

A vertical photograph on the left side of the page shows a red ketchup bottle and a paper bag of fries against a solid orange background. The ketchup bottle is on the right, and the bag of fries is on the left, partially obscured by the bottle.

Quick-service restaurant chain innovates customer experience with AI

CHALLENGES

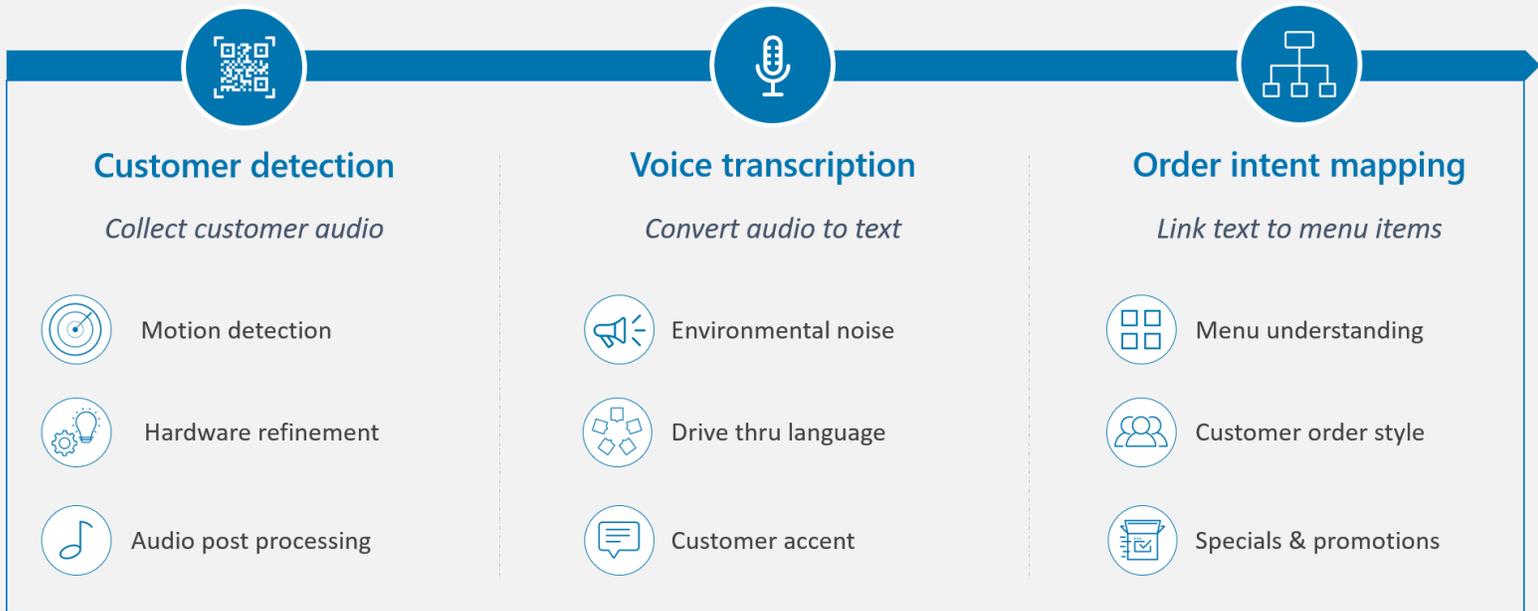
An international restaurant chain wanted to innovate its quick-service restaurant (QSR) interactions with customers via order-taking automation.

The QSR chain could create a more consistent customer experience when demand increased during peak hours by reducing order-taking efforts at the drive-thru window. Automating the routine order-taking process would assist service leads and reduce delays to help ensure a high level of customer satisfaction.

SOLUTIONS

Neal Analytics worked with the customer to modernize the order-taking process by leveraging AI, voice dictation, and intent mapping technology. Our solution combined state-of-the-art AI, Azure Cognitive Services, specialized hardware, and field-tested architecture.

The voice ordering solution consists of three core components: Customer detection, voice transcription, and order intent mapping.

