SPEECH RECOGNITION:

The Right Way to Collect Alphanumeric Phrases.

How to increase IVR Alphanumeric Collection Success Rates and Decrease Friction to Callers.

An alphanumeric phrase is a lengthy series of letters and numbers typically seen in product serial numbers or other identification numbers. It is difficult for speech recognition systems to differentiate between the variety of numbers and letters with similar sounds, such as "B" and "D" or "A" and "eight."

TODAY'S SOLUTIONS FRUSTRATE CALLERS

To identify and correct speech recognition errors, today's speech recognition solutions typically employ a strategy of confirming a speaker's utterance. For example, a caller might provide a number and the system restates the number and asks for confirmation:

System: **"What is your phone number?"**

Caller: **"555-1234"**

System: **"That was 555-1234. Is that correct?"**

Caller: **"Yes"**

When collecting alphanumeric information, there is even more potential to mishear because of the similarities in sounds among certain letters and numbers (*e.g., was that '1234' or '12B4'?*).

The longer the alphanumeric string, the greater the chance for recognition errors. Long strings harm customer experience because the caller must provide a long string, listen to a long string in the confirmation prompt, and, if not satisfied that the recognizer correctly interpreted the utterance, repeat the long number once again.

Further, one-step correction is designed to respond to simple yes/no responses and cannot recognize when a caller attempts to correct the information immediately, as in:

System: **"What city and state?"**

Caller: **"Moorestown, Pennsylvania"**

System: **"That was Morristown, Pennsylvania, right?"**

Caller: **"No. Moorestown!"**

HOW TO DECREASE FRICTION WITH CALLERS

CASE STUDY:
Capturing Serial Numbers

PTP worked with a client who wanted to improve the accuracy of capturing alphanumeric serial numbers using the IVR. The serial numbers help the client identify product information and warranty status.

Each serial number is formatted in three parts: (a) Manufacturer plant and date, (b) sequence information, and (c) configuration code.

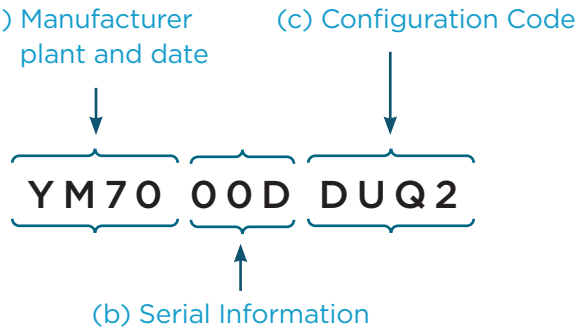

Figure 1: The client's serial numbers were formatted in three parts.

IVR IMPLEMENTATION—PHASE ONE

PTP implemented the solution in two phases. With the initial deployment, the IVR call flow asks callers to provide the product they are calling about. Based on that product, the IVR is able to predict certain parts of the serial number. This creates a better customer experience because it decreases what a customer must tell the IVR.

Next, when the caller is asked to say the serial number, the IVR's recognition engine creates a group of results consisting of recognized utterances that are ranked by a confidence score. This is called the n-best list. The IVR asks the caller to confirm only the highest ranked interpretation from that list.

System: **"What is the serial number?"**

Caller: **"GB182B6ETV"**

System: **"You said 'GB182B6ETV', correct?"**

GB182G6ETV

GB182B6ETV

GB1A236ETV

GB1H2Z6ETV

Figure 2: The n-best list includes the highest ranked interpretation of the serial number.

IVR IMPLEMENTATION—PHASE TWO

Subsequent to the initial deployment of the solution, PTP performed a series of speech recognition tuning and call flow optimization exercises to improve serial number collection within the IVR.

To do this, we constructed a hypothesis of how the confirmation strategy could be improved, considered challenges that the strategy may pose on the caller or the user experience, and constructed a test of that hypothesis.

THE HYPOTHESIS

We developed the hypothesis that confirmation could be improved by asking the caller to confirm only that portion of the serial number for which the recognition engine was uncertain.

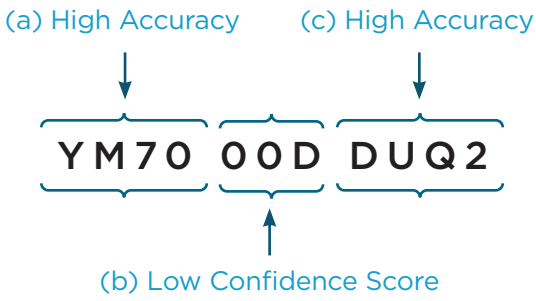

Figure 3: We determined the system could accurately detect the beginning and ending characters of serial numbers, but was less confident with the middle sequence.

The recognition engine is most successful with the more structured parts of the serial number (the beginning and ending). Thus, the characters that are most often in question are the "middle part" of the serial number. The challenge, then, was to find a way in which callers could provide feedback on only the middle of the serial number.

In addition, we learned from examining production tuning data that the top three results in the n-best list almost always contained the correct result. Moreover, those results were remarkably similar with only a few positions in variation.

GB182G6ETV

GB182B6ETV

GB18UB6ETV

GB1HUB6ETV

Figure 4: Data showed that the n-best list almost always contained the correct serial number and only varied by a few characters.

