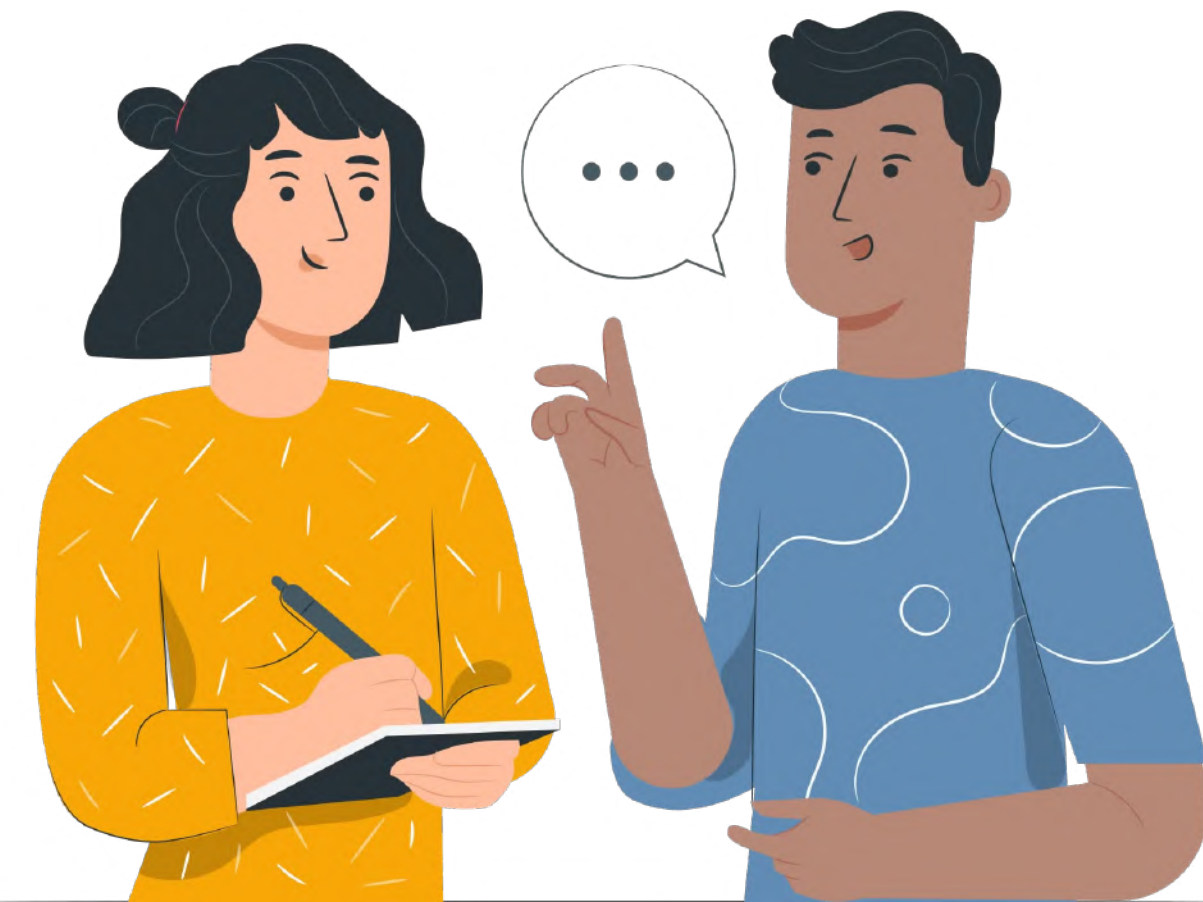
- What are the key challenges and limitations with existing dietary apps?
- How AI could offer personalized, adaptable dietary recommendations?



User Interviews

Why we chose this approach?

To gather in-depth qualitative data to understand user challenges with dietary management, focusing on their experiences, needs, and expectations of existing products.



Experimental Procedure

Participants recruitment

Target Group

Age Range: 18-45 years old

Pursuing long-term fitness goals and experiencing difficulties in managing diet.

Recruitment Resources

Professional networks

Personal contacts

Academic networks

Targeted Recruitment

Interviewed 15 participants, who could significantly benefit from AI-based dietary guidance.



Experimental Procedure

Interview process

Developed an interview script with open-ended questions



Conducted through virtual meetings, 45– 60 mins



Interviewed – past use of diet apps, any issues they faced, and their preferred feedback methods

Perceptions and Expectations of AI-driven Apps

We are aiming to develop a dietary management app that considers both taste preferences and health-related factors to provide personalized dietary plans that are tailored to each individual's fitness goals.

15. How do you feel about AI technologies personalizing your dietary plan based on your health data, preferences, and goals? If you were to use an AI-powered app for dietary management, what features would you consider essential?

16. How do you think an app might improve your experience with its diet plan recommendations?

Data Privacy and User Trust

17. What concerns, if any, do you have regarding the use of personal data when using AI-driven apps?

Future Aspirations and Enhancements

18. If you could suggest one feature or improvement for your experiences or needs, what would it be?

Closing

Thank you for sharing your valuable insights. We appreciate your feedback on the dietary management app that we are developing. Do you have any further questions or would you like to provide any additional comments?

User Interview Questionnaire

Introduction

Thank you for participating in this interview. Your insights will be invaluable in developing an AI-driven dietary management app designed to support diverse dietary needs and fitness goals.

Personal Information

1. Age:
2. Gender:
3. Occupation:

Fitness Background

4. Describe your current fitness routine, including the types and frequency of activities you engage in. If applicable, also mention any periods in the past where you consistently engaged in moderate to intense fitness activities.

Dietary Management Challenges and Solutions

If you do not currently engage in a consistent fitness routine, provide answers for the periods in your life when you were actively engaging in a consistent fitness routine.

5. Can you describe your dietary goals, both in relation to your fitness activities and outside of them?
6. How does your fitness routine affect your dietary routine and planning?

Purpose of the Study

The purpose of this study is to explore the experiences and expectations of individuals who engage in fitness activities. We are conducting this research to develop an AI-driven application that provides personalized dietary recommendations based on users' fitness goals and food preferences. The application aims to intake users' dietary preferences, restrictions, and fitness goals and use AI technology to recommend a personalized dietary routine unique to the user.

Your Participation

Your participation will involve a one-on-one interview session where we'll ask you questions about your dietary habits, nutritional preferences, and any difficulties you encounter in maintaining a balanced diet while engaging in fitness activities.

