

Technical Disclosure Commons

Defensive Publications Series

February 25, 2019

MEETING-AWARE PRESENTATION OF A HOME SCREEN USER INTERFACE FOR A CLOUD-BASED CONTENT MANAGEMENT PLATFORM

Ashish Duggal

Follow this and additional works at: https://www.tdcommons.org/dpubs_series

Recommended Citation

Duggal, Ashish, "MEETING-AWARE PRESENTATION OF A HOME SCREEN USER INTERFACE FOR A CLOUD-BASED CONTENT MANAGEMENT PLATFORM", Technical Disclosure Commons, (February 25, 2019)
https://www.tdcommons.org/dpubs_series/1980



This work is licensed under a [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/).

This Article is brought to you for free and open access by Technical Disclosure Commons. It has been accepted for inclusion in Defensive Publications Series by an authorized administrator of Technical Disclosure Commons.

MEETING-AWARE PRESENTATION OF A HOME SCREEN USER INTERFACE FOR A CLOUD-BASED CONTENT MANAGEMENT PLATFORM

A cloud-based content management (CBCM) platform enables users to access and collaboratively edit documents (e.g., word processing documents, presentation slides, spreadsheets) via a graphical user interface. The CBCM platform can be supported by a cloud storage system having a cloud-based environment (including a server and a data store) connected to a user device via a network. The CBCM platform can additionally provide one or more applications such as an online calendar application that manages meeting events with a scheduled time and location, invitee(s), their contact information (e.g., a profile), an email application, and a messenger application. Thus, users can schedule meetings and communicate with each other over email messages or instant messages to facilitate online collaboration involving documents. A user can access the CBCM platform by logging into a user account using login credentials. After the log-in, the CBCM platform can present a home screen user interface (UI) that displays a list of files and folders associated with the user account. The home screen UI of the CBCM platform can be provided by a web browser or a mobile or desktop application.

For online collaboration, numerous documents or files, including sensitive and confidential files can be stored in the cloud storage system. Accordingly, when a user attends an off-line meeting and accesses the CBCM platform from the user device, people around the user can see content displayed on the home screen UI via the user device. If the user were to attend a team meeting, such inadvertent disclosure may not be much of a problem as invitees to the team meeting (e.g., teammates) would already share confidential documents. However, a potential leak issue may arise if such disclosure occurs at a meeting with an external party or with

attendees with whom the user is not comfortable sharing such content. Conventionally, the CBCM platform does not provide users with control over content being displayed on the home screen UI.

Therefore, a technique is proposed for preventing unintended disclosure of content stored on the cloud storage system. The technique can be implemented by a meeting-aware presentation (MAP) service as a part of home screen loading operations provided by the CBCM platform. The MAP service can consider context of a meeting a user attends and intelligently select and display, on the home screen UI, documents or files that have been determined to be not sensitive to be disclosed to participants in the meeting. The MAP service can adopt a combination of a rule-based as well as machine-learning based algorithm to determine appropriate files that would be presented as a part of the home screen UI of the CBCM platform for different meetings.

Figure 1 illustrates a flow diagram of a method for intelligently presenting a home screen of a CBCM platform based on scheduled meetings. First, at block 100, the MAP service can receive a request to provide a home screen UI of the CBCM platform. The MAP service can receive the request when a user logs into the CBCM platform by providing user credentials such as log-in identification and a password.

Subsequently, at block 110, the MAP service can determine attributes of meetings scheduled in close proximity to receiving the request. The MAP service can request meeting information from the online calendar of the user who requested the home screen UI. The online calendar can be one of the applications provided by the CBCM platform or an external application with which the MAP service can communicate (e.g., via an application programming interface (API), an intermediate service, etc.). The MAP service can then obtain the meeting information from the online calendar. In some examples, the MAP service can further narrow the

meeting information to meetings that are scheduled for today. The MAP service can determine attributes of these meetings. For example, the MAP service can determine, as attributes, a time and location of the meeting, a title of the meeting, a number of invitees to the meeting, and a profile of invitees including name of the invitee, email address, job position, and organizational hierarchy information (e.g., using the organization's directory information repository such as an Lightweight Directory Access Protocol (LDAP) repository). Invitees can include users who have been invited, who have accepted, and/or tentatively accepted a meeting invite sent via the online calendar.

