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Providing contextual information for multi-party chats

Sammy El Ghazzal

Sandro Feuz

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ABSTRACT

It can be difficult for the individual group members of a multi-party chat to determine the relationships that connect the different members. Owing to this unfamiliarity, individuals can feel unsure and hesitant to express themselves freely in the multi-party chat. Such restraint can limit the topics and style of chat messages. On the other hand, a lack of restraint can be deemed as inappropriate or offensive. This disclosure describes mechanisms that provide contextual information about connections among the members of an ad-hoc multi-party chat group. With permission of the group members, the techniques of this disclosure are applied to determine and label salient group member clusters that are displayed to everyone in the chat.

KEYWORDS

- Messaging application
- Group chat
- Multi-party chat
- Connection mapping
- Social network subgraph
- Graph labeling
- Contextual information
- Chat context
- Inferred relationships
- Unsupervised clustering

BACKGROUND

Many messaging applications allow users to specify an ad-hoc group of individuals for the purposes of multi-party communication. A public message sent to the group can be read by any of the individuals within the group. Often times, the group members are a subset of the contacts of the user that creates the group. In cases where the contacts that are part of the group come from different spheres of the group creator's life, not all individuals within the group may know each other. Further, it can be difficult for the individual group members to determine the relationships that connect the different members within the group. Owing to this unfamiliarity with others in the group, individual members can feel unsure and hesitant to express themselves freely in the group chat. Such restraint can potentially limit the topics and styles of the chat messages. On the other hand, a lack of restraint risks in a member sending messages that may be deemed as inappropriate or offensive by one or more members of the group. In general, knowing relationships that exist between various group members helps each member choose how to communicate and helps them know what to expect in the group chat.

For example, Alice creates an ad-hoc group of friends from her neighborhood and colleagues from work to chat about an upcoming party to which all members of the group are invited. Alice's neighbor Bob may feel awkward asking a question in the group because he does not know the connection between Alice and the other chat participants. For instance, Bob may refrain from making a joke because he does not know whether some of group members have a more formal relationship with Alice.

DESCRIPTION

This disclosure describes mechanisms for providing contextual information about connections among the members of an ad-hoc multi-party chat group. To this end, with the

permission of the group members, the techniques of this disclosure are applied to determine the connections and clusters among the group members that serve as contextual information displayed to members of the group.

With the permission of the group members, information and messages shared online by each of the individuals in the group or available publicly via various information sources, such as social networking services, online forums, etc. are utilized. Such information, can include, e.g., existence of social network connection links between group members, co-presence of group members in a publicly posted photo visible to all, messages exchanged with group members in the chat, etc. An unsupervised machine learning algorithm (e.g., k-means) is applied to the graph of connections created based on the information. The output of the algorithm identifies subgroups or clusters within the larger member set of the chat group.

The identified subgroups serve as input to a classification model that is used to label these subgroups with appropriate human-understandable tags such as family, colleagues, high school friends, etc. To determine the most suitable label, the classification model takes into account a variety of information about each pair of members, with permission from the group members. This information can include, e.g., a length of time the pair has been connected, occupations of the paired individuals when the connection was created, friends in common, content viewed or liked by both individuals, locations at which the pair is co-present, features of photos in which the pair is co-present, etc. For example, two skydiving buddies in gear could be pictured with each other on a photo of their club's Web page. In such a case, application of computer vision techniques can yield label suggestions such as `plane,' or 'skydiving' that can help other group members know how the two individuals are connected.

The detected subgroups and/or labels can be displayed to the group members along with other group information, such as a group icon and description. The connections can be displayed as a graph along with labels for the subgraphs with the most strongly connected members.