Data Collection

During our conversation, we'll be recording the session and taking notes to capture your insights. Please rest assured that we won't be asking for any sensitive personal information.

Use of Your Data

Interview Script & Questionnaire

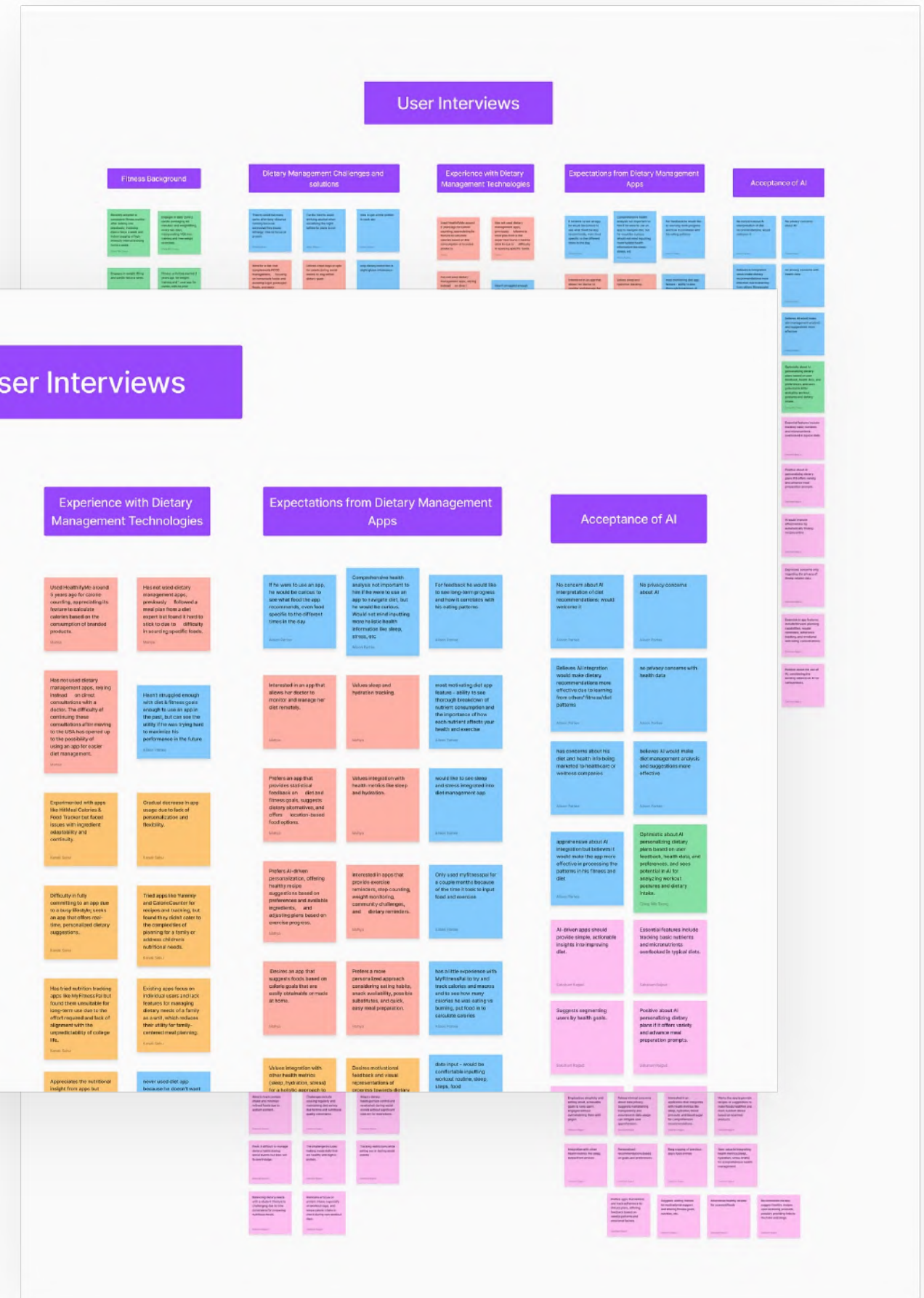
Experimental Procedure

Post Interview

Transcribe interviews for analysis

Thematic analysis to identify common themes

5 themes



Insights

What user interviews revealed...

Adaptive Personalization: Tailor meal and fitness plans based on individual circumstances such as health conditions and other daily commitments, while offering varied, appealing, and easy-to-prepare meal suggestions to overcome the monotony.

Enhanced Nutrient Analysis: The app must provide precise nutrient analysis and ingredient adaptability for non-packaged foods, enhancing personalization and making dietary management more precise and user-friendly.

Comprehensive Health Integration: Integrate a wide range of health data to offer a holistic health overview, and include educational resources to empower users with cooking and nutritional knowledge, enabling informed dietary choices.

