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Context based automatic email responses

ABSTRACT

When users are not available to respond to emails, they typically set-up automatic responses to incoming emails using standard messages (e.g., a standard out of office reply) or simple rule based systems. However, such standard responses may not provide adequate context and detail to the recipient of the automatic reply. Techniques described here employ machine learning and heuristic models to dynamically generate contextual responses to emails based on the communication history between the corresponding email sender and recipient(s).

KEYWORDS

- Scoring mechanism
- Out-of-office
- Automatic response
- E-mail reply
- Inbox

BACKGROUND

Automatic responses are deployed by users when they are out of the office or otherwise unavailable to respond to email communication. Users set-up automatic responses in advance, but these responses may become obsolete, as they are independent of the content and context of future incoming emails. Such static responses may not provide senders of emails adequate information to take further action.

DESCRIPTION

In situations where users are unable to respond to emails, automatic responses can be improved by adding contextual information. Such context is identified, for example, from past
communications related to the incoming emails. Techniques described customize automated responses based on the content of the incoming email and email communications received during the given automatic response period, e.g., out of office period. The automatically generated response could be entirely new or may use the static message and then also include appended content and phrases based on the described techniques.

![Customized automatic email response generator](image)

**Fig. 1: Customized automatic email response generator**

The automatic response generator (104) uses machine learning techniques to identify, with user consent and permission, relevant content from incoming emails and match that content with other communications received by users during the automatic response (e.g., out of office) period. Based on this matching analysis, machine learning and/or heuristic based techniques are used to extract meaningful user metadata and content data from previous email communications (102) and generate relevant automatic email responses (110).

The techniques first determine whether to modify the standard user provided response based on the incoming email message (“the trigger”) and other emails (“the context”) received by users during the relevant time period. If a modification is required, customization can be
either minimal or extensive, depending on the context. For example, minimal customization may involve determining relevant details of the person to contact for the inquiry based on the context, and including this information in the standard automatic response. Alternatively, pertinent details may be incorporated into the static user provided response where appropriate, for example, based on topics or keywords in incoming emails. In some cases, extensive customization involves generating a new free-form text response to the email.

Prediction model(s) (106) may be trained and optimized for different criteria. For example, machine learning techniques for extracting relevant metadata or content could be optimized to identify private and sensitive information and exclude such content from the automatic response to preserve user privacy. Similarly, matching can be optimized based on semantic analysis and clustering (e.g., of different topics) so that the incoming emails are appropriately matched with relevant email communication previously received by the user.

To avoid sharing potentially sensitive data, users are enabled to configure privacy settings in advance. For example, a default privacy level is tailored such that content included in the automatic reply does not include sensitive data. A user interface (108) is provided to easily customize and turn on and off privacy options. For example, the present techniques can be either disabled completely or selectively disabled, e.g., for internal versus external emails and customized, turned off for particular groups, etc. Also, the user interface allows automatic replies to be turned off.

For emails corresponding to sensitive matters, only contact information of the relevant people who can respond to the email sender is included in the automatic reply while in more permissive contexts, additional details could be incorporated. These additional details in the context of a project may include relevant events related to the project (conference/meeting),
pertinent project contacts/teams and project status updates (e.g., started, in progress, on hold, cancelled).

For example, where sensitive topics are involved in the email, the automatic reply may say: “Consider contacting X, Y, Z for the latest updates on this project.” However, in a more permissive context, the automatic reply can say: “Appears that X just began working on the project. Consider grabbing a coffee with X until I return, when I’ll be happy to chat with you.”

Similarly, automatic response to an email (without sensitive content) inquiring about a meeting may say: “Contact Y for additional information regarding meeting ABC or to join the meeting.”

Also, the relationship of the email sender to the project may inform the automatic reply. For example, if the sender has been deeply involved with the project (based on past emails), a detailed response customized for the sender may be suitable. However, if an incoming email is the initial communication regarding a project, a brief introductory response may be appropriate.

Automatic emails may also be sent to project stakeholders alerting them about an email sender with interest in the project: “Looks like Bob is interested in the project. If you have time, consider chatting with him.” This interest could be in part determined by the number of emails that Bob sent about the project, for example, Bob may have sent fifty emails about the project. Also, incoming emails that are urgent or need user approval may be escalated to relevant stakeholders to enable prompt action before the user’s return or subsequent reply.

*Examples of Use*

Alice sets up an automatic email response for all email communication received during her vacation from work. While on vacation, Alice may receive the below message from Bob.
To: Alice
From: Bob
Subject: Project Delta

Hi, Alice, can you give me a heads-up about what's going on with project delta from the beta-team?

Fig. 2: Sample Incoming Mail

Standard automatic responses are typically static predetermined messages such as Fig. 3.

To: Bob
From: Alice
Subject: Project Delta - Automatic Reply

I'm currently OOO between 15/08 and 28/08. For questions related to our team, please contact beta-team@company.com.

Fig. 3: Sample Standard Automatic Response

However, the present techniques offer a more useful response such as the message shown in Fig. 4.

To: Bob
From: Alice
Subject: Project Delta - Automatic Reply

I'm currently OOO between 15/08 and 28/08. However, John from beta-team may have an update related to project delta. Please reach out to him at john@company.com.

Fig. 4: Sample Customized Automatic Response

The techniques can incorporate related features to enhance the usability of the automatic response generator. For example, translation techniques can be employed if a user receives or sends emails in different languages (e.g., language used for communication within the team is
different from language used for communication with the customer). Also, content analysis techniques may be used to decipher and extract content from videos, audios, images, etc.

Other machine learning based features can be incorporated. For example, emails received during the automatic response period may be prioritized for user review using a scoring mechanism to rate the effectiveness of automatic responses generated.

In situations in which certain implementations discussed herein may collect or use personal information about users (e.g., user data, information about a user’s social network, user's location and time at the location, user's biometric information, user's activities and demographic information), users are provided with one or more opportunities to control whether information is collected, whether the personal information is stored, whether the personal information is used, and how the information is collected about the user, stored and used. That is, the techniques discussed herein collect, store and/or use user personal information specifically upon receiving explicit authorization from the relevant users to do so.

For example, a user is provided with control over whether programs or features collect user information about that particular user or other users relevant to the program or feature. Each user for which personal information is to be collected is presented with one or more options to allow control over the information collection relevant to that user, to provide permission or authorization as to whether the information is collected and as to which portions of the information are to be collected. For example, users can be provided with one or more such control options over a communication network. 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. As one example, a user’s identity may be treated so that no personally identifiable information can
be determined. As another example, a user’s geographic location may be generalized to a larger region so that the user's particular location cannot be determined.

CONCLUSION

Techniques described generate automatic email responses that are tailored to the content of the incoming emails. After securing user permission, incoming email content is matched with context from past email communications to identify and extract details to be included in the automatically generated response. The automatically generated response can be entirely new or can use the static message and also include appended content and phrases based on the described techniques. Sensitive data is protected by allowing users to specify privacy levels with respect to content, context and contacts. The described techniques have many applications and may be used by, for example, email providers/clients, automatic email response services as well as email/digital assistants and operating systems.