shaip

CASE STUDY

Boosting E-Commerce Chatbot Accuracy with Chain-of-Thought Reasoning

Leveraging step-by-step AI reasoning to handle complex customer inquiries and improve satisfaction in online retail

COMPANY
A global leader in online retail, specializing in AI-powered customer support systems.

INDUSTRY
E-commerce

USE CASE
Enhancing the problem-solving ability of a customer service chatbot to handle complex product queries.

OUR OFFERING
CoT-based prompt engineering

KEY STATS

100,000+
Customer Interactions processed using CoT-based reasoning.

27%
Reduction in response time for multi-product and troubleshooting queries.

30%
Increase in customer satisfaction from improved issue resolution.

OVERVIEW

The client sought to improve the customer experience on their platform by refining their AI chatbot, which handled product inquiries, returns, and troubleshooting. The chatbot struggled with complex customer questions, especially when multiple issues or products were involved in a single query. For instance, customers often inquired about the return policy for two different products bought under different conditions.

We introduced Chain-of-Thought (CoT) prompting to help the chatbot break down these complex questions and guide it through step-by-step reasoning, resulting in more accurate and comprehensive responses.

PROJECT SCOPE

The project focused on training the chatbot to process multi-part customer queries for over 100,000 unique interactions across various product categories, such as electronics, fashion, and home appliances. The CoT approach enabled the AI to handle:

- **Multi-product Inquiries:** Addressing questions involving multiple items in the same interaction.
- **Step-by-Step Issue Resolution:** Helping customers troubleshoot product issues by guiding them through detailed solutions.

CHALLENGES

Complex Queries: Customers often asked multi-part questions that required resolving different issues simultaneously.

Inconsistent Answers: The chatbot's previous responses were inconsistent when handling product returns and technical issues in a single conversation.

Scalability Issues: As customer interactions increased, maintaining the chatbot's performance across different product lines was difficult.

SOLUTION

- **CoT Prompt Engineering:** We crafted prompts to guide the AI through the logic of answering multi-part questions. For example, the chatbot was trained to ask clarifying questions before jumping to conclusions.
- **User Feedback Loops:** We incorporated customer feedback to improve CoT prompts, allowing the chatbot to learn from real-world interactions.
- **Example** for Chain-of-thought prompting

Customer Query:

"I ordered a smartphone and a pair of headphones. The smartphone screen is cracked, and the headphones aren't pairing with my devices. I also need to update my shipping address for a new order I placed yesterday, but it's not letting me update it in my account. Can you help me with these issues?"

Step 1: Identify and Categorize the Issues

"It looks like you're dealing with three separate issues: (1) a damaged smartphone, (2) pairing problems with your headphones, and (3) updating your shipping address for a recent order. Let's take these one by one."

Step 2: Address the Damaged Smartphone

"For the smartphone, since the screen is cracked, you may be eligible for a replacement or repair, depending on the warranty status. Can you confirm whether you purchased extended warranty coverage, or if this happened within the 30-day return window?"

- **Branch 1:** If warranty or within the return window:

  "Great! In that case, I'll assist you in starting a replacement request. Could you confirm the date of delivery and whether you'd prefer a replacement or a refund?"

- **Branch 2:** If outside the return window or no warranty:

  "Since the phone is outside the return window and doesn't have an extended warranty, you might still qualify for a paid repair. Would you like me to help you set up a repair request?"

Step 3: Diagnose the Headphone Pairing Issue

"For the headphones, let's try a troubleshooting step first. Have you tried resetting the headphones by holding the power button for 10 seconds and then attempting to pair again?"

» **Branch 1:** If customer confirms troubleshooting didn't work:

"Thank you for trying that. If the issue persists, I can check if your headphones are still within the return or warranty period. Could you provide the purchase date so we can move forward with a repair or replacement?"

» **Branch 2:** If troubleshooting works:

"I'm glad the troubleshooting worked! If you need help with anything else regarding the headphones, feel free to let me know."

Step 4: Help with Shipping Address Update

"For the new order you placed, let me check if the shipping address can still be updated. Please hold on for a moment while I verify the status of the order."

» **Branch 1:** If the order has not yet been shipped:

"Good news! The order hasn't shipped yet, so I'll help you update the shipping address right away. Can you please provide the correct address?"

» **Branch 2:** If the order has already been shipped:

"It seems the order has already shipped and can't be updated. However, you can still contact the shipping carrier directly to request an address change. Would you like the tracking details for your order?"

Step 5: Provide a Summary and Next Steps

"Here's a quick summary of what we've done: (1) We've started the process for your smartphone replacement/repair, (2) resolved the troubleshooting for your headphones, and (3) attempted to update the shipping address. I've also shared the tracking details for your recent order. Is there anything else I can assist you with today?"

Rationale:

This CoT prompt is more complex, as it handles multiple distinct issues (product return, technical troubleshooting, and account management) while guiding the chatbot through each step in a logical sequence. It incorporates decision branches based on customer responses (e.g., whether the warranty covers the smartphone or troubleshooting resolves the headphones issue) and dynamically updates its course of action depending on the situation. This enhances the chatbot's ability to manage multi-layered customer queries with high accuracy and efficiency.

THE OUTCOME

- **100,000 Annotated Customer** Interactions delivered as per project timelines
- **27% Reduction in Response Time:** With CoT prompting, the chatbot delivered faster responses by processing each question more efficiently.
- **30% Increase in Customer Satisfaction:** Customers reported higher satisfaction with chatbot's ability to handle complex queries, especially for troubleshooting and multi-product inquiries.
- **Scalability across Departments:** The CoT-based chatbot logic was easily extended to customer support, order tracking, and payment resolution, improving overall chatbot efficiency.

CUSTOMER TESTIMONIAL

★★★★★

"Implementing Chain-of-Thought reasoning transformed how our chatbot addresses customer queries. The step-by-step logic enabled it to handle even the most complex issues, dramatically improving both speed and accuracy."

— Head of Customer Experience

ABOUT SHAIP

Shaip provides high-quality, multi-type data (text, audio, image, video) for building unbiased AI/ML models. Shaip licensing, collecting, and annotating data for Healthcare, Conversational AI, Computer Vision, and Generative AI/LLM. Going beyond data, Shaip also offers a Responsible LLM Toolkit for aligning and enhancing models using RLHF. Headquartered in Kentucky, with offices in Silicon Valley and India, our global team combines data science expertise with deep industry insights.

ABOUT THE CLIENT

The client is a global leader in online retail, specializing in AI-driven customer support solutions. With millions of customers worldwide, it delivers a seamless shopping experience across electronics, fashion, home appliances, and more. By leveraging cutting-edge AI technologies, they continually enhances its customer service capabilities to offer faster, more accurate assistance across a variety of product categories.