

# Case Study

## GenAi-powered review categorization

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# Business Context, Problem Overview and Solution Approach

- Restaurant business is known as long-time established type of business. Nowadays, there is a vast variety of restaurants that may satisfy the most demanding customers tastes. However, staying competitive and maintaining highest quality is very challenging as this type of business heavily relies on many factors such as supply chain stability, keeping up with the modern trends, seasonality, acquiring quality personnel, customer retention, and many other aspects. To succeed, it is essential to continually assess and improve customer experience, making sure that you meet and excel customers expectations. Failing to satisfy current customers or attract new ones can lead to profit loss, which in turn will impact food pricing, service quality, overall sales, and restaurant's reputation.

# Business Context, Problem Overview and Solution Approach

- As the statistics show, 80% of the restaurants do not survive until their 5<sup>th</sup> anniversary. This is an important indication that every detail matters in the restaurant business. Obviously, the greatest attention is paid to the food aspects, that includes menu variety, pricing, new updates, holding to the modern trends. However, other aspects such as the quality of service, welcoming personnel, ambience, waiting times and the overall customer experience do contribute to the final decision of the customer whether he/she wants to come to this place again. As the saying goes, there would not be a second chance to make a first good impression, we should put all our efforts and try our best to win the customer from the first attempt. In this case study, there is a set of ten reviews collected from different customers. Our goal is to utilize Prompt Techniques to extract valuable insights and identify key factors that drive business profitability.

# Business Context, Problem Overview and Solution Approach

- Application of Perplexity Ai, would help us to analyze the customer's reviews efficiently by performing sentiment analysis as well as categorizing reviews into predefined fields, that will help determine which factors play key role for the customer retention and acquiring new customers. In this case study, the particular focus is on the following aspects, which are food quality, service, ambience, price and the overall experience. Understanding customer's feedback would allow us to determine which aspects are important for the restaurant business, and therefore would help increase of profitability. Furthermore, it is beneficial to the business establish connections with the customers. This would allow establishing good relationship with the clients as well as receiving valuable feedback from the new customers. To make this process more automatic and cost effective, we recommend to use Ai systems to make analysis of the customer's reviews and utilize it for generation of the customized responses to the clients of the restaurant.

# Business Context, Problem Overview and Solution Approach

- Introduction of the AI system in the area of the customers communication, would help evaluate real situation with the business performance and determine the current situation of the business self-representation. To maximize the benefits of AI, we explored 4 various techniques for the analysis, including:
  - i. Zero Shot Prompt,
  - ii. One-shot Prompt,
  - iii. Few-shot Prompt and
  - iv. Chain of Thought.
- Few-shot prompting approach provided the best results for this problem. Cust2024-008 and Cust2024-010 reviews were chosen as the examples in the prompt, which is provided in the next 3 slides.

## Few-shot Prompt

You are a product analyst. your task is to make a review analysis, based on the example I gave you. Context: - Review # 1: "**The food was disappointing, and the service was slow and inattentive. The appetizer of stuffed mushrooms lacked flavor, and the main course of chicken marsala was overcooked and dry**" Original landing page # 1: - Sentiment Classification:

Negative - Tags: Food: Yes, Quality: Yes, Service: Yes, Ambience: No, Price: No, Overall Experience: Yes - Priority: High - Suggested Actions/Next Steps: 1. Revise Appetizer Recipes - Focus on enhancing flavor profiles for appetizers like stuffed mushrooms; 2. Improve Cooking Techniques - Train kitchen staff on proper cooking methods to ensure dishes like chicken marsala are cooked to perfection; 3. Service Training - Implement staff training programs to improve attentiveness and efficiency in service; 4. Customer Feedback Loop - Establish a mechanism for gathering real-time feedback from customers during their dining experience; 4. Quality Control Checks - Introduce regular quality checks for both food and service to maintain high standards; 5. Menu Review Sessions - Conduct regular reviews of the menu items to identify and rectify any recurring issues; 6. Staff Adjustments Evaluate staffing levels during peak hours to ensure adequate service coverage.