At block 120, the MAP service can determine whether the home screen UI request is associated with a meeting based on attributes of the meetings identified above. The MAP service can determine that the request to provide the home screen UI is associated with a meeting based on the scheduled times of the meetings. For example, the MAP service can determine the association in response to identifying a meeting that is scheduled within a predetermined threshold of time period (e.g., within an hour) before and/or after receiving the request to present the home screen UI. The MAP service can select a meeting that is scheduled close to the time of receiving the request. In another example, the MAP service can determine that the request is associated with a meeting based on a location of the meeting, in addition to the scheduled time of the meeting. The MAP service can identify location of the user device that requested the home screen UI. The location can be provided as part of the request at block 100. The MAP service can then determine whether the user's location is within predetermined threshold proximity (e.g., a half a mile radius) of the location of the meeting near the scheduled meeting time. In response to determining that the user device is located close to the location of the meeting around the scheduled meeting time, the MAP service can determine that the home screen UI request is

associated with the meeting. On the other hand, in case the MAP service determines that the home screen UI request is not associated with any meeting, the MAP service can display a default view of the home screen UI. The default view would provide a non-edited list of files associated with a user account of the user in the cloud storage system. The non-edited list can include all of the files associated with the user account or some of the files (e.g., files that were recently accessed by the user, files that are most popular among the user's collaborators, files recently shared with the user, etc.) that have not been filtered in order to be hidden from potential meeting attendees.

In response to determining that the request is associated with a meeting, the MAP service, at block 130, can determine a type of the meeting based on the attributes of the meeting. For example, a meeting can be a public meeting (a meeting with general public), customer meeting (a meeting with a customer), multi-team meeting (a meeting between two or more teams at the same organization), team meeting (a meeting for a team), or any other meetings.

The MAP service can first identify a number of invitees to the meeting from the attributes of the meeting (e.g., a time and location of the meeting, a title of the meeting, a number of invitees to the meeting, and a profile of invitees). The MAP service can then classify the meeting as a public meeting, if the number of invitees is greater than a predetermined threshold number (e.g., 20 people). If the number of the invitees does not satisfy the threshold number of people, the MAP service can determine the type of the meeting based on a profile (e.g., a name, email address, job position, and organizational hierarchy information) of invitees. The MAP service can classify a meeting as a customer meeting in response to determining that the user and at least one other invitee are from different organizations. The MAP service can identify an associated organization of the user and an invitee based on an email address or organizational hierarchy

information from the profile of invitees. The MAP service can determine a meeting to be a multi-team meeting in response to determining that the user and all the invitees are from the same organization but different teams. On the other hand, in response to determining that the user and all the invitees are from the same organization and from the same team, the MAP service can determine that the meeting is a team meeting. In a further example, the MAP service can classify a meeting to be a team meeting when there is an invitee who is “a manager” or “a team leader” based on the job position or the organizational hierarchical information, in addition to having invitees from the same team and same organization. For a meeting that cannot be classified as one of these meetings (i.e., public meeting, customer meeting, multi-team meeting, and team meeting), the MAP service can determine the meeting to be a miscellaneous meeting.

Once the type of meeting is determined, at block 140, the MAP service can predict one or more files to be displayed as a meeting-aware view on the home screen UI of the CBCM platform based on the type of meeting. The MAP service can retrieve files associated with the user account. For example, the MAP service can query files created by the user and/or shared with the user from the cloud storage system. Each file can be associated with different levels of file access. For example, a level of file access can be an access level by a user, a team, an organization, and public. That is, a file can be shared with a specific user per the access level by a user, any user belonging to a specified team or organization according to the access level by a team or organization, and/or all users based on the access level by public. Specifically, the access level by a user for a “file A” can list a “User X” and “User Y.” In such a case, the “file A” can be accessed by both “User X” and “User Y,” regardless of a team or an organization to which the “User X” and “User Y” belong. In another example, the “file A” can also have the access level by a team to list a “Team 1.” In this case, any users who belong to “Team 1” can access the “file

A,” in addition to the “User X” and “User Y.” A file can have the access level by public set to “yes.” In such a case, any users can access the file.