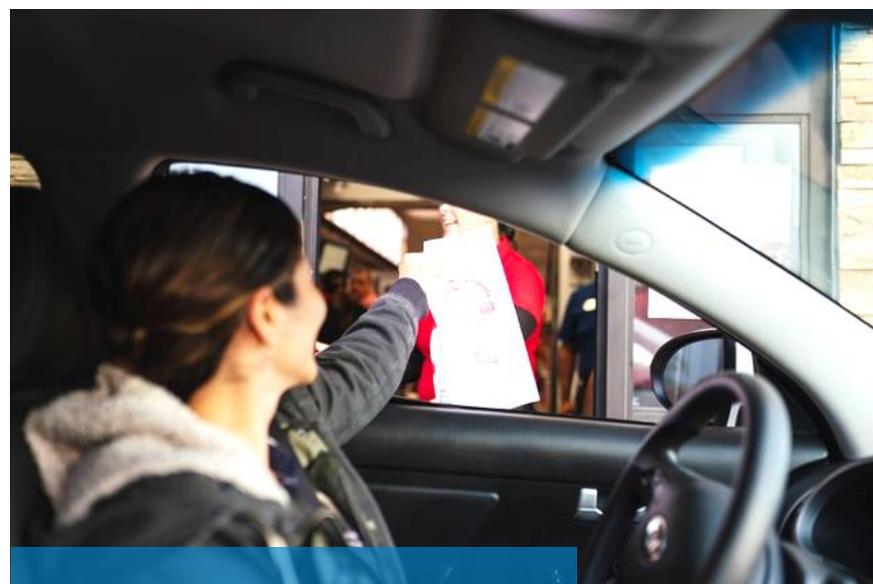
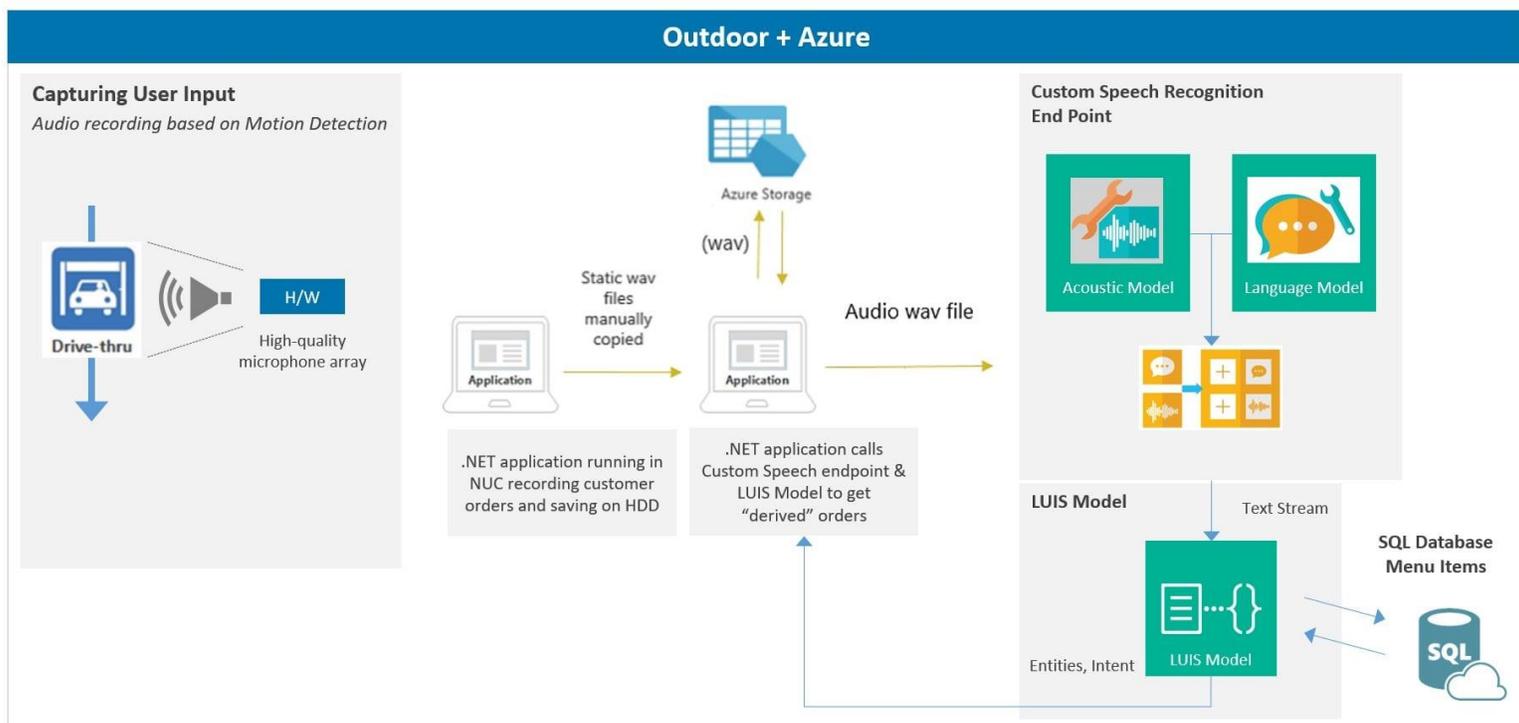