## Few-shot Prompt (cont'd)

- First Response to Customer: Dear [Customer's Name], Thank you for sharing your feedback regarding your recent visit to our restaurant. We sincerely apologize that your experience did not meet your expectations. We are particularly concerned to hear about the disappointment with both the food and the service you received. Your comments regarding the stuffed mushrooms and chicken marsala are invaluable, and we will take immediate steps to address these issues with our kitchen team. Additionally, we recognize the importance of attentive service, and we will be implementing training sessions for our staff to ensure that all guests receive the level of care they deserve. Your feedback is crucial in helping us improve, and we hope you will give us another chance to provide you with a dining experience that exceeds your expectations. Warm regards, [Your Name] [Your Position] [Restaurant Name] [Contact Information] Context: - Review # 2: **"The restaurant has a decent menu with a variety of options. The food was satisfactory, but nothing stood out as exceptional. The Caesar salad was fresh and well-dressed, but the pasta dish lacked depth of flavor"** Original landing page # 2: - Sentiment Classification: Neutral - Tags: Food: Yes, Quality: Yes, Service: No, Ambience: No, Price: No, Overall Experience: Yes - Priority: Normal - Suggested Actions/Next Steps: 1. Enhance Pasta Dish; 2. Menu Innovation; 3. Maintain Salad Quality; 4. Staff Training; 5. Customer Feedback Loop; 6. Quality Control; 7. Chef's Review; 8. Competitive Analysis



## Few-shot Prompt (cont'd)

- First Response to Customer: Dear [Customer's Name], Thank you for taking the time to share your feedback with us. We appreciate your insights regarding our menu and the dishes you tried during your visit. We're glad to hear that you enjoyed the freshness of our Caesar salad. However, we're sorry to learn that the pasta dish did not meet your expectations. Your comments about the flavor are valuable, and we will certainly take them into consideration as we strive to enhance our offerings. We are committed to providing an exceptional dining experience, and your feedback helps us improve. We hope you'll consider visiting us again soon so we can provide you with a meal that exceeds your expectations. Warm regards, [Your Name] [Your Position] [Restaurant Name] [Contact Information]. please create combined table where individual reviews are mapped to the outputs of their corresponding categories.

# The structure of the Prompt

- The Prompt for the few shot case includes **2 examples** for the customer review analysis made for the reviews Cust2024-010 and Cust2024-008.
- The prompt includes the classification of the review into **5 predefined structured fields** as Sentiment (Positive, Neutral, Negative), Tags (food, quality, service, ambience, price and overall experience), Priority(High, Normal, low), Actions/Next Steps and First Response to Customer.
- There is detailed analysis performed for the **Actions/Next Steps field**, there is enough information on the methods for improvements based on the feedback provided. To make effective training, there are examples that includes the **neutral and negative experience**, to highlight the variety of the aspects need to be taken into consideration.
- The First Response to Customer is **build on the Actions/ Next Steps input**, to make sure that there is a logical connection between the two fields. By providing first accurate response to the customer, we make sure that we address all customer concerns and find appropriate solution to each case.

# Exploring Different Prompting Techniques

## ZERO-SHOT PROMPT

- This technique is not consistent and generates random output to the same question, as there is no specific example exists to train the model. This could create issues when running experiment for the different datasets and when comparing the results.
- Utilizing lengthy instructions is not efficient approach as it results in confusion of AI, and it could summarize and paraphrase the actual input text and use it for further analysis.
- Performs well on the Classification Tasks to generate the structured fields as Tags and Priority as well as Sentiment Analysis.
- Does not demonstrate good results for the Action(s)/ Next Step(s) and First Response to the Customer as generates very short answers and skip some aspects of the customer's reviews.

# Exploring Different Prompting Techniques

## ONE-SHOT PROMPT

- Cust2024-008 review analysis was chosen as example, that guides model through the structure and the context of the response. The example was having detailed response on the Action(s)/ Next Steps (s ) field and the First Response to the Customer, therefore generated nice results for other customer reviews.

## FEW SHOT PROMPT

- Cust2024-008 and Cust2024-010 reviews were chosen as the examples for model training. The results were good and further improved compared with one-prompt. This can be observed from the Action(s)/ Next Step(s) field as it contained more suggestions on the quality improvements based on the customer's review.