The MAP service can then apply a rule to the retrieved or predicted files to select files to be displayed on the home screen UI based on the type of the meeting. As part of a rule for all meeting types, the MAP service can select a file associated with the meeting (e.g., a file to be presented in the meeting) to be included on the home screen UI. The MAP service can identify such a file from an attachment in a calendar invite for the meeting, or a link or reference included in the calendar invite.

In addition, the MAP service can select and apply a rule appropriate for the type of meeting to selectively display files on the home screen. The MAP service can first apply a default rule for the determined meeting type. A default rule for the public meeting is to select files having the access level by public set to be “yes.” For the customer meeting, a default rule can be to display files that are shared between the two or more organizations that match organizations specified in the access level by an organization, as well as files set to be “public.” As for the multi-team meeting, a default rule can be to select files shared with the invitees, teams to which the invitees belong, an organization of the teams, and the public based on the access level by a user, team, organization, and public for each file. A default rule of the team meeting can be similar to that of the multi-team meeting in that, for the team meeting, the rule specifies to present files shared with the invitees, the team of the invitees, the same organization, and the public. As for the miscellaneous meeting, the default rule can be to display all the files associated with the user account regardless of the access levels.

Once a default rule is applied, the MAP service can list the selected files on the home screen as a meeting-aware view. The MAP service can allow the user to switch between the

meeting-aware view and the default view (i.e., presenting an un-filtered list of files associated with the user account). The MAP service can further provide the meeting-aware view to be customizable for different types of meetings. For example, the MAP service can provide an option for a user to turn on or off the meeting aware view. Additionally, the MAP service can enable the user to access other files not presented on the home screen via a link to a file directory or a file browser in the home screen UI.

The MAP service can periodically or in real-time update the default rules using a machine learning model under supervised learning. The machine learning model may correspond to a model artifact that is created by the MAP service using training data that includes training inputs and corresponding target outputs (i.e., correct answers for respective training inputs). The MAP service can train a machine learning model using user actions associated with a file access during a time period of the meeting. For example, in the public meeting, the user can access and open a file that does not satisfy the default rule (e.g., a file shared with a specific user instead of general public). In such case, the MAP service can generate training input that includes attributes of the file accessed or opened by the user labelled with a type of meeting, “public meeting.” Examples of attributes of a file can include keywords associated with the file, title of the file, any other metadata related to content of the file, and levels of file access. The MAP service can also generate target output that includes a classification, “display” (instead of “no display” classification).

The MAP service can find patterns (i.e., common characteristics of files not included in the default rule to be displayed on the home screen for the particular type of meeting) in the training data that map the training input to the target output (i.e., a “display” classification) and provide the machine learning model that captures these patterns. The machine learning model

may be composed of, e.g., a single level of linear or non-linear operations (e.g., a support vector machine [SVM] or may be a deep network, i.e., a machine learning model that is composed of multiple levels of non-linear operations. An example of a deep network is a neural network with one or more hidden layers, and such machine learning model may be trained by, for example, adjusting weights of a neural network in accordance with a backpropagation learning algorithm or the like.

Once the MAP service determines that the machine learning model is ready for use, the MAP service can update the default rules to incorporate the common characteristics of files not included in the default rule. Accordingly, the MAP service can intelligently refine a list of files to be presented on the home screen UI that is tailored to the user's preference for each meeting type.

At block 150, the MAP service can present the home screen UI of the CBCM platform with the predicted files. In another example, the MAP service can provide a modifiable list of invitees on the home screen UI allowing a user to add or remove an invitee from the list. Based on the update to the list of invitees, the MAP service can also update the meeting type and consequently a list of files presented on the home screen UI.

Further to the description 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 user activities on the CBCM platform, information about content of documents stored in the cloud storage, information about user's schedule, a user's preferences, or a user's current location), and if the user has 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. 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.

