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Using a Bot to Interact with Phone Menus to Reach a Human Customer Service Agent

ABSTRACT

Phone menus that automate customer service operations are commonplace. Reaching a human customer service agent by interacting with such menus can be a convoluted and lengthy process that often results in the caller being stuck in circular links within the options. When a caller is successful in invoking the option to speak to a human agent, they may be put on hold and made to wait for a long time before a human agent answers. This disclosure describes a bot that, with user permission, automatically interacts with phone menus on behalf of a user and helps the user reach a human customer service agent without the burden of menu navigation or dealing with long hold times. The bot can interact with customer service phone menus, identify the options necessary to reach a human agent, and select such options by mimicking the corresponding button presses or voice input.

KEYWORDS

- Phone menu
- Voice menu
- Interactive voice response (IVR)
- Menu navigation
- Bot
- Virtual assistant
- Human agent
- Customer service agent
- Speech synthesis

BACKGROUND

Phone menus that automate customer service operations are commonplace. These menus are based on dual-tone multi-frequency (DTMF) input from the phone keypad. For example, a customer that dials the organization's customer service number can press "1" to reach

Department A, “2” to reach Department B, and so on. Alternatively, or in addition, such menus support voice-based interaction.

When the customer makes a choice, the next step is often the presentation of a submenu associated with the previous choice. However, such menus can be hard for a customer to navigate. Moreover, the menu options are often inadequate to serve the customer’s needs, especially when the customer simply wishes to reach a human customer service agent. Yet, such menus do not provide the customer an easy way of obtaining a phone number or other contact information (e.g., email address) to reach a human agent directly.

Reaching a human customer service agent by interacting with the phone menu options can be a convoluted and lengthy process that often results in the caller being stuck in circular links within the options. If callers do happen to be successful in invoking the option to speak to a human agent, they may be put on hold and made to wait for a long time before a human agent answers. In addition, callers may have the option to leave a callback number to receive a call from a human agent at a later time. As a result, when callers ultimately reach a human agent after a wait, they may be busy attending to other matters during the wait time, and may therefore require time to switch context and speak to the agent. If the context switch takes too long, the human agent can perceive it as the caller being unavailable and disconnect the call, thus requiring the caller to start the process all over again.

Some virtual assistants or bots include capabilities to perform tasks on behalf of a user by interacting with customer service options. However, such solutions are limited in scope to a few specific and highly constrained situations, such as making reservations. Moreover, these applications support bot-to-bot or bot-to-human interactions and do not include functionality to

act as an intermediary to facilitate human-to-human (caller to human agent) customer service interactions by navigating phone menu options.

DESCRIPTION

This disclosure describes a bot that automatically interacts with phone menus on behalf of a user and helps the user reach a human customer service agent without the burden of menu navigation or dealing with long hold times. With user permission, the bot can interact with customer service phone menus, identify the options necessary to reach a human agent, and select them by mimicking corresponding DTMF button presses.

If the call is put on hold for a human agent to become available, the bot can wait in line on behalf of the user so that the user does not need to actively monitor the call and can focus on other matters while on hold. In addition, if the phone menu provides a callback option, the bot can leave a callback number for the user to receive a call from a human agent at a later time, should the user prefer it to holding.

When the presence of a human agent is detected (e.g., based on received speech), the bot can notify the user to take over the interaction and speak to the customer service agent.

Alternatively, or in addition, the user can have the option to let the bot interact with the human agent on the user's behalf. For instance, if the user is in the middle of another task and requires time to switch to conversing with the human agent, the user can choose to have the bot interact with the agent to stall so that the agent does not hang up before the user is able to join the call.

When interacting with the human agent on the user's behalf with the user's permission, the bot can query the agent to obtain relevant pieces of information such as name, ID number, direct phone number and/or extension, existing or new case or ticket number for the issue that

the call is about, etc. The collected information can be displayed when the user picks up the phone to interact with the human agent.

Sometimes, a human agent cannot be reached because of call volumes, understaffing, etc. When the bot encounters such a situation, it can extract contact information for human agents, such as phone numbers, email addresses, social media handles, etc., from phone menu prompts and/or other online sources. Such information can be ranked and sorted based on criteria such as the likelihood of reaching a human agent, likelihood of obtaining a resolution for the issue at hand, etc. The ranked and sorted list can be presented to the user for reaching a human agent in the future. The user can further interact with the list as needed, e.g., to re-sort according to a different criterion, copy the information, save information to another application, etc.