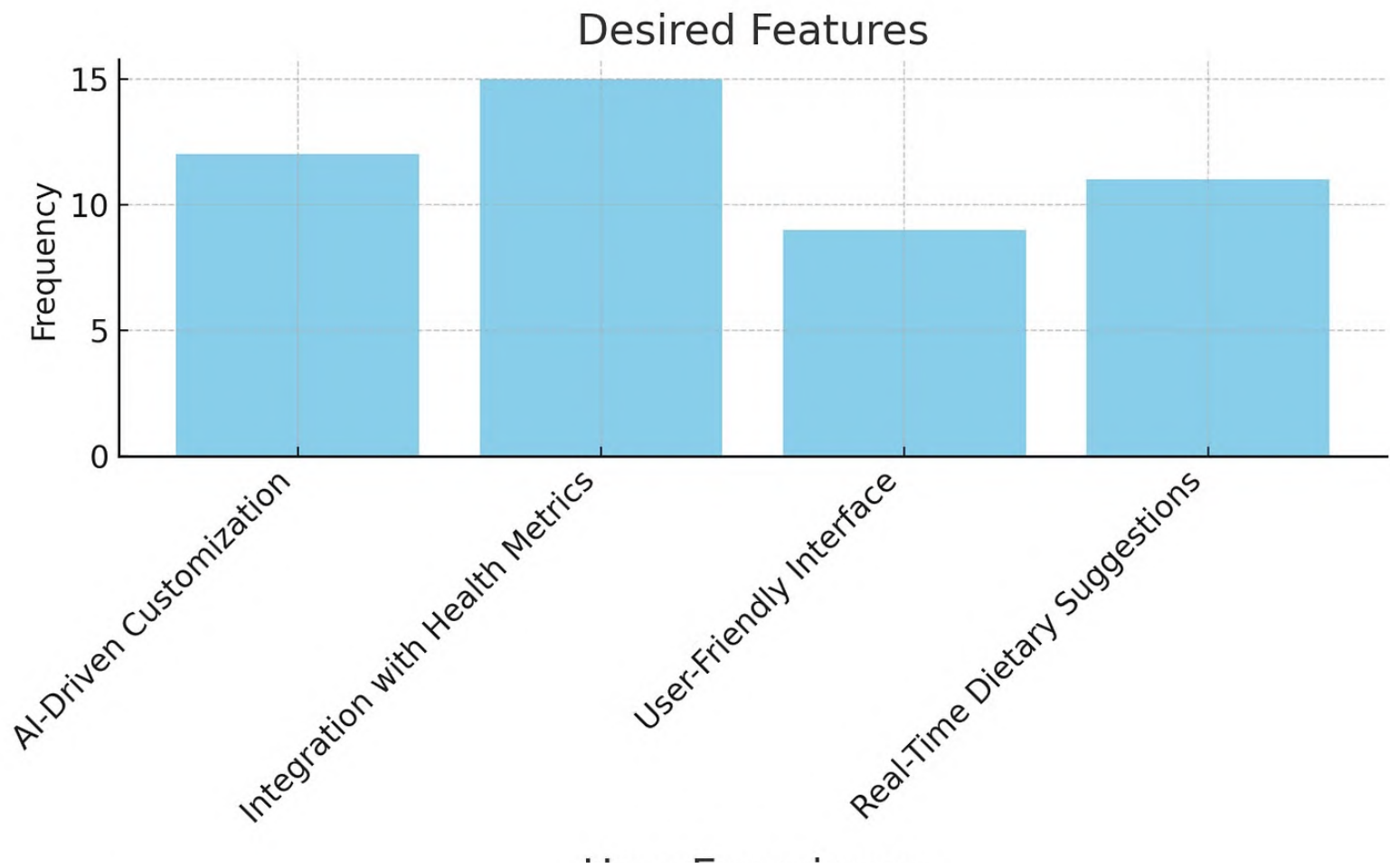
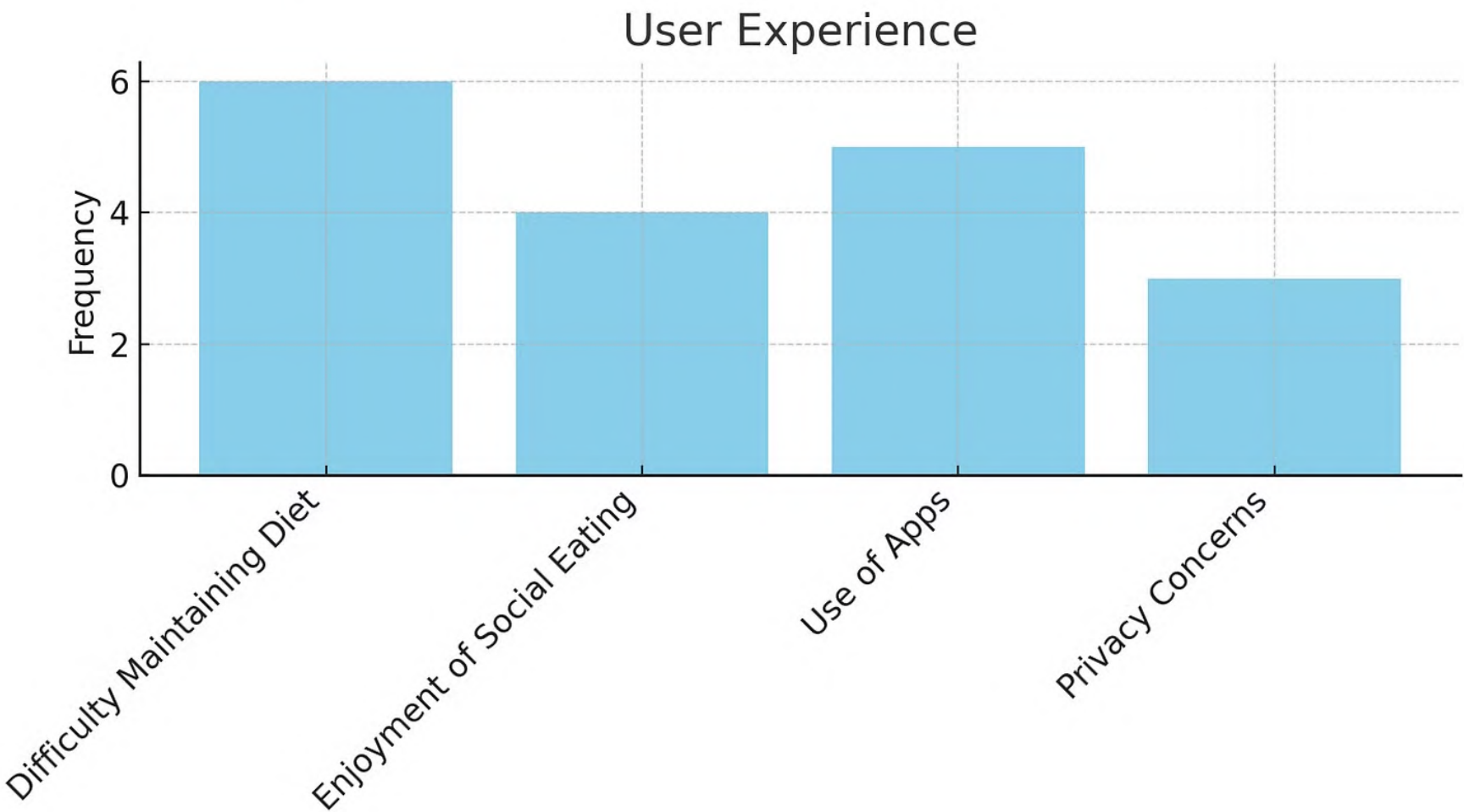
"I aim for healthy meals to support my energy, but struggle to find diverse food items and time to cook."