ABSTRACT

A mechanism is proposed for intelligently presenting a home screen UI of a CBCM platform based on scheduled meetings. The method includes receiving a request to provide a home screen of the CBCM platform. The method also includes determining attributes of one or more meetings scheduled in close proximity to receiving the request. Further, the method includes determining whether the request is associated with a meeting based on attributes of the meeting. The method furthermore includes, responsive to determining that the request is associated with the meeting, determining a type of the meeting based on the attributes of the meeting. The method includes predicting one or more files to be displayed in the home screen of the CBCM platform based on the type of meeting. The method then includes presenting the home screen of the CBCM platform with the predicted one or more files.

Keywords: home screen display, meeting-aware selective display, machine learning.

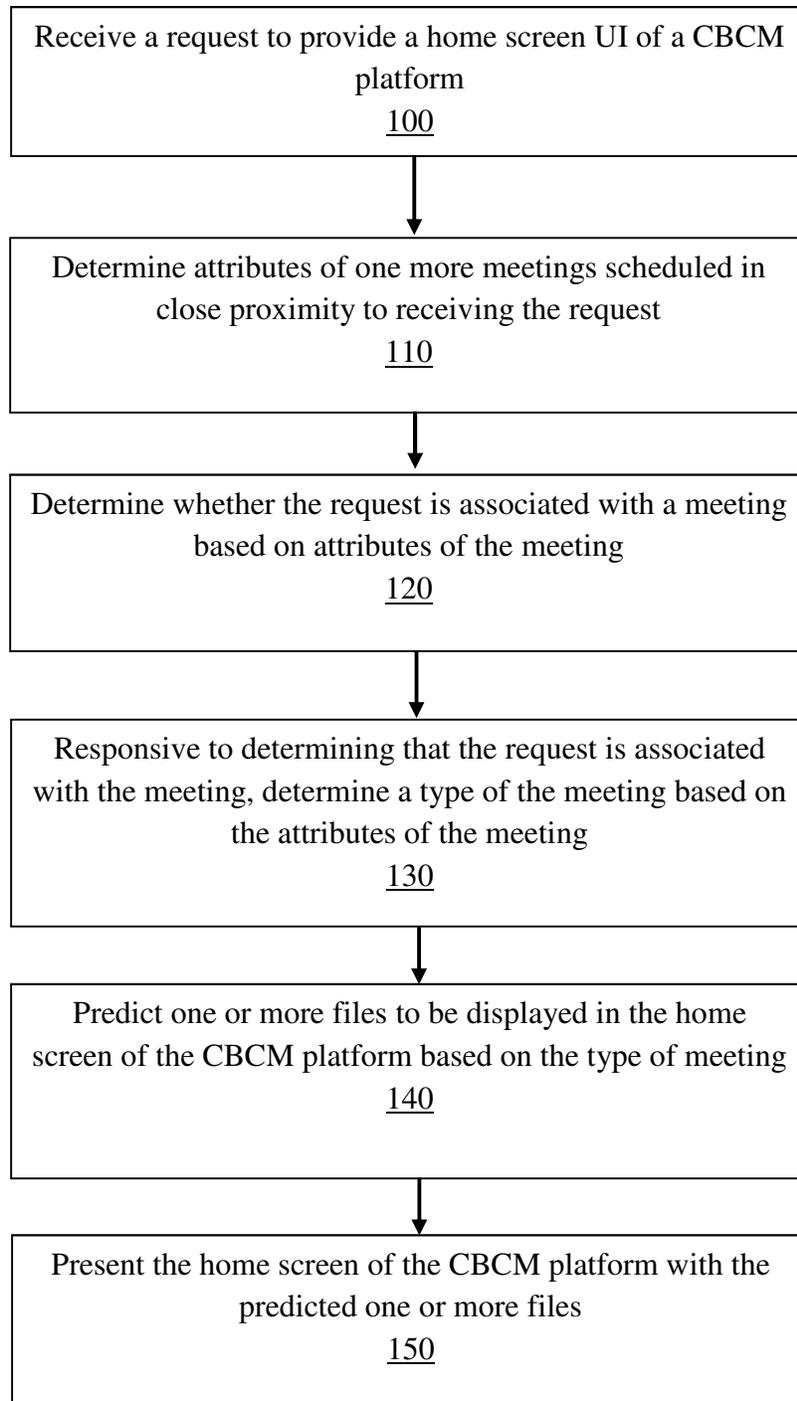


FIG. 1