Group: G10 - Strawberry Dumplings

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Topic: Smart Ordering in a Restaurant

Summary

Introduction

The project we chose is smart ordering in a restaurant, the slogan is： Give a brain to Search Engine, and give an ears to ChatGPT.

The traditional restaurant ordering process often involves flipping through physical menus, which can be time-consuming and sometimes overwhelming. Customers may have questions about the menu, ingredients, or dietary preferences. Our goal is to streamline this process and make it more interactive and user-friendly.

We designed the product to enhance the customer experience of ordering food at a restaurant by combining the powerful search relevancy capabilities of Elasticsearch with the advanced Q&A capabilities of ChatGPT and integrating voice search capabilities.

In this service, Elasticsearch serves as the backbone for efficient data retrieval and search relevance. It excels at processing large amounts of data and delivers lightning-fast search results, making it an ideal choice for our smart ordering system. Elasticsearch indexes and stores a variety of data related to products, including descriptions, user reviews, pricing information, and more.

ChatGPT's Q&A feature takes the system to the next level by understanding and processing natural language user queries. We designed prompts at ChatGPT so that customers can interact with the restaurant system by asking questions or describing their preferences via text or voice. ChatGPT interprets these queries, extracts basic information, and communicates with Elasticsearch to retrieve relevant product data.

Interview Summary

Gathering user feedback through interviews stands as a pivotal method for the enhancement and development of products.

Our classroom experiences, particularly the instructive interviews led by our teachers, have been instrumental in expanding our understanding.

We summarize and apply it to our script, as shown in the Figure 1:

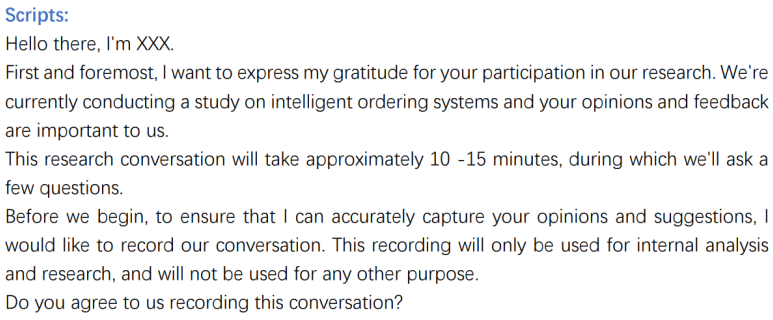

Scripts:
Hello there, I'm XXX.
First and foremost, I want to express my gratitude for your participation in our research. We're currently conducting a study on intelligent ordering systems and your opinions and feedback are important to us.
This research conversation will take approximately 10 -15 minutes, during which we'll ask a few questions.
Before we begin, to ensure that I can accurately capture your opinions and suggestions, I would like to record our conversation. This recording will only be used for internal analysis and research, and will not be used for any other purpose.
Do you agree to us recording this conversation?

Figure 1 Section of Interview Script

First, introductions and acknowledgments begin with a friendly and polite introduction, thanking participants for their participation and expressing appreciation for their time and contributions. This sets a positive tone for the conversation and makes participants feel valued.

Second, explain the purpose of our study to ensure participants understand the context and focus of the conversation.

Then, solicit input and feedback, encourage participants to actively participate in the conversation, and inform the duration of the interview. Setting clear expectations for participants' time commitment can help manage their expectations and willingness to participate.

Finally, seek permission to record the conversation. Ensure participants understand and agree to the recording and respect their privacy and rights by seeking consent in advance.

Through the user interviews, we understand the process of designing a product from 0 to 1.

First of all, we need to design some interview scripts in advance to improve efficiency, and design some open topics instead of simple binary answer questions.

For example, our script questions are like this:

Have you had any experience ordering food online in restaurant? (what form/way…).

We have taken into thorough consideration the potential responses from users and, accordingly, devised specific follow-up questions for both positive and negative user responses.

(If positive) Could you describe your most recent online ordering experience?

(If negative) Why haven't you tried ordering food online? Is there any reason?

