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Improved Group Chat User Experience by Use of Topic Detection

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ABSTRACT

As the number of participants in a group chat conversation increases, the problems of multiple topics and frequent topic switches become salient. These increase the burden on individual users to keep track of the conversation topics. These also lead to inefficiencies due to the disruption and interruptions caused by messages and notifications on topics that might be irrelevant or uninteresting to some of the chat participants. To address these problems, with user permission, this disclosure utilizes a machine learning model trained for automated detection of discussion topics in a chat. The detected topics are presented to the user to facilitate appropriate action based on current discussion topics or occurrences of topic switches. Model inference operations are performed entirely on the user's device with specific user consent, thus preserving user privacy.

KEYWORDS

- Group chat
- Messaging conversation
- Topic detection
- Conversation thread
- Thread muting
- Topic muting
- Natural Language Processing (NLP)

BACKGROUND

People use messaging or chat applications for a variety of personal and professional purposes. Many messaging or chat applications provide the ability for users to engage in group chats, e.g., that include several other participants in the conversation. Such group chats often involve simultaneous discussion of a number of topics interwoven within the same chat, thus making it difficult to follow the thread of conversation pertaining to a specific topic within the discussion. Even without overlapping topics, the discussion may switch topics once discussion on the topic at hand is concluded.

In such cases where the chat involves multiple topic switches, the current topic of discussion may not be of relevance or interest to all participants within the chat. Yet, users need to keep track of the topics by reading messages in the group conversation at regular intervals to determine if the irrelevant or uninteresting conversation is over. While the irrelevant or uninteresting conversation is taking place, users may also need to disable chat message notifications to avoid being disturbed. The problems of multiple topics and frequent topic switches become more salient with higher numbers of participants in a group chat.

DESCRIPTION

This disclosure utilizes a machine learning model that is trained for automated detection of discussion topics in a chat. User permission to access chat messages and other parameters for such topic detection is obtained prior to accessing such data to utilize the model. A user can revoke the permission at any time and can limit permission to specific group chat conversations, while disallowing permission for other chat conversations. For users that do not provide permission, no user data is accessed and topic detection is not performed.

User-permitted parameters regarding the chat are provided as input to the machine learning model. These may include, e.g., features related to the online chat conversation (e.g., the time of creation, title, measurements of chat activity, etc.), features related to the chat participants (e.g., names, demographics, relationships with other participants, past chats between participants, etc.), features related to the contents of the chat (e.g., raw message text, images, metadata, etc.). Topic detection to identify the current topic of discussion in the chat is performed by the model based on one or more of these user permitted parameters. The model output is a probability distribution over a set of possible topics that may be the current chat topic. The set of possible topics may be a pre-defined topic list, a subset of entities in a knowledge graph, or freeform text.

