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Artificial intelligence based personal assistant for handling phone calls

ABSTRACT

When making calls to business entities, an individual often needs to navigate a menu of choices using the phone keypad until a desired option is found. If the desired choice requires speaking with a human, the individual may further need to wait on hold until someone is available to answer the call, thus wasting time. In the case of incoming calls, the number of the calling party may be unknown or blocked. Many such calls are from automated systems used for telemarketing. The techniques of this disclosure describe an Artificial Intelligence (AI) based personal assistant for handling incoming and outgoing phone calls on behalf of a user with the user's permission.

KEYWORDS

- Personal assistant
- Telemarketing calls
- Unknown number
- Blocked number
- Menu navigation
- Touch tone menu
- IVR menu

BACKGROUND

Individual users make and receive a number of phone calls every day. When making calls to business entities, an individual often needs to navigate a menu of choices using the phone keypad until the desired option is found. If the desired choice requires speaking with a human, the individual may further need to wait on hold until someone is available to answer the call, thus

wasting time. In the case of incoming calls, the number of the calling party may be unknown or blocked. Many such calls are from automated systems used for telemarketing. However, without answering a call, it is not possible to know whether the call is undesired. If the call is from an unwanted party, the recipient user may waste time in an undesired conversation or face the socially awkward situation of hanging up on a caller.

DESCRIPTION

The techniques of this disclosure describe an Artificial Intelligence (AI) based personal assistant for handling incoming and outgoing phone calls on behalf of a user, with the user's permission. The AI-based assistant is trained to interact using natural language, including the knowledge of linguistic emotional cues. The AI-based assistant is also provided with access to relevant databases of phone numbers, e.g., numbers used by scammers and telemarketers.

An incoming call with an unknown number is terminated without answering if the number is found in the database of scammers and telemarketers. If a call is received from a blocked number, it is first answered by the AI-based assistant to determine if the call is from an automated system or a human. This is achieved, e.g., by asking the calling party to interact with the AI-based assistant and perform actions, such as pressing specific keys or answering questions. When the AI-based assistant engages in conversation, it identifies itself as an automated assistant program.

The AI system is trained, e.g., as a classifier, to identify whether a reply is from a human caller. If a human caller is detected at the other end, further information is gathered from the caller, such as the purpose and urgency of the call. Based on the information provided by the caller and the knowledge of the user's context, gathered with the user's permission, the call may be immediately escalated to the user or presented later at a more opportune time.

In the case of outbound calls, the user may ask the AI-based assistant to place a call and navigate through the appropriate menu choices required to reach a human or to get a desired answer via the automated system. For example, if a user wishes to find out the balance on a credit card, a call automatically placed and relevant menu options are automatically selected by the AI-based assistant, until the automated system provided by the credit card company provides the desired information, e.g., “The current balance is \$126.” Responses during menu navigation, e.g., card number, customer identifier, etc. are provided by the AI-based assistant based on accessing user-permitted data.

Alternatively, the user can transfer control to the AI-based assistant during a call, e.g., when the call is placed on hold by the called party prior to reaching a human. The control is transferred back to the user when a human is available after the hold, thus avoiding wasting the user’s time. The user can also choose to include the AI-based assistant as an additional party in an outgoing call. In such cases, with the user’s permission, the ongoing conversation is processed to determine the context of the discussion. The user can then transfer control to the AI-based assistant in the middle of the call, if necessary, for tasks that arise during the interaction, such as responding to automated menu options or holding for a human. When in control, the knowledge of the conversation is utilized by the AI-based assistant to carry out the task on the user’s behalf. When appropriate, the control is passed back to the user.