Neal Analytics built a scalable solution to capture, translate, and analyze orders. The solution takes an input of the customer audio from a high-quality microphone array at the drive-thru window. The process is as follows:

1. A high-quality microphone array records customer orders at the drive-thru window.
2. An AI bot acts as an "intelligent" voice agent to take customer orders, leveraging the solution's logic process to converse, clarify orders, and move customers through the process.
3. The order's audio (.wav file) is sent to [Custom Speech](#), using acoustic and language models for Speech to Text.
4. The text stream is then sent to the [Language Understanding \(LUIS\)](#) model for entity detection.
5. The solution maps the text to stored menu items and order intent.
6. The solution generates a valid order list of items (item, quantity) to send directly to the restaurant chain's POS system.

Voice ordering solution architecture diagram

Voice Ordering Solution Architecture



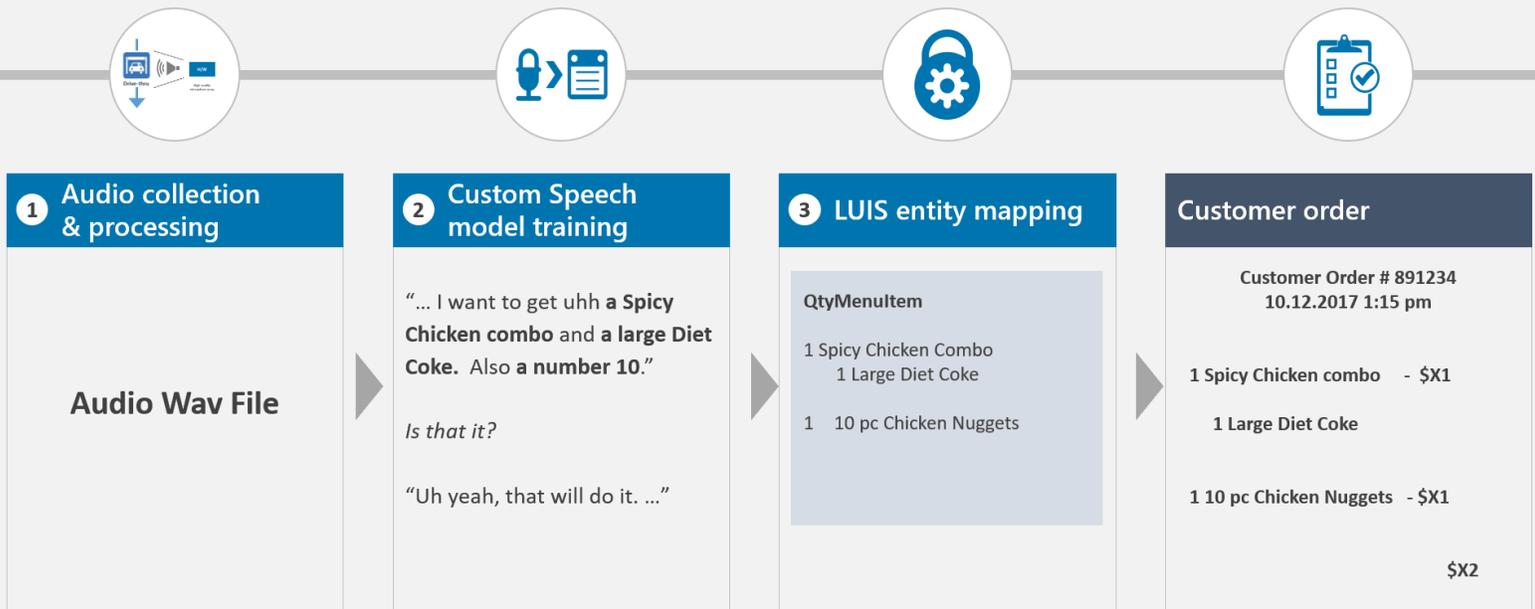
Some critical challenges around AI voice ordering included managing the impact of environmental noise, high variance found in customer order styles and the process of mapping conversational orders with the Language Understanding (LUIS) model.

However, with continuous testing and quick iterations, the Neal Analytics team was able to train the models further to improve accuracy and mapping.

RESULTS

Neal Analytics integrated AI-enabled audio hardware and a custom voice ordering solution to assist service leads during peak hours. This "digital drive-thru" connected to the restaurant chain's Point of Sale system to generate orders, using logic to map order intent to menu items. Below is an example of the process.

Voice order example



By automating the order-taking process with bots, Neal Analytics was able to help the restaurant chain:

- Lower customer service costs
- Provide faster, quality responses
- Improve the customer experience