# Exploring Different Prompting Techniques

## CHAIN OF THOUGHT PROMPT

- This technique allows more improvement with more retraining performed on the model. This example allowed to achieve satisfactory results by breaking the task in 6 small steps.
- There were good performance on the classification and sentiment analysis. On the other hand, the model summarized a lot Action(s)/Next Step(s) and reflected these suggestions in the First Response to Customer field, that do not fit to the context, as the customers do not need to know this specific information. Based on this result, this approach requires more retraining to achieve better reasoning and differentiation of actions needed for quality improvement strategies to acquire/ retain the customers.

# Exploring Different Prompting Techniques

- For this case study, it is recommended to use a variety of prompting approaches to access the problem. As a starting point, the task could split into small steps, i.e., implementing Chain of Thoughts approach. This would help understand the matter of the problem, as well as monitor the quality of the answers generated by AI.
- The COT approach can be used on several examples, until the consistent answers received from AI. Then, one example can be used to generate One-Shot prompt in the appropriate format. It is important that this example prompt has sufficient information that can be used for analysis, otherwise the AI agent would generate repetitive answers for other cases.
- Optionally, to improve results further, the Few-Shot prompt technique could be used. To achieve accurate results, make sure that prompt has enough information, covering different types of examples.

# Prompting Template to Solve The Problem

## Prompt Template:

You are a product analyst/ product manager [role or profession]. your task is to make a review analysis [asset], based on the example I gave you [enter your context].

## Final Prompt:

You are a product analyst. your task is to make a review analysis, based on the example I gave you.

Context:

Review # 1: “\_\_\_\_\_”

Original landing page:

-Sentiment Classification:\_\_\_\_ -Tags: Food\_\_, Quality\_\_, Service\_\_, Ambience\_\_, Price\_\_, Overall Experience\_\_\_\_ - Priority:\_\_\_\_-Suggested Actions/Next Steps:\_\_\_\_-First Response to Customer:\_\_\_\_\_

## Prompting Template to Solve The Problem (cont'd)

Review #2: "\_\_\_\_\_"

Original landing page:

-Sentiment Classification:\_\_\_\_ -Tags: Food\_\_, Quality\_\_, Service\_\_, Ambience\_\_\_\_, Price\_\_\_\_,  
Overall Experience\_\_- Priority:\_\_\_\_-Suggested Actions/Next Steps:\_\_\_\_-First Response to  
Customer:\_\_\_\_\_

**The Few Shot Prompting Technique is the most suitable for the Restaurant Review as it creates a structure needed for analysis, also it indicates the context needed to create the field as Action (s)/Next Steps (s). Compared with other approaches, it allows to generate good results without extensive fine-tuning.**



# Output from the Prompt

Customer\_ID    Review

Cust2024-002	I had a mixed experience at this restaurant. While some dishes were enjoyable, others fell short of expectations. The appetizer of crispy calamari was perfectly cooked and flavorful, but the main course of chicken piccata lacked seasoning and was slightly overcooked.
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*\*Only one output provided as an example. Please see the attached PDF showing all of the outputs in a table format.*

# Output from the Prompt (cont'd)

Sentiment	Tags	Priority	Suggested Actions/Next Steps	First Response to Customer	Sentiment	Tags	Priority	Suggested Actions/Next Steps	First Response to Customer
Neutral	Food: Yes, Quality: Yes, Service: No, Ambience: No, Price: No, Overall Experience	Normal	<ol style="list-style-type: none"> <li>1. Improve Main Course Quality</li> <li>2. Enhance Seasoning Techniques</li> <li>3. Staff Training</li> <li>4. Quality Control Checks</li> <li>5. Menu Review Sessions</li> <li>6. Customer Feedback Loop</li> </ol>	<p>Dear [Customer's Name],</p> <p>Thank you for sharing your feedback about your recent visit. We're pleased that you enjoyed our calamari appetizer, but we apologize that the chicken piccata didn't meet your expectations. We appreciate your honest assessment as it helps us improve. We'll review our seasoning and cooking processes for our main courses to ensure consistency across all dishes. We hope you'll give us another opportunity to provide you with a fully satisfying dining experience.</p>		Neutral Yes			<p>Warm regards,</p> <p>[Your Name]</p> <p>[Your Position]</p> <p>[Restaurant Name]</p> <p>[Contact Information]</p>