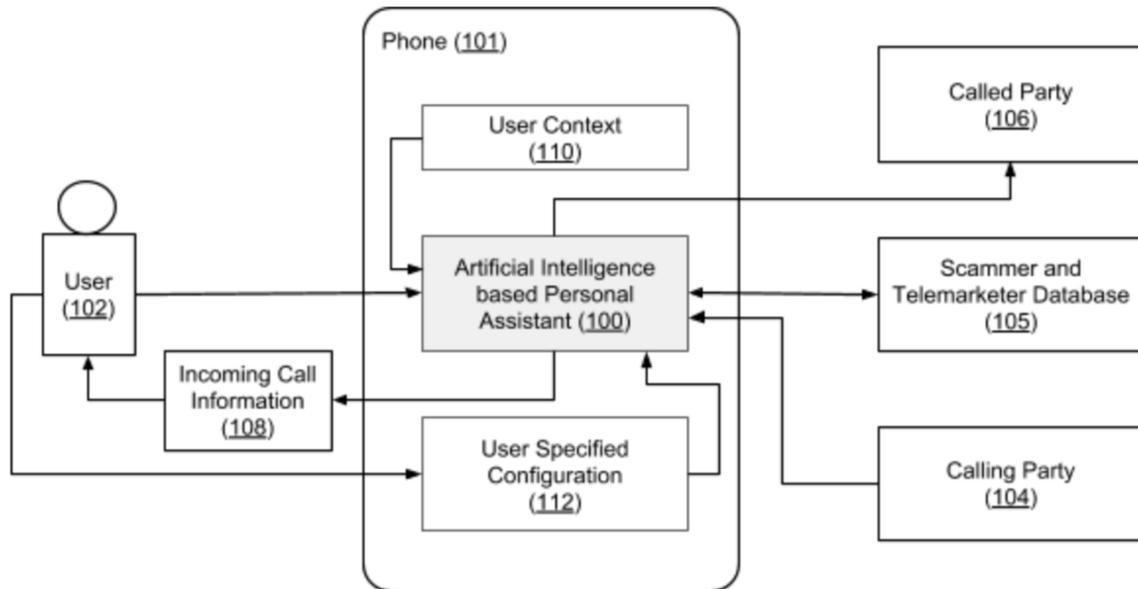


Fig. 1: Artificial intelligence based assistant handling incoming and outgoing calls

Fig. 1 shows an implementation of the techniques of this disclosure. The AI-based assistant (100) is inserted in a call between the user (102) and the calling party (104) or called party (106). When the AI-based assistant is not required, the user interacts directly with the calling or called parties.

When an incoming call from a calling party is handled by the AI-based assistant, the scammer and telemarketing database (105) is consulted. If the caller's number is found in the database, the call is terminated without answering, or alternatively, the calling party is asked to interact with the AI-based assistant, e.g., to determine if it is a human. If a human is detected, relevant information (108) is collected and based on the information and the user's context (110), the call is escalated to the user immediately, or the information is presented at a later time.

When the AI-based assistant is invoked in an outgoing call, it interacts with the called party (e.g., automated systems such as Intelligent Voice Response, IVR, menus) on the user's

behalf by utilizing the knowledge of the conversation and the user's context, and transfers control to the user when appropriate.

The user can customize the operation of the AI-based assistant by specifying various preferences regarding how incoming and outgoing calls should be handled. For example, the user may specify whether telemarketing calls can be terminated without answering or when the caller may be asked to leave a message instead of escalating the call to the user. The operation may be further extended from handling unknown or blocked numbers to one or more numbers within the user's contact list. In addition, the user can configure the AI-based assistant to operate differently at different times. For example, incoming calls may be handled differently during business hours than at other times. Thus, the AI-based assistant can serve as an intelligent "Do Not Disturb" system, preventing unwanted and unimportant interruptions. By invoking the AI-based assistant, the user further avoids the annoyance and wasted time involved in answering undesired incoming calls and holding for a human on outgoing calls.

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 social network, social actions or activities, profession, a user's preferences, or a user's current location), 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

The techniques of this disclosure describe an Artificial Intelligence (AI) based personal assistant for handling incoming and outgoing phone calls on behalf of a user with the user's permission. An incoming call with an unknown number may be terminated without answering if the number is found in the database of scammers and telemarketers. If a call is received from a blocked number, it will first be answered by the assistant in order to determine if the call is from an automated system or a human. Based on the information provided by the caller and the knowledge of the user's context gathered with the user's permission, the call may be immediately escalated to the user or presented later at a more opportune time. When the assistant is included in an outgoing call, it interacts with the called party or its automated systems on the user's behalf by utilizing the knowledge of the conversation and the user's context and transfers the control back to the user when appropriate. By utilizing the assistant, the user prevents the annoyance and wasted time involved in answering undesired incoming calls and holding for a human on outgoing calls.