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Moderated User Input for Editing and Extending Knowledge Bases

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Moderated user input for editing and extending knowledge bases

ABSTRACT

Currently, conversational apps do not have the capability for the user provide input that can edit or extend a backend knowledge base from which the app derives the output. This disclosure describes a framework to support the creation of conversational apps with backend knowledge bases that can be updated by users. The framework includes capability to enable the user to provide feedback and input regarding the answers provided by a conversation app in response to a query. Such user contributions are processed by corresponding moderators to edit the associated content within the knowledge base as needed.

KEYWORDS

- Knowledge base
- Conversational app
- User contributed content (UCC)
- User generated content
- Voice interface
- Smart speaker
- Virtual assistant
- Bot
- Conversational agent

BACKGROUND

Conversational apps or devices, such as smart speakers, or smart assistant applications implemented on devices such as smartphones, tablets, laptops, home appliances, etc. provide information to users via speech output. The speech output is derived from a backend knowledge

base. Users of currently available conversational apps and devices only consume the content provided by such apps. In cases where the content is inaccurate or unsuited to answer the user query, use of conversational apps results in a frustrating User eXperience (UX). Moreover, user feedback is typically limited, e.g., users can only provide only generic feedback to the app indicating that the content was incorrect or unusable. Currently, conversational apps do not support the capability for the users to provide input that can edit or extend the backend knowledge base from which the app derives the output.

DESCRIPTION

This disclosure describes a framework to support the creation of conversational apps with a backend knowledge base (or knowledge bases) that may be updated by the users. A conversational app created within the framework is seeded with an initial knowledge base. Specific individuals can be assigned as content moderators with permissions to edit the knowledge base. The editing privileges of the content moderators can be restricted to specific topics within the knowledge base by assigning moderators as topic owners.

When a user asks a question to an app that utilizes the framework, conversational models within the framework suggest a list of answers that best match the user's query. The answer(s) is then delivered to the user by the conversational app. Upon receiving the answer(s), the framework provides the user with the ability to provide feedback and input regarding the answers. For instance, the user may rate the answers, vote for the best match in a list of answers, flag inappropriate and inaccurate content, suggest improvements to the answers, contribute additional material, etc. The user may provide such feedback in any one of a number of ways, including voice input, text chat with a bot or a live person, etc.

In some instances, content suggested by the user may include appropriate links, e.g., URL pointers. Such user contributions are processed by the corresponding moderators to edit the associated content within the knowledge base as needed. For these purposes, a knowledge base editing console is associated with each app within the framework.

Further, the framework also allows users to recommend preferred ways to render and recognize data as part of the conversational design of the app. For example, the user might recommend a better voice user interface (voice UI or VUI) design on how the data should be rendered as conversational prompts, e.g., by instructing the conversational app with "don't say it that way, say it this way..." For example, the user may instruct the conversational app to say, "It is freezing, don't forget your jacket" or "it is freezing" in response to a query about weather instead of "The temperature is 32 degrees." If the user permits, the suggested conversational prompts can utilize information such as the user's age or experience about the topic, to adapt the way conversation prompts are rendered, e.g., to other users.

The user can also provide hints at different ways other users might ask for the same or similar information. For example, various slang or different grammars might map to effectively the same question. The user hint may be an instruction such as, e.g., "If the user said this or that, then it means the same as..." For example, the user hint may indicate that "hiking trail" is the same as "trekking route." Similar to how the data in a knowledge base is updated, VUI design and different ways in which the same question is asked can be updated, e.g., in the conversation model utilized by the conversational app or device.