It can cope with different answers from users and improve the efficiency of our interviews. Through interviews, we need to understand user needs, expectations, and priorities to determine which features or improvements are most important. As well as identifying problems or inconveniences that users may encounter when using products or services, helping to improve the ease of use of the product. It is also necessary to understand how users actually use the product, including which functions they use frequently and which functions they rarely use, in order to obtain positive and negative feedback from users, including what they like and dislike about the product, and Suggestions for possible improvements. Find out whether users have used competitors' products and what they think about competitors' products.

As mentioned earlier, the questions in the interview script were open-ended so that we could guide interviewees to share their actual experiences and stories to better understand their needs and expectations.

In short, user interviews provide the opportunity to gain an in-depth understanding of

users and help improve and optimize products and services to ensure that they better meet user needs and expectations. This information is extremely valuable for both product development and user experience design.

Storyboard and Final Application Relationship

First of all, our storyboard has three main application scenarios.

Scenario 1:

This scenario is tailored for individuals dining solo who seek to seamlessly navigate, choose, and place orders from curated restaurant selections. The primary goal of this storyboard is to illustrate the entire user journey, encompassing the initial app launch through to relishing their meal. The application's key functionalities revolve around delivering personalized restaurant suggestions derived from user preferences.

Scenario 2:

This scenario is designed for user groups who need to order food for a team, family gathering, or special event. The main goal of this scenario is to provide users with a convenient way to organize group food orders through a mobile application. The purpose of this storyboard is to illustrate a user-friendly and efficient process for organizing group food orders using a mobile app. It enables users to streamline the ordering process, select restaurants, and ensure a smooth dining experience for groups, family gatherings, or special events. This scenario helps facilitate coordination and convenience for group ordering.

Scenario 3:

This storyboard is intended to illustrate a "special needs" scenario, such as the example described in the story - a user who has completed a strenuous workout and needs a quick and healthy energy refueling option. Our product can conduct voice searches while users are exercising and recommend healthy and light restaurants to users to meet their immediate needs for energy replenishment.

The scenarios outlined in the storyboard played a pivotal role in our product development process by assisting us in honing the essential functions of the product.

1. Intelligent and personalized recommendations based on user needs:

During the design process, we focused on creating a powerful recommendation system that takes into account the specific needs and preferences of users. We have integrated search relevancy capabilities of Elasticsearch with the advanced Q&A capabilities of ChatGPT and integrating voice search capabilities to provide users with tailored recommendations.

Consider user feedback and restaurant ratings to ensure recommendations meet their expectations.

2. Convenient voice search:

Recognizing the importance of convenience, we implemented voice search functionality into the app. Users can simply activate a voice command, such as "I want a healthy salad," and get specific dish details more easily and quickly without the need for a server recommendation. We have access to the speech recognition API and can accurately understand and process user voice commands.

3. The interface with clear logic makes it easy for users to get started quickly and improve efficiency：

Our design process prioritizes a user-centered approach, resulting in intuitive and beautiful interfaces. We conducted user testing and iterative design to ensure the application's logic and flow made sense to users every step of the way. Features such as simple navigation menus and informative menu descriptions enhance usability.

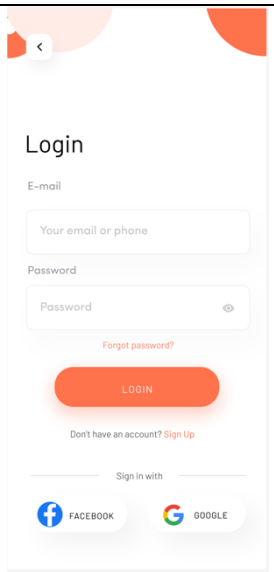
So, we kept these core features in mind throughout the design process and translated them into the final application.

Paper Prototype vs. Final Application Comparison

Our final app closely matched the paper prototype in terms of overall design and functionality. However, some specific improvements and changes have been made to enhance the user experience.

We've made some adjustments to the user interface to improve usability.