"It was kind of annoying to have to input everything you were eating all the time"

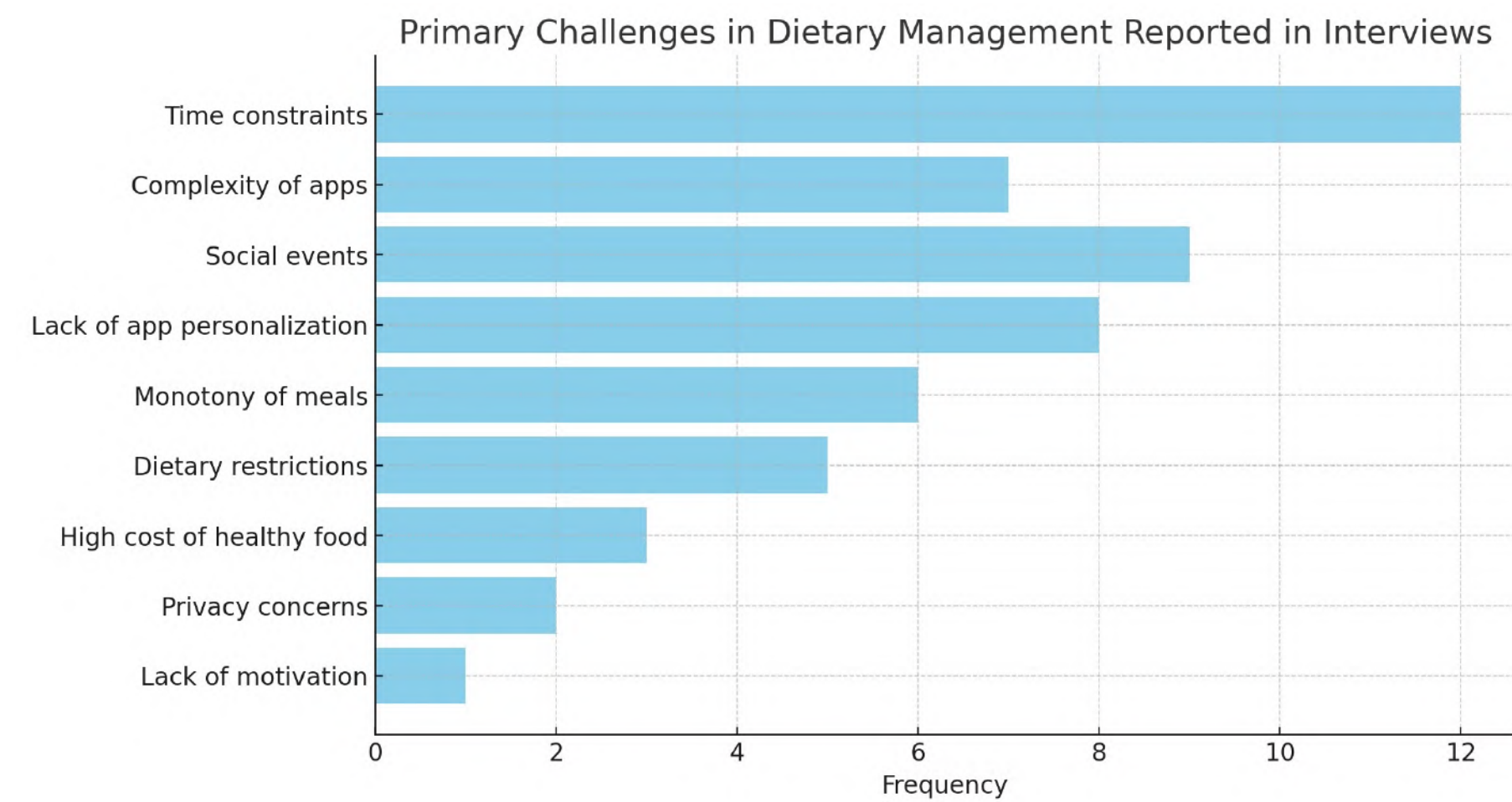
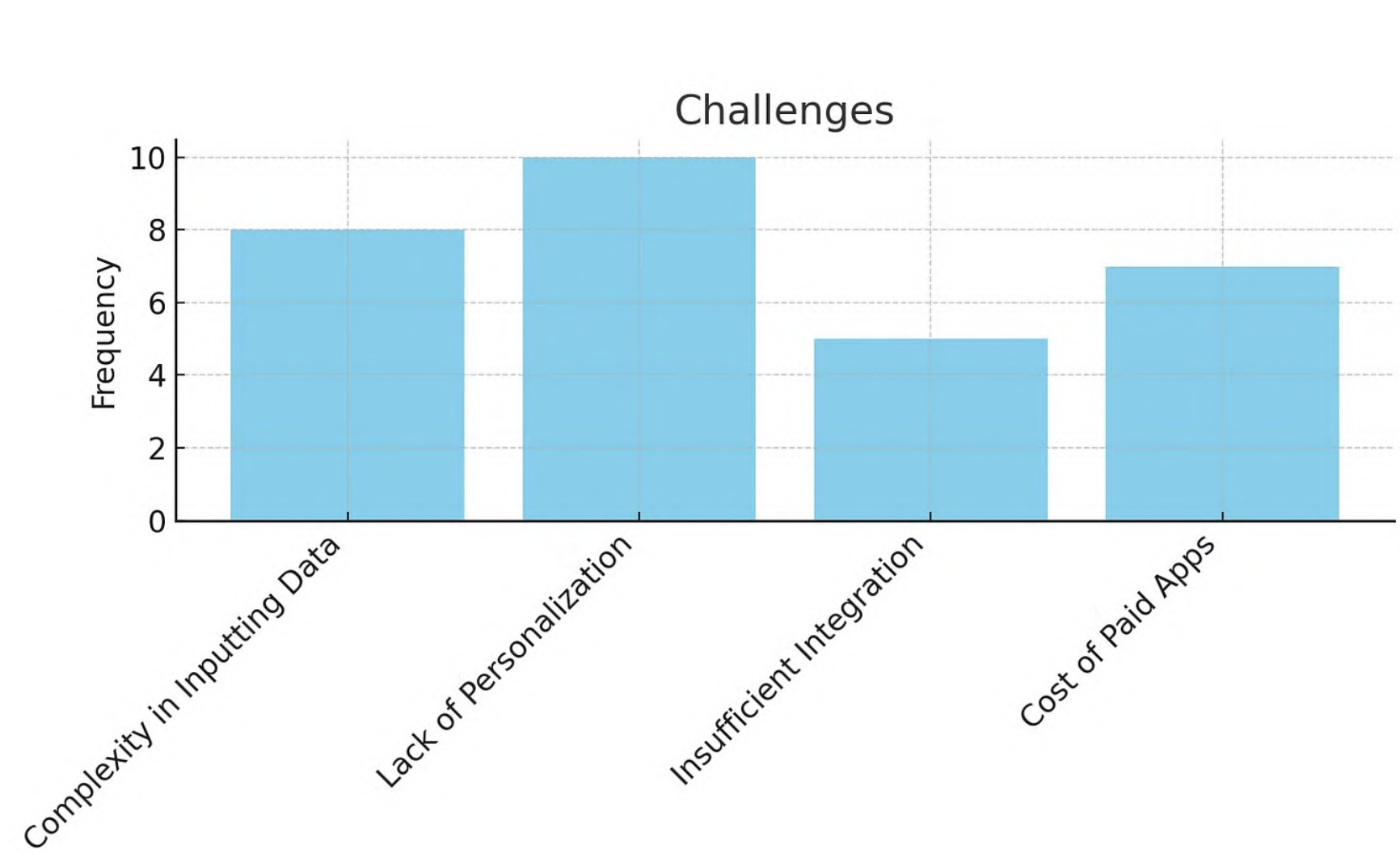
"It will be helpful if we can access metrics and can view the feedback instantly."