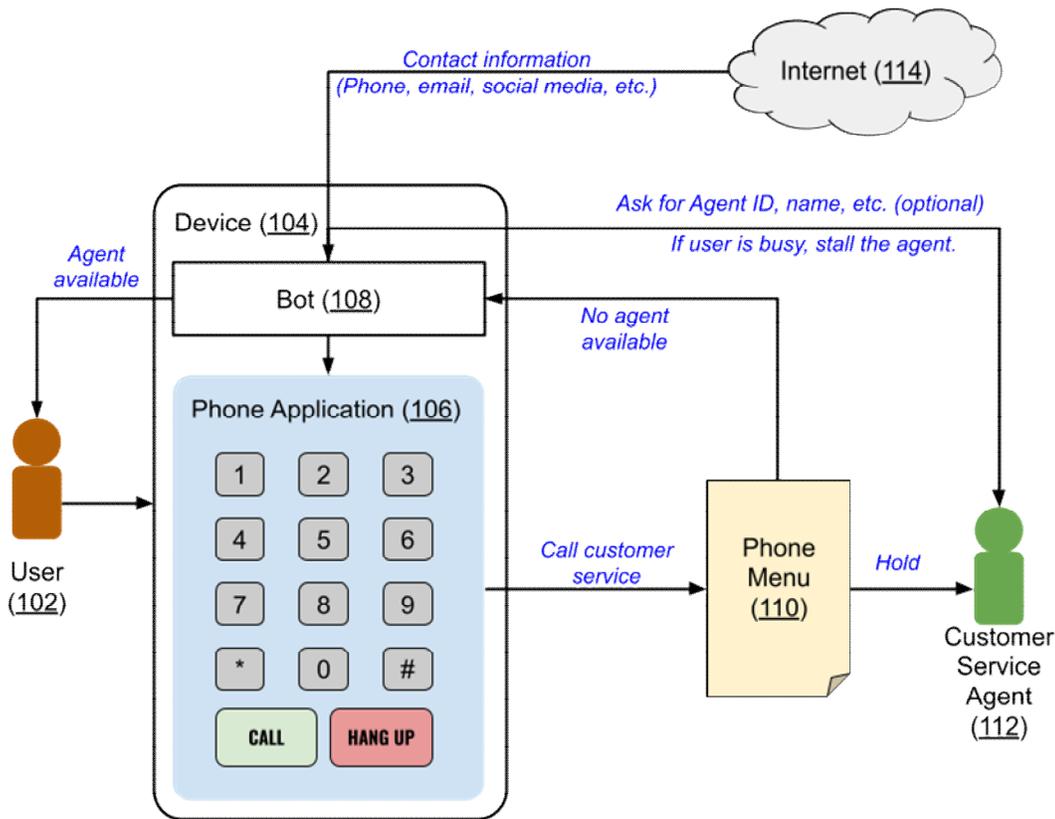


Fig. 1: Employing a bot to interact with phone menu options to reach a human agent

Fig. 1 shows an example of operational implementation of the techniques described in this disclosure. A user (102) uses the phone application (106) (or other calling application) on a device (104), e.g., a smartphone or other smart device capable of voice calls, to call the customer service number (or other identifier) of an organization to reach a human customer service agent (112). The call is initially connected to an automated customer service application at the organization's end that offers a phone menu (110). To reach a human agent, it is necessary to navigate the presented menu options by pressing buttons within the calling application, e.g., numbers corresponding to various menu options.

With the user's permission, interaction with the automated menus is performed by a bot (108) that runs on the user device to select the options required to reach a human agent. If put on hold, the bot monitors the hold. When the call is ultimately connected to a human agent, the user is prompted to take over and talk to the agent. Optionally, if the user permits, the bot acquires pertinent information, such as agent ID, name, service ticket number, etc., and displays it to the user. With user permission, the bot is employed to stall the agent until the user is available for interaction. In case no agent is available at the time of the call, the bot can look up alternate contact information (114) and provide it to the user. For example, if no human agent answers for a threshold amount of time (e.g., 15 minutes, 30 minutes, etc.), a timeout error code can be presented to the user, with the option for the bot to automatically retry the call at a later time. The user can specify how long to wait before retrying, and the maximum number of times to retry. Further, the bot can detect responses such as "please try calling during our regular business hours 7am to 7pm Mondays to Friday" and process these semantically. In this case, the bot can present an error code that indicates that the user's call was placed outside of business hours.

With user permission, the bot can automatically schedule a subsequent call attempt during business hours as detected, and optionally, add the call to the user's calendar.

The bot may obtain alternate contact information from the internet or from within the phone menus, e.g., from a menu option that states "please hang up and try calling xxx-xxx-xxxx instead." The new contact number obtained in such a manner can be recognized and presented to the user. If the user permits, the new number can be automatically called to end the current call session and initiate a new session with a different phone system. Other contact information such as email addresses, web addresses, etc. may be recognized and presented to the user.

The bot can detect the presence of a human agent based on speech. To that end, the bot can include mechanisms to distinguish between a human voice and synthetic voice of a bot designed to mimic human speech. For instance, such mechanisms can be implemented using appropriate heuristics and/or machine learning classifiers trained to identify human speech.

The techniques described in this disclosure can be implemented to support interaction with any platform or application that involves DTMF-based (or other numerical selection based) phone menu navigation. Alternatively, or in addition, the techniques can optionally support voice-based interaction with the menu options, e.g., with user permission, the bot can implement speech synthesis techniques to navigate the menu. For example, if the menu options are, "say *laptop* for laptop repair; *phone* for phone repair; *tablet* for tablet repair;..." the bot can synthetically generate the appropriate keyword ("*tablet*") and send it over the call.

Implementation of the techniques enable users to save time that is spent navigating convoluted phone menu options and/or being stuck on hold, thus freeing up the time to focus on other tasks until a human agent is available. The option to acquire relevant information via the

bot further raises the efficiency of the calling process, thus enhancing the user experience (UX) of placing voice calls for seeking customer service.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about a user's preferences, customer service numbers called, issue that a call is about, etc.), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes a bot that automatically interacts with phone menus on behalf of a user and helps the user reach a human customer service agent without the burden of menu navigation or dealing with long hold times. With user permission, the bot can interact with customer service phone menus, identify the options necessary to reach a human agent, and select them by mimicking the corresponding button presses. If the call is put on hold for a human agent to become available, the bot can wait on behalf of the user or leave a callback number so that the user does not need to actively monitor the call. When the presence of a human agent is detected based on speech, the bot can notify the user to take over the interaction and speak to the customer service agent. The bot can also interact with the human agent on the user's behalf until

the user is ready and/or collect relevant information. The techniques described in this disclosure can be implemented to enhance the user experience and efficiency of reaching a human customer service agent within any platform or application that employs phone menu options.

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