For example: We improved the login interface on the homepage because most users reported that they were unwilling to log in to the system through social media. According to user preferences, we deleted the cumbersome login help as the Table 1 shows:

Before improvement	

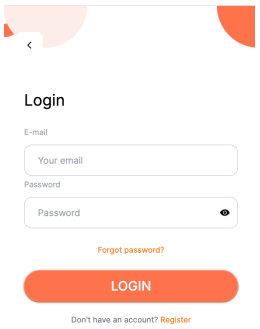
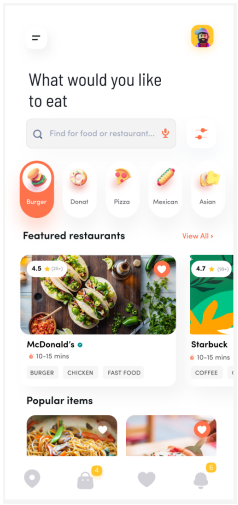
After improvement	

Table 1 Login Comparison between Initial and Final

In addition, we have also fine-tuned the navigation of the homepage, as shown in Table 2 and we have improved and streamlined the process. thereby improving overall efficiency.

Before improvement	

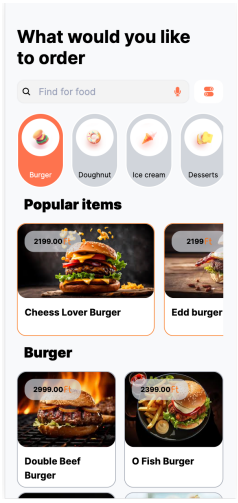
After improvement	

Table 2 Home Page Comparison between Initial and Final

These adjustments were made to ensure that the final application not only retained the core functionality and aesthetics of the paper prototype, but also provided a more user-friendly and efficient ordering experience that met specific user needs and preferences.

Evaluation Learnings

The composition of our evaluation team was based on the target user group consisting of available smartphone users with experience in using mobile applications to reserve and order food services. We use a user-centered approach, ensuring feedback and evaluation comes from individuals who represent the application's target audience.

Our evaluation platform covers Android and iOS platforms. Since the initial prototype design model size is based on iPhone 13, we focus on iOS. This approach ensures that applications are tested on the most popular mobile operating systems to meet a wider range of users. group.

We determined our focus test scenarios before the evaluation: mainly targeting search and smart recommendation scenarios, which are key features of the food ordering application. This focus enables the evaluation team to thoroughly evaluate core functionality.

To effectively manage the assessment process while adapting to potential delays and changes in task complexity. The assessment schedule was estimated and planned, with the scheduling process lasting 3-4 weeks, with each assessor being allocated a duration of 30 minutes.

At the same time, taking into account the need to participate in assessments remotely, we have provided evaluators with the option to participate online and offline, ensuring flexibility and accessibility for all team members regardless of their location.

In order to conduct a fair evaluation, we have taken measures to prevent contact between evaluators and maintain the objectivity of the results.

To encourage evaluators to provide valuable feedback and actively participate in the evaluation process. We use drink tokens as rewards for evaluators after the evaluation, which can help motivate active participation and promote collaboration.

During the evaluation phase of the app, we gained valuable insights from user feedback and testing, allowing us to make significant improvements to enhance the user experience.

We designed two test cases. One is based on functional testing, and the other is based on interface interactivity testing.

Case 1:

Function Testing--Fuzzy search with precise recommendations:

1.Users voice-search(i.e. spicy dish) in app using our search button.

2.App suggests dishes in restaurant.

3.Evaluator selects dish but doesn't order.

4.Evaluate search accuracy, relevance, and voice recognition precision.

Case 2:

Interactive Testing--Specific Needs Search

1. Evaluator voice or text searche for needs, i.e: "hot pot."

2. Evaluator views dish details based on the search results, including the add or delete items, check prices, and customized notes in the system

3. checks the interaction for accuracy.

4. Assess overall process smoothness and system response time.

Evaluation-Based Improvements

Based on our evaluation, we improved this accordingly:

In Case 1, we conducted a test evaluation of search accuracy and relevance, and found that the fuzzy search function was generally accurate in recommending dishes based on user voice commands, but occasionally mismatches occurred. To improve this, we have optimized ChatGPT's prompt to be more precise to better understand context and user preferences. We noticed that speech recognition accuracy was mostly good, but it occasionally misunderstood certain words or accents. We are working to improve the system's speech recognition capabilities, including better accent recognition and dialect understanding. Therefore, we use Whisper, a multi-task model that can perform multi-language speech recognition, speech translation and language recognition.