Some of the quotes from user interviews

Results: Frequency of themes in User Interviews:



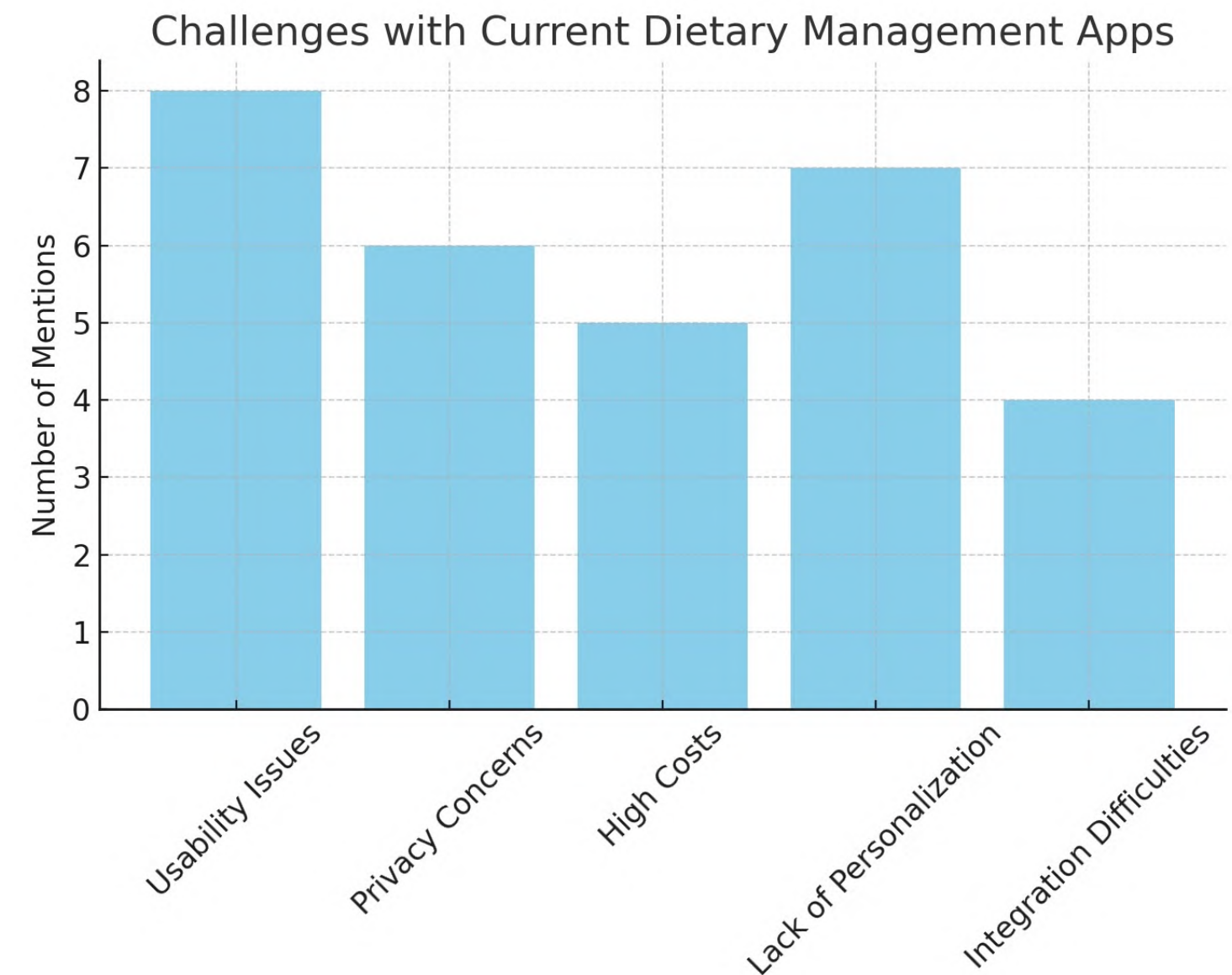
Results: Frequency of themes in User Interviews:



Results

RQ 1: What are the primary challenges and limitations faced by users of existing dietary management apps?