# Output from the Prompt

- The Sentiment scored as Neutral, as the review contains both positive feedback about calamari and also it complains about the lack of seasoning in chicken piccata.
- The priority assigned as normal, as it contains both positive and negative experience. This review is useful as it contains suggestions for the food quality improvement, but does not require the management to take urgent actions.
- The Action(s)/ Next Step(s): the steps 1, 2, 3 are closely interconnected, and originate from the proper training of the staff to cook the chicken piccata. While steps 4,5,6 are related to the constant monitoring of the customer feedback to access the quality of the dish and recent updates to dishes in the menu.
- The Customer review expresses gratitude for the honest and valuable feedback from the customer, and addresses welcoming message expecting the host the customer again.

# Observations/Insights

- The customers of the following restaurant are mostly attracted by the quality of the food, that is the major factor determining whether customer would have positive, negative or neutral experience.
- The price of the food does not influence the customers decision to eat at this restaurant.
- 50% of the customers are neutral and negative about their experience in this restaurant. Improving this ratio would open opportunities to increase profitability of the business.
- The positive reviews mainly focused on the food quality, while the negative ones show dissatisfaction with food as well as with inattentive service.
- The signature meals of this restaurants are the seafood, lamb and desserts, as they are most often mentioned in the positive reviews.

## Observations/Insights

- The main complaints related to food caused due to the lack of seasoning and overcooking the dishes such as Pasta and Ceasar Salad. Retraining of the personnel and revising of the cooking methods would help improve customers experience.

## Conclusions

According to the customers review analysis, the negative cases recommended to be handled in the urgent manner. The main solution approach is in revision of the cooking techniques and the staff retraining. Also, service can be improved by providing it in more quick and attentive manner.

The positive scenarios are in the low priority nature, but we need them to express appreciation of the customer's feedback and invite them again to visit the restaurant.

Always maintain the quality of the food and service by establishing continuous feedback loop with the customers, that would provide guidance for further improvements and growth incentives for the business.

## Recommendations to other business.

- Please study carefully the area of the business, where it is planned to utilise AI and evaluate all pros and cons to determine suitability of the AI as the solution to this particular problem. Always remember that positive experience can enhance overall business performance, while negative can contribute to the high cost of unnecessary expenditures. It is recommended to be reasonable to decide whether AI needs to be utilized or not, and obviously do not use AI just for the sole purpose of using it.

# APPENDIX

# Dataset overview

- Dataset Source: Collection of the customer reviews from the particular restaurant.
- Data Structure: Data represented in the form of table, with 2 columns, which are i) Customer\_ID, unique number for each customer and the review, and ii) the review text. Each row represents a single feedback provided by the customer. The data provided in an Excel file, that is converted to CSV that can be analyzed by Perplexity AI.
- Attributes/Features: column A- Customer\_ID ( categorical), column B- Review (text)
- Example Records:

	A	B
1	Customer_ID	Review
2	Cust2024-001	The food at this restaurant is absolutely amazing! The flavors are rich and vibrant, and every dish is a culinary delight. The tender, melt-in-your-mouth steak is perfectly seasoned and accompanied by a velvety red wine reduction. The dessert selection is a work of art, with the creamy tiramisu stealing the show.
3	Cust2024-002	I had a mixed experience at this restaurant. While some dishes were enjoyable, others fell short of expectations. The appetizer of crispy calamari was perfectly cooked and flavorful, but the main course of chicken piccata lacked seasoning and was slightly overcooked.



# Dataset overview

- Missing Values: Cust2024-006 wrong entry.

Cust2024-005	This restaurant exceeded my expectations. The food was outstanding, and the portion sizes were generous. The appetizer platter was a feast for the senses, featuring a colorful array of bruschetta, crispy calamari, and creamy spinach dip. The main course of grilled salmon with lemon butter sauce was cooked to perfection, flaky and moist. Save room for dessert—the chocolate lava cake is an indulgent treat.
Cust2024-006	Not Applicable, what is this iudbidsub
Cust2024-007	I am a regular customer at this restaurant, and I am never disappointed. The food is consistently delicious. The signature dish, a succulent rack of lamb, is always tender and flavorful. The side of truffle mashed potatoes is a heavenly accompaniment. The impeccable service



**Happy Learning !**