In Case 2, reviews show that users found it easy to search for specific needs (e.g. “hot pot”) and view dish details. However, there are some minor issues with adding or removing project functionality and custom annotations. We made the interface more

intuitive and added clear prompts for users to modify orders. In terms of fluency and response time, reviews show that the overall process is smooth and

Overall, during the evaluation process, we collected more vertically accurate user feedback, allowing us to fine-tune the application to improve search accuracy, speech recognition accuracy, and overall user experience. We also addressed issues related to system responsiveness to ensure that applications meet user needs and expectations more effectively. Regular user feedback and iterative improvements remain a fundamental part of our development process to continuously enhance the application.

Final Application Description

Our smart ordering system is a product that combines the powerful search relevance capabilities of Elasticsearch and the advanced question and answer capabilities of ChatGPT, and also integrates voice search capabilities. In this project, the Human-Computer Interaction(HCI) plays a key role in improving the customer ordering experience.

One of the key points of the project is to enable customers to interact with the system in a familiar and natural way through ChatGPT's natural language query function. This greatly improves user-friendliness, as customers can ask questions and describe their tastes and needs in the language they normally use, rather than having to rely on predefined options or specific commands.

The project's voice search functionality adds variety to the user interface. It makes it easier for customers who prefer verbal communication to interact with the system. The implementation of this function allows users with different abilities and habits to enjoy the convenience of ordering food.

In terms of HCI, we focused on how to present customers' ordering information in a clearer and more intuitive way. We have made many iterations on the design of the product interface. By visually displaying menus, prices and product descriptions, we ensure that customers can quickly understand and make informed choices.

In order to optimize the user experience, we considered how to create a more meaningful interaction between customers and the system. Our HCI design allows the system to remember customers' preferences and order history to provide personalized suggestions and recommendations. This enhances user interaction with the system, making customers feel more valued and respected.

In short, the design of our smart ordering system in terms of HCI focuses on providing a natural, diverse and user-friendly interface to enhance the customer ordering experience. By combining ChatGPT's natural language processing and Elasticsearch's search capabilities, we provide customers with an intelligent, efficient and interactive ordering system that meets various user needs and preferences. The HCI design of this project helps improve user satisfaction, making customers feel more relaxed and happy ordering food.

Conclusion

Through this project, we learned some core principles of human-computer interaction, which are mainly reflected in our products:

Simplifying the task structure, we have significantly simplified the operating methods of the product, reorganizing complex operations through new technologies, prioritizing the enhancement of the customer experience in the restaurant, designing a system that is intuitive and easy to use for customers, regardless of their technical background, which reflects HCI's focus on accessibility and usability.

Meanwhile, on the technical side, our inclusion of ChatGPT demonstrates an understanding of the importance of natural, human-like interactions in human-computer interaction. When designing the search function, we introduced artificial intelligence to make the interaction more conversational and less mechanical.

To improve responsiveness, we use Elasticsearch to provide fast and relevant search results, mainly to improve user satisfaction, which is also a key factor in HCI.

The introduction of the voice search function reflects the trend of human-computer interaction towards multi-modal interaction, that is, users can interact with the system in multiple ways (such as text, voice). This function caters to the preferences and abilities of different users and enhances the accessibility of the system sex.

We conducted iterative product design and testing based on user feedback, and continued improvements based on user feedback to ensure that the system always meets user needs and preferences.

We also consider ethics and user privacy, and we inform our evaluation teams during the evaluation and testing phases to ensure that customer data is handled securely and responsibly.

Our projects demonstrate user-centered design, responsiveness, multimodal interaction, iterative development, and ethical considerations. This knowledge is vital for anyone studying or working in the field of human-computer interaction, as we continue to adapt and evolve as technology advances to effectively meet user needs.