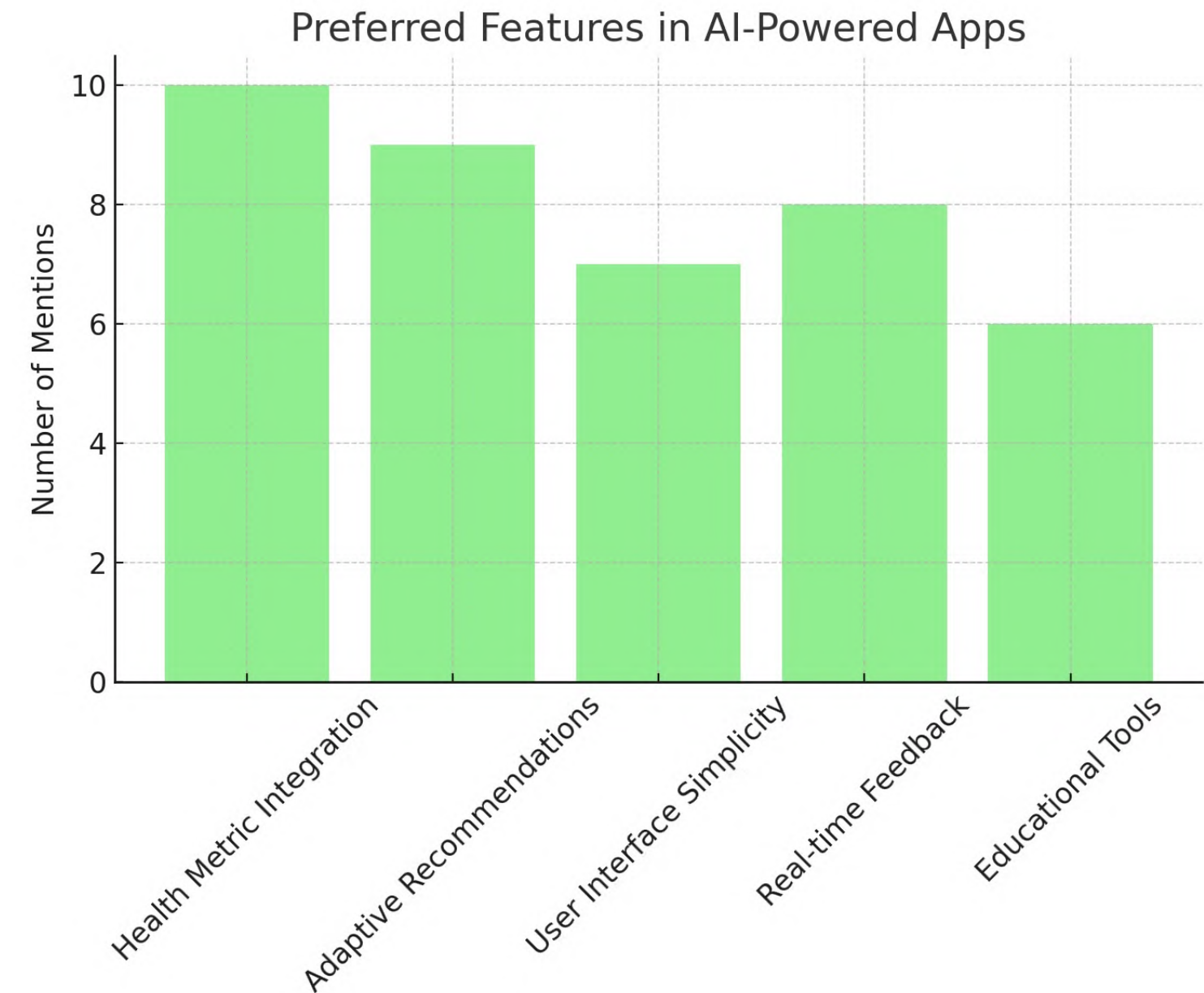
- **Complexity in Data Input:** Users find manual entry burdensome, leading to reduced app usage.
- **Lack of Personalization:** Inadequate customization for individual dietary needs and preferences.
- **Insufficient Health Metrics Integration:** Apps fail to incorporate crucial metrics like sleep and stress.
- **Barriers to Adoption:** High input effort, cost concerns, and lack of regional food customizations.



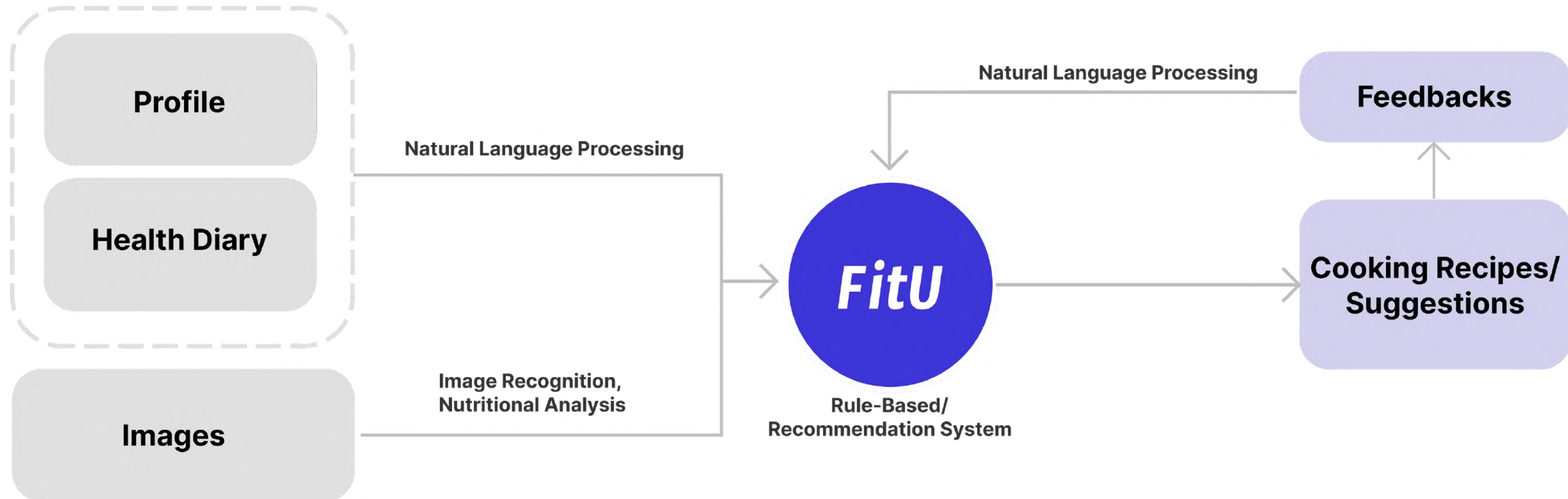
Results

RQ 2: Potential of AI in Dietary Management Apps

- **Adaptive Learning:** AI customizes meal suggestions based on user intake and activities.
- **Holistic Health Management:** Strong preference for integration of various health metrics.
- **Educational Resources:** Demand for apps providing nutritional knowledge and cooking tips.