The predicted topics are presented to the user via a user interface that allows users to perform appropriate action. For instance, based on the detected topics, the user is provided with options to modify device settings to disable notifications until the topic changes (which may be detected by the model). In addition, the user interface allows the user to specify preferences that enable automated notification handling depending on the detected topics. For instance, for notifications corresponding to specific topics, the user can choose to enable or disable notifications, assign different levels of visibility or urgency, select specific icons, etc.
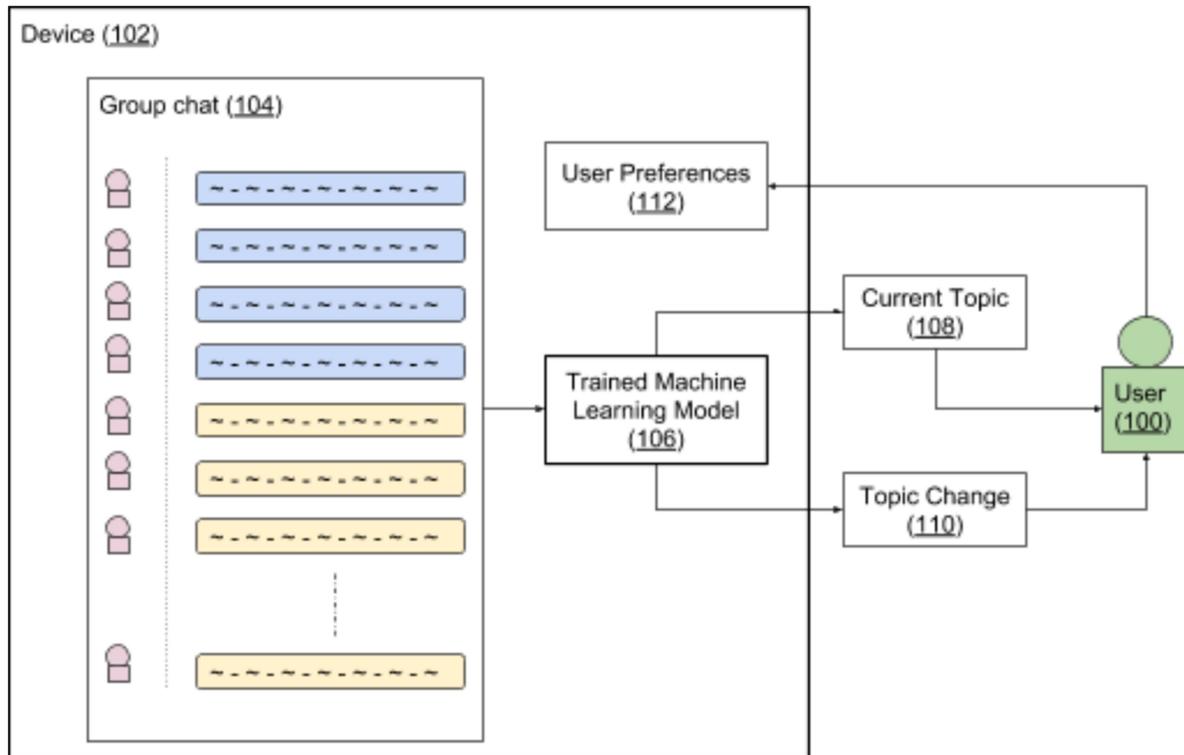
Fig. 1: Detection of discussion topics in a group chat

Fig. 1 shows an implementation of the techniques of this disclosure. A user (100) is participating in a group chat (104) using a device (102). The user has provided permission for topic detection to be performed for the group chat by a trained machine learning based model (106) by accessing one or more parameters as described above. With each incoming message in the group chat, the model is applied to infer the current topic of discussion and determine whether the inference indicates a change of topic. The inferred topic (108) and the change-of-topic indication (110) is conveyed to the user and a corresponding user interface is provided for appropriate action, such as muting notifications until a topic change is detected, or adjustment of preferences (112) related to the chat and corresponding notifications that are then utilized, e.g., to mute notifications of incoming messages for particular topics, to notify the user when a topic of interest is under discussion, etc.

The techniques of this disclosure can increase the efficiency and effectiveness of participating in group chats by allowing users to specify irrelevant and uninteresting topics, and automatically filtering out such topics. The users can thus focus their time and effort on the topics of importance in the group chat, and on other tasks outside of the group chat. Moreover, the users can minimize the disruption caused by chat notifications by manually muting or demoting notifications for unwanted topics and specifying preferences for automatic prioritization and filtering of notifications based on detected chat topics. Once such user preferences are appropriately specified, manual time and effort required to interact with chat notifications is eliminated.

The machine learning model may be trained using data from existing chats that users have permitted for use in such training and via synthetic data that mimics real-world chat conversations. The various functionalities described above may be achieved via separate models dedicated specifically to that aspect. For instance, a separate model may be utilized for the purposes of detecting whether an incoming chat message results in a change of topic. Model inference operations are performed entirely on the user device, thus preserving user privacy.

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 machine learning model for automated detection of discussion topics in a chat using user-permitted input features related to the online chat space, chat participants, and chat contents. A probability distribution over a set of possible topics that may be the current chat topic is provided as the model output. The predicted topics are presented to the user and facilitate appropriate user action. The user is enabled to specify preferences that enable automated notification handling depending on the detected topics. Model inference operations are performed on the user, thus preserving user privacy. The techniques of this disclosure can increase the efficiency and effectiveness of participating in group chats by allowing users to specify irrelevant and uninteresting topics, and automatically filtering out such topics. The users can thus focus their time and effort on the topics of importance.

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