Case study

Streamlining Electric Vehicle Charging Support with an AI Chatbot

A major provider of electric vehicle charging services asked us develop an AI-powered chatbot for their mobile application. Their primary goal was to streamline customer support by reducing the load on their call center. Additionally, they wanted to enhance the user experience by offering quick and accurate answers to common customer inquiries.

By leveraging advanced AI technology, we created a scalable chatbot solution that met the client's needs. The chatbot can efficiently handle a wide range of user queries and deliver fast and accurate responses. As a result, the client successfully optimized their support operations, improved customer satisfaction, and gained valuable insights into user behavior to further refine their services.

The client

A regionally prominent electric vehicle charging network sought our help in creating an intelligent chatbot to enhance customer support and the user experience. Facing an increasing volume of inquiries, they wanted to integrate an AI-driven solution into their mobile app to handle common questions and issues, thereby reducing the load on their call center.

The challenge

The client required a robust chatbot solution that could:

- **Automate customer support** by providing answers to frequently asked questions about charging electric vehicles and using the client's charging network

- **Generate accurate responses** by leveraging the client's extensive knowledge base, including FAQs, charging manuals, and guides

- **Transfer unresolved or complex inquiries** to a live customer support agent for further assistance

- **Protect sensitive user information** and maintain strict data privacy standards

To meet user expectations, the chatbot had to handle diverse queries such as:

- Where can I find the nearest charging station?

- How can I create an account?

- What payment methods do you accept?

- My charging session is not starting. What should I do?

- How long will it take to charge my vehicle?

Overall, the solution had to provide reliable support while ensuring a seamless user experience within the client's app ecosystem.

The result

We developed a scalable chatbot solution capable of handling a wide range of questions related to EV charging support, from locating the nearest station to troubleshooting charging issues. The chatbot seamlessly integrates with the client's knowledge base, supports voice and text queries, and transfers unresolved issues to human agents when needed. Here's what we achieved:

- **Enhanced user experience.** Users can quickly get answers to their questions via a chatbot integrated into the client's mobile app, improving convenience and satisfaction.

- **Improved customer support.** By handling a wide range of inquiries, the chatbot eliminates the need for users to wait for an available support representative, significantly reducing response times.

- **Optimized support team workload.** The chatbot's ability to handle common and complex queries frees up the client's support team to focus on higher-priority tasks.

- **Scalability.** The chatbot is designed to scale easily, allowing the client to accommodate the growing number of electric vehicle users.

- **Data-driven insights.** By collecting and analyzing user data, the chatbot provides actionable insights into customer behavior and preferences, helping the client refine their services.

This solution allowed our client to enhance the efficiency of their support operations while preparing for future growth.

Our approach

To help our client achieve the desired results, we thoroughly analyzed their requirements and started outlining the workflow. The Apriorit team suggested using established frameworks like Docker to accelerate development while making sure the solution met all functional and performance requirements.

As a result of our initial discussions with the client, we offered a fixed-price collaboration model, as it was best suited for developing an efficient chatbot. After approving the plan with the client, we assembled a dedicated team and moved to development.

Customer support chatbot: project details

OUR TEAM

- AI developers
- Full-stack developers
- QA specialists
- Business analyst
- Project manager

OUT TECH STACK

- Claude 3.5
- FastAPI
- PostgreSQL
- React
- Python

How we did it

The Apriorit team delivered the project in two key milestones. First, we developed and demonstrated a basic version of the chatbot running on a local machine, ensuring core functionality met the client's expectations. Then, we completed the project by deploying the fully functional chatbot on a powerful cloud platform, ready for real-world use.

Here's the four-stage roadmap that helped our team turn the client's vision into a competitive and scalable solution.

4 stages of the customer support chatbot project

01 Objectives and requirements gathering

02 MVP development and local testing

03 Full-fledged cloud deployment

04 Post-deployment support and optimization

Stage 1. Objectives and requirements gathering

To make sure that the chatbot met the client's needs, we started by gathering detailed requirements. During discussions with the client, we identified potential use cases, outlined key features for the chatbot, and addressed possible technical constraints. We decided to create an AI-based chatbot using Claude 3.5 instead of a rule-based chatbot for several reasons:

- Improved natural language understanding

- Ability to be continuously trained and fine-tuned

- Adaptability to a wide range of queries

- Time efficiency without creating an extensive set of rules and manual updates

After gathering requirements, our team created a comprehensive specification document to guide development and align expectations.

Stage 2. MVP development and local testing

The initial milestone focused on delivering a basic version of the chatbot to show its core functionality. Key tasks during this stage included:

- Demonstrating internet search capabilities for responding to user queries

- Deploying the chatbot locally using **Docker**, as the production environment wasn't ready yet

- Implementing a limited subset of planned features, with some prompts and knowledge base integration pending

- Creating an admin panel that allowed the client to upload custom files, such as FAQs and charging manuals

The chatbot sent questions and answers to the server via **WebSockets**, introducing fast and reliable communication between the chatbot and the **back end**. Meanwhile, the client handled mobile app development, seamlessly achieving AI chatbot integration into their app.

To ensure the AI provided accurate and contextually relevant responses, we began fine-tuning the Claude 3.5 LLM during this stage. This process included:

1. Training the model on a curated subset of the client's documentation

2. Preventing hallucinations with the help of prompt engineering and reinforcement learning techniques

3. Testing the model's outputs against sample queries to refine its performance and minimize inaccuracies

The MVP provided the client with a clear view of the chatbot's foundational capabilities. Our QA specialists conducted extensive testing to identify and fix any issues. After resolving bugs and refining performance, we presented the updated MVP to the client for feedback.

Stage 3. Full-fledged cloud deployment

With the MVP approved, we expanded the chatbot's functionality and deployed it in a production-ready environment and to the client's AWS account. This stage included:

- Implementing all planned features, such as voice query support

- Setting up the necessary cloud infrastructure on AWS to host the chatbot on the customer's account

- Configuring the chatbot to interact with external services like Google search and the chosen LLM

- Programming the chatbot to ask follow-up questions before providing recommendations to boost the quality of responses

- Creating detailed documentation to assist the client with chatbot operation and future maintenance

After that, we showcased the fully functional chatbot to the client, highlighting its scalability and enhanced features compared to the MVP.

Stage 4. Post-deployment support and optimization

Following deployment, the client began integrating the chatbot into their mobile application. Our team continues to provide post-deployment support, optimizing performance and addressing any emerging issues to ensure a seamless user experience.

The impact

As a result of our collaboration, the client now has a fully functional AI-powered chatbot integrated with their knowledge base and capable of handling a wide range of user inquiries. This solution has significantly improved the user experience by providing fast, accurate, and context-aware responses to customer questions both by text and by voice.

The chatbot also provides immediate, 24/7 support, significantly improving customer satisfaction and reducing wait times. We continue to support the client as they integrate the chatbot into their mobile application, ensuring smooth performance and identifying opportunities for further optimization.

Want to achieve smarter customer engagement with your app?

Apriorit will develop a secure chatbot solution that boosts the user experience and drives results for your business.