APPROACH TO TESTING

In our testing, we eliminated yes/no questions and developed a three-step process to confirm serial numbers:

1. **Acknowledge the first part:**
   "I got the first part, which is GB1."
2. **Ask about the second part:**
   "I'm not sure about the next part. If it's 2G, press 1. If it's 2B, press 2. If it's UB, press 3. Or to start over, press #."
3. **Acknowledge the last part:**
   "I got the last part, which is 6ETV."

SCENARIO ONE

- 3 Options
- 2 Characters

"If it's 2G press 1. If it's 2B press 2. If it's UB, press 3."

SCENARIO TWO

- 2 options
- 2 Characters
- Radio Alphabet

"If it's A as in alpha, D as in delta press 1. If it's J as in juliet, B as in bravo press 2. If it's UB, press 3."

SCENARIO THREE

- 2 Options
- 3 Characters
- Radio Alphabet

"If it's A as in alpha, 8, D as in delta press 1. If it's J as in juliet, A as in alpha, B as in bravo, press 2."

SCENARIO FOUR

- 3 Options
- 2 Characters
- Radio Alphabet

"If it's A as in alpha, D as in delta, press 1. If it's J as in juliet, B as in bravo, press 2. If it's K as in kilo, Z as in zulu, press 3."

SCENARIO FIVE

- 3 Options
- 3 Characters
- Radio Alphabet

"If it's A as in alpha, 8, D as in delta, press 1. If it's J as in juliet, A as in alpha, B as in bravo, press 2. If it's K as in kilo, 8, Z as in zulu, press 3."

Figure 5: The survey included five scenarios that varied the number of options, characters, and use of the radio alphabet.

The study was structured to vary scenarios using the following characteristics:

- **The number of positions in variation**—the number of characters that differ across the top results in the n-best list.
- **The number of options given to callers**—two or three options were presented to determine if they were too challenging to respond correctly.
- **The use of the Radio Alphabet**—as in "the letter A as in alpha" and "the number eight."

The study included 1,000 participants who encountered one of five scenarios described in *figure 5*, which varied the number of options, characters, and use of the radio alphabet.

The trials were evaluated on both the success of the participant (did the participants correctly indicate which option matched their utterances), as well as the results of a follow-up survey presented to each participant to track customer experience.

The majority of participants were successful in each scenario. Based on these results, we concluded that none of the scenarios tested is unduly difficult for callers and that callers should perform well when encountering any of the scenarios.

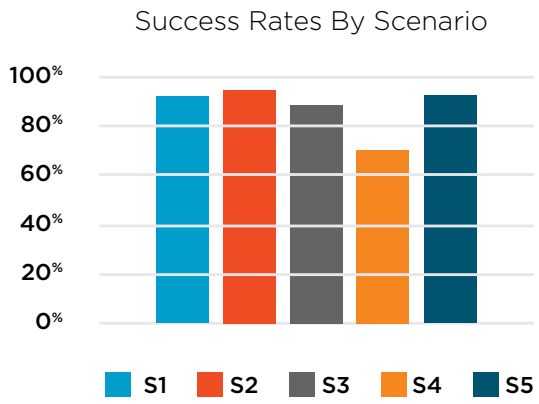

Figure 6: Participants were successful in each of the five scenarios confirming that callers should perform well with any of the approaches we tested.

In addition, most callers were successful with or without the use of the radio alphabet. However, most participants indicated in the post-survey that they found the radio alphabet easier than not using it. This likely reflects some difficulty in understanding the system when the radio alphabet is not used.

One of the most significant findings of the study is that callers were easily able to handle up to three options.

Since we learned earlier that the correct serial number almost always appears in the top three options of the n-best list, callers will likely be presented with the correct serial number as one of the options.

CONCLUSIONS

PTP implemented a new confirmation strategy for the client. This strategy includes:

- **3 Options**
- **3 Characters**
- **Radio Alphabet**

To account for instances in which the correct response was not included in the options presented, PTP recommended that callers be given a means to indicate that none of the options is correct. The client has since observed the following successes:

+10% **Increase — Serial Numbers**
success rate when asked for a serial number

+8% **Increase — First Try**
callers who are asked only once

+5% **Increase — Attach Rate**
percentage of calls exiting IVR with the serial number

ABOUT PTP'S PROFESSIONAL SERVICES TEAM

We think good CX is beautiful.

Improving CX does more than create loyalty. It connects people to the things they care about. It helps companies grow and innovate. And, at the largest scale, it helps bridge cultures. We're here because we're about doing CX better than anyone else. And that's reason for you to be here, too.

With the goal of delivering beautiful technology systems and differentiated client service, the leadership team formed PTP in 2004. Since its inception, PTP has demonstrated profitable growth, leading it to become a $30 million dollar company by 2014.

A Proven Approach
delivered by a team of senior professionals, who solve your unique business problems. Our customer-centric approach is unbiased and optimizes the technology solution to your unique requirements.

Performance-based Commitments
that fully align our work to your goals and objectives. We believe putting our "skin in the game" is critical to maximizing project success and achieving your strategic goals. We are willing to tie our success to project results because we are confident in our ability to deliver on our promises.

A Culture Rooted in Partnership, Hard Work and Collaboration
meaning we work alongside your organization and recognize that knowledge transfer is a critical success factor in all projects.