Results



Results

User-reported Issue	AI Feature	Impact
Complexity in Inputting Data	Photo/Video Meal Logging	Reduces the effort of data entry by automating nutritional analysis
Lack of Personalization	AI-driven Custom Meal Suggestions	Tailors dietary recommendations to individual health goals and preferences
Insufficient Health Metrics Integration	Integration of Sleep, Stress Levels	Offers a holistic view of health beyond just diet and exercise
Barriers to Adoption	User-friendly Interface & Educational Resources	Lowers entry barriers by enhancing ease of use and providing valuable nutrition education

Results: Use Cases

1. Personalization and Holistic Health Integration

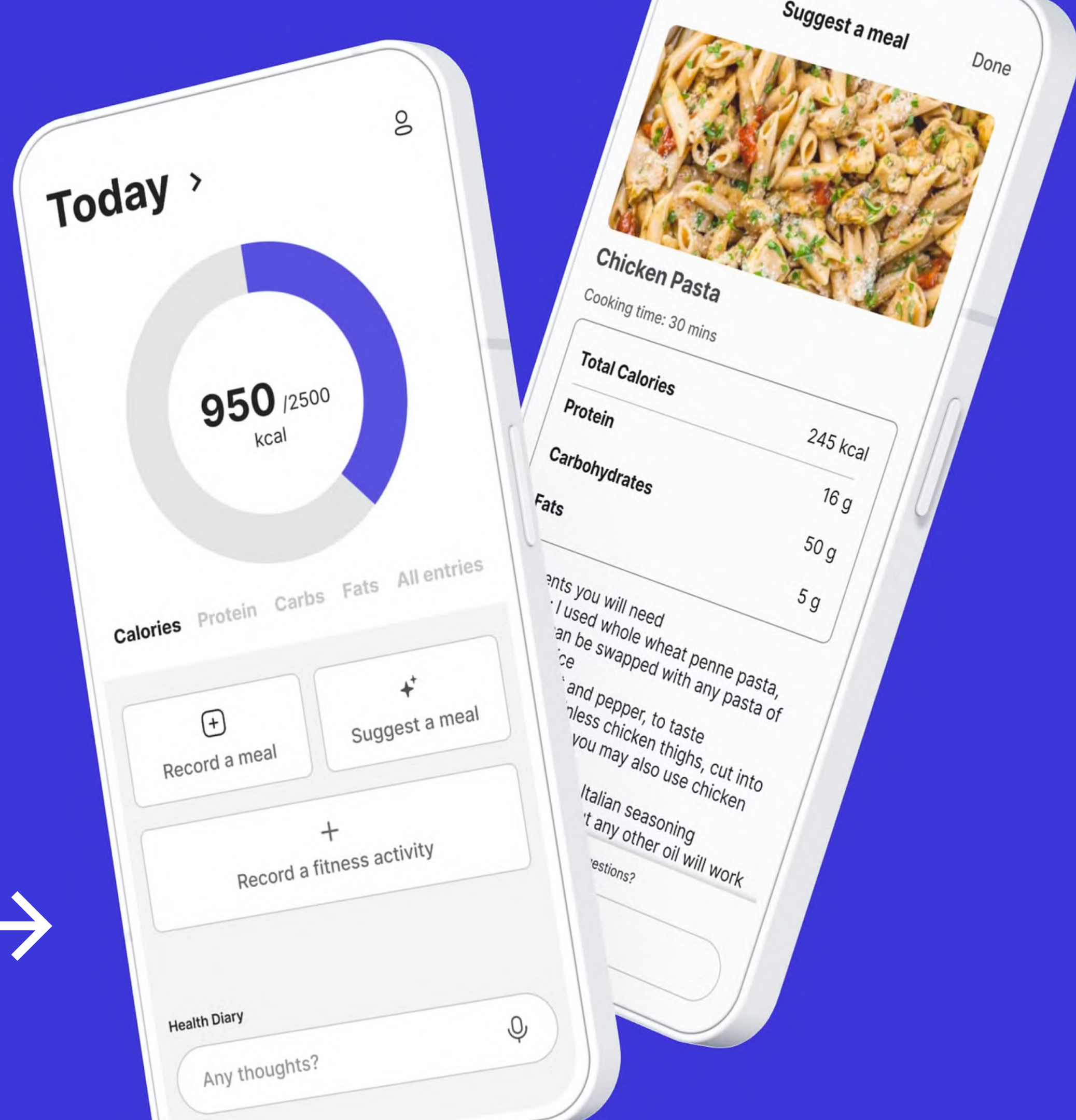
- *Sarah, a busy professional with PCOD, struggles with her erratic work schedule. She desires a dietary app that not only recommends personalized meals but also integrates sleep and stress tracking to align with her health and fitness goals.*

2. Overcoming Barriers to Adoption

- *Emily, a college student, is skeptical about the accuracy and privacy of dietary apps. Her past experiences with cumbersome apps that required manual entry led to disengagement.*