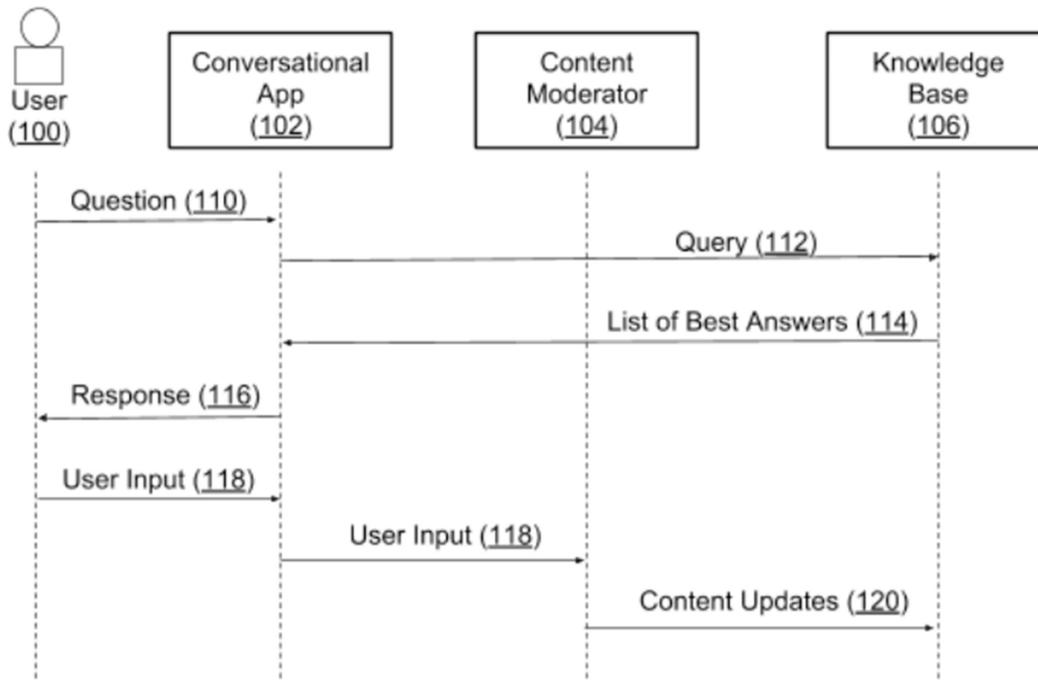


Fig. 1: Enabling user edits to the knowledge base of a conversational app

Fig. 1 shows the flow of operations for a conversational app within the described framework. The framework includes the conversational app or device (102) that is configured to access knowledge base (106). The framework also supports content moderator(s) (104).

As illustrated in Fig. 1, a user (100) interacts with the conversational app, e.g., by asking a question (110). The question is relayed as a query (112) to the backend knowledge base for the app. The list of best answers (114) for the query is determined and returned to the conversational app which, in turn, is presented as the response (116) to the user.

The user can provide input (118) regarding the received response. As mentioned above, such input may include ratings, flags, suggestions for edits, pointers to additional content, etc. The user input is sent to the moderator (104) that is in charge of the corresponding content. The moderator examines the user input to determine if any edits or extensions to the knowledge base

are warranted. Based on the determination, the moderator makes appropriate changes (120) to the knowledge base.

Such user and moderator editing and extending of the knowledge bases is similar to the features of wikis that permit multiple users to edit and extend text-based wiki content. However, unlike a wiki, the framework described herein includes a machine learning model that enables users to ask questions using naturalistic conversation input. Moreover, if the user permits, the most appropriate answers are determined by considering the conversational context of the user, e.g., as determined by the various sensors within the user's devices and apps that are permitted for use to determine the conversational context.

The ability for a user to provide input for editing and extending the knowledge base enables conversational apps to provide up-to-date information. In contrast with implementations in which backend content is centrally controlled by a limited number of contributors, the techniques of this disclosure distribute the effort of maintaining accuracy, currency, breadth, and depth of the knowledge base content across a larger number of people, thus avoiding a large burden on any one entity and providing transparency about the state and source of the knowledge base content.

Further, the framework permits separation between the conversational app operation and the underlying backend knowledge base. As a result, conversational apps can be customized to operate with knowledge bases that include non-public information, such as an internal Frequently Asked Questions (FAQ) document of a company. Similarly, the framework supports the development of conversational apps on shared infrastructure that can provide capabilities derived from best practices and latest technologies, such as machine learning. When a conversational app is seeded with the initial knowledge base, the machine learning capabilities of

the shared infrastructure are used to answer the user's questions. If permitted by the user, the user input and corresponding moderation decisions collected by the framework can be used to retrain the model to improve the accuracy and relevance of the answers provided by the conversational app over time.

The capabilities of the shared infrastructure can also be made available to the developers of the conversational apps in the form of an Application Programming Interface (API). Developers can utilize the API to create custom conversational apps for custom knowledge bases that include the user input, moderation, and model training mechanisms described above. With user permission, user input and feedback provided to the conversational app may also be used in other relevant products, services, and contexts as appropriate.

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

This disclosure describes a framework to support the creation of conversational apps with backend knowledge bases that can be updated by the users. The framework provides users with the ability to provide feedback and input regarding the answers provided by a conversation app in response to a query. User contributions are processed by moderators to edit the associated content within the knowledge base as needed. The conversational apps can be customized to operate with knowledge bases that contain non-public information. With user permission, the user input and corresponding moderation decisions can be used to retrain the model to improve the accuracy and relevance of the answers provided by the conversational app over time.