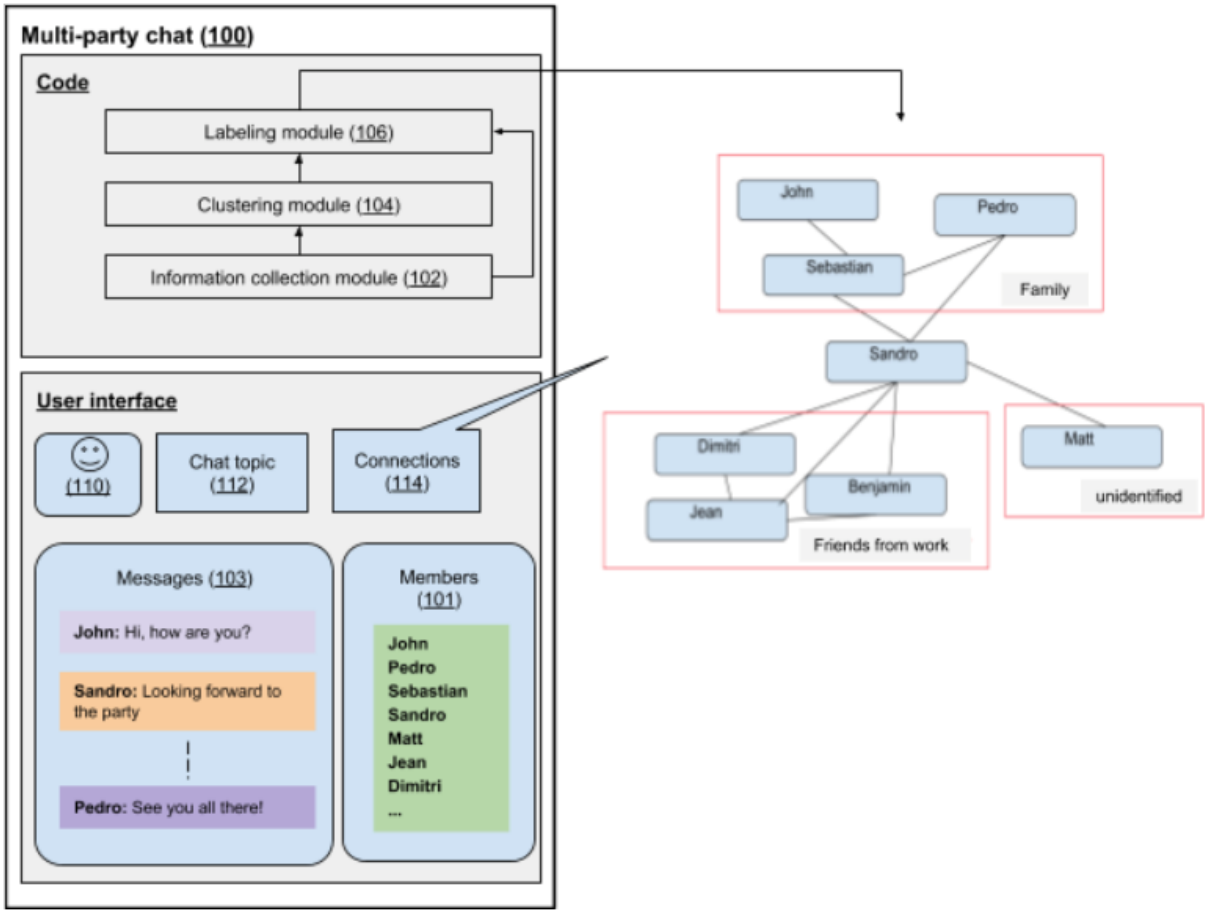

Fig. 1: Determining and displaying connection information for members of a group chat

Fig. 1 shows an ad-hoc multi-party chat (100) application with a group chat created by a user Sandro. As shown in the user interface, the group chat includes members (101) and messages (103) exchanged by the members. Members of the group chat include Sandro's family members, his friends from work, and others. With permission from the group members, relevant connection and content information pertaining to the group members is obtained (e.g., by the chat application) by an information collection module (102) from one or more information

sources that the group members have permitted. The information is analyzed by the clustering module (106) to determine subgroups within the larger chat group. The subgroups and other relevant information are processed by the labeling module (108) to assign the subgroups with appropriate human-readable labels, such as ‘family,’ and ‘friends from work.’ If the group members permit, the connections (114) and labels are shown along with other group information such as an icon (110) and a topic (112).

In case the user-permitted information sources do not provide adequate information, group members may be provided with a setting within the group chat that allows a user to share connections with extended higher-order circles, such as friends of friends. If the group members permit sharing such connections, then group members who are not directly connected can discover the intermediate individuals through which they are indirectly linked. Additionally, or alternatively, the creator of the group can set an option that provides group members the option to enter a short piece of text describing their connection to the creator and the group, should they wish to provide such information. If the group members permit, these text responses are shown to the other members of the group to help everyone understand each other’s connections to the creator, the group, and other group members. Such approaches that rely on user input can also be used to confirm or augment information inferred via the automated approaches.

The provision of connection and context information about group members obtained with user permission via automated and/or manual techniques can improve group dynamics and user experience of multi-party chats. The availability of such information saves group members the time and effort of trying to find the information on their own and helps them construct chat messages such that they are appropriate for the relationships and connections among the

members of the group. The techniques of this disclosure can be integrated with any application that provides chat or messaging capabilities.

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 mechanisms that provide contextual information about connections among the members of an ad-hoc multi-party chat group. With the permission of the group members, the techniques of this disclosure are applied to determine and label salient group member clusters that are displayed to everyone in the chat. The subgroups and labels can be displayed to the group members along with other group information, such as a group icon and description. Automated approaches based on unsupervised clustering and machine learning can be further reinforced or augmented via user input. The provision of connection and context information about group members can improve the group dynamics and user experience of multi-party chats.

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