FitU

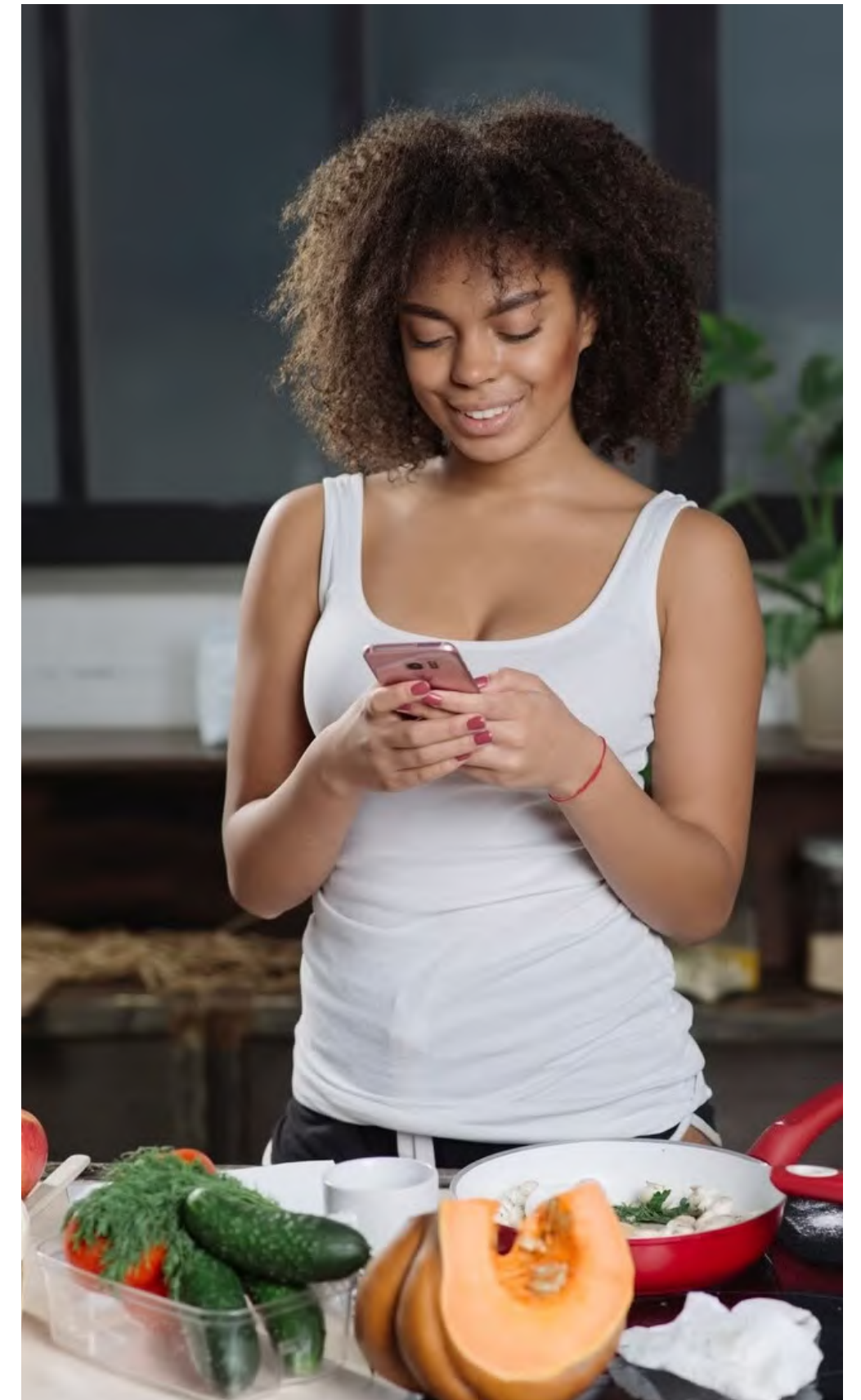
An AI-powered Dietary Guidance



Prototype →

Discussion

- FitU addresses challenges we discovered from user interview data, implementing mechanisms from prior research, providing solutions to common dietary mobile application challenges
 - **Complexity in inputting data:** The AI features present a simple way of recording daily dietary intake
 - **Lack of personalization:** Analyzed data from conversational AI and neural-network based image recognition can provide highly customized recommendations for each individual user
 - **Insufficient integration with other health metrics:** Conversational AI input allows users to record metrics other than food intake & fitness patterns
 - **Barriers to adoption:** Because the data intake is based on primarily image capture and conversational input, the app can be advertised as simple to keep up with



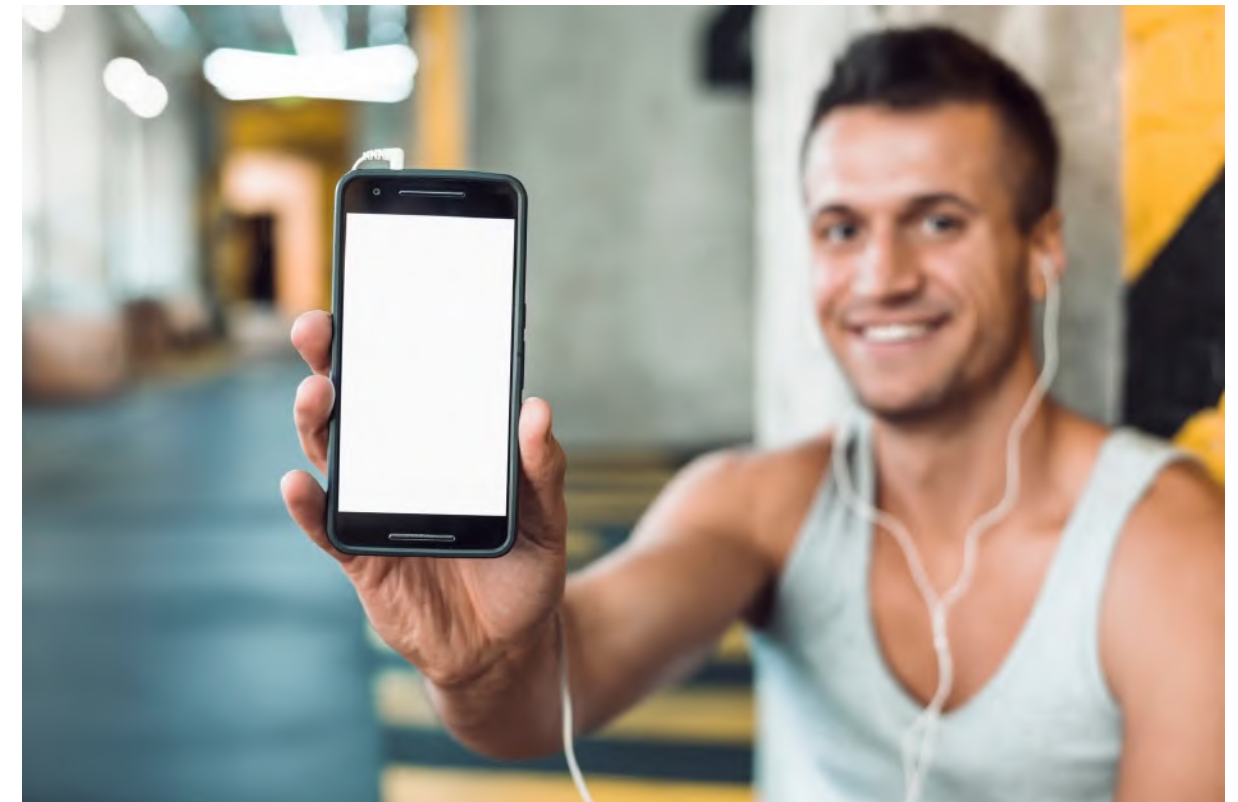
Conclusion

- FitU's framework builds on prior research that serves as foundational elements to building a comprehensive user data-focused mobile application:
 - **Camera-input powered image recognition and deep neural networks** allows ease of users recording their dietary patterns
 - **Conversational AI utilizing natural language processing** incorporates a holistic approach towards personalized diet, fitness, and lifestyle recommendations
 - **Generative AI** adapts the patterns assessed from the camera and conversational input and suggests personalized meal recommendations to help the user achieve their fitness goals
- Combining these features into one smartphone application presents a novel way to drive users toward meeting their fitness goals



Future Work

- Next steps:
 - Develop personas
 - Cognitive walkthrough of the prototype
 - Further prototype iterations
- Possible future considerations:
 - Local restaurant menu integration
 - Integration with meal delivery services
 - Social networking features
 - Integration of local workout activities, classes, and groups



Questions

- What additional features or changes in app flow may we want to consider in the future?
- What are some potential concerns or limitations you see with the implementation of AI technology in dietary management in FitU?
- How may we make FitU appeal to those skeptical of providing nutritional and fitness health data to AI technology?
- How do you think user engagement and adherence to dietary management apps like FitU can be encouraged and sustained over time?

Thank you



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