CMPUT 391 Project: Online Image Sharing Database

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The Online Image Sharing Database is a system designed to store images that can be uploaded by a user and are viewable amongst registered users. The database requires users to be registered in the system in order to upload or view images. Users can also be part of groups which can allow the to have special viewing permissions of images not visible to other users not within a specified group. Images on the database can be provided with a subject, a description and a location which describes the image according to the user and affects the search terms relevant to it. This database system was coded in HTML and JSP; JSP was chosen due to each member having previous experience with java coding and being able to translate that experience into the coding of the system.

**Users:**

The user system is designed to keep track of registered users that are allowed to access the database and upload images; existing users can enter their username and password to access the database, while new users can register by clicking the corresponding button below the text boxes. When registering, users have to specify a username to show to others, a password, their first and last name, their address, their email and their phone number. After specifying the stated values, the username and password are submitted into the ‘user’ table in the database with the current date, and the other variables as well as username are inserted into the ‘persons’ table. Users may also become part of a group which allows them to view images with group restrictions. One can also check their account information by clicking the profile button on the main screen. From here, they can also change any information they like aside from their username.

The user system has a simple interface: Users are presented with a login screen asking for a user name and a password. If the fields mismatch, the login fails and the user is notified of the error. Users can also create new user accounts by clicking the register button below the text fields; this brings the user to a registration page, where information is typed in and added into the users and persons tables. However, if the username or email already exists in the database, registration fails and the user must choose a different username/email address. Registration will also fail if any of the fields are left empty. When changing information, an update statement is sent to the database, matching by username and replacing all other fields with the updated information as specified by the active user.

**Images:**

Images in the database are provided by users and come with a subject, description and location that helps to describe the image. Images in the database can also have a number of unique views determined by an entry in another table, view, which is defined by an image id and a username, serving as keys to that table. By default, the five most uniquely viewed images in the database are displayed on the main page when accessed. Privacy for an image can be private, public, or group specific; public is visible to all users, private is only visible to the owner, and group specific can only be viewed by those in the group specified by the image permissions. However, an admin can view all images on the database regardless of privacy levels. Information for an image can be edited by the owner after it has been uploaded, but the image itself cannot be changed.

To fetch the five most popular images, an SQL statement joining the tables images and views is used, where images are grouped by photo\_id and ordered by count in a descending order. From the results, the top 5 images are selected to be displayed on the main page.

**Upload System:**

The upload module is available for users to upload any images they wish to share. When uploading to the database via web page, a path to the image is provided along with the subject, description, and location text data. Privacy for the image is automatically set to private when uploading, but can be changed after the image is uploaded. Thumbnails for the uploaded image are automatically generated when uploading. When uploading, two SQL statements are used: the first as an insert statement, containing only the image and the photo ID, and a second as an update statement which adds the thumbnail information, subject, description, location, date, and privacy after being specified by the uploader. When uploading is finished, the user may edit the image information at any time to set privacy or change text information. For privacy, users have the option to make an image private, public, or visible to one of the groups that the user is a member of. Users can also delete any pictures they have uploaded at any time. In SQL, this is performed by deleting all rows in view with the corresponding photo\_id, and the same is done again for images.

**Groups:**

Groups are defined as a collection of users with a unique permission for certain images. Groups in the database consist of two components: a table defining groups with their corresponding IDs, and another table listing members with the groups they are associated with. Groups can have multiple users, and users can be a part of multiple groups. When defining a group, a user can select the option to create a new group from the main page and define the name of that group. However, only one group can be created per user, and the group name is unique to the entire database. The rest of the details of the group are automatically generated and inserted into the database. After the group is made, the user can add members into the group by specifying the username of the new member and the name of the group they are to be added to. Once added, members can view images visible only to that group. Group owners may also remove members from a group that they own, and can delete their groups if desired.

In this database system, two default groups are provided: Public and Private, as all images technically belong to a group in terms of privacy. However, despite being classed as groups, public and private have unique properties that affect visibility to users; images permitted to the group ‘public’ are automatically visible to all users, while images permitted to the group ‘private’ are visible only to the uploader and any admins in the system. When the group is deleted, all images with privacy set to that group are automatically updated to be private instead.

**Search System:**

The search system used in this database is designed to find images corresponding to one or more specified keywords to match a part of the subject, description or location of an image. Users can type a series of keywords to find an image and/or specify a date range based on when images were uploaded. Images shown are only those that are public and visible to the current user, including any associated groups that the user is a member of. Images found by the search query are by default, sorted by rank which is based on how often a keyword is found in the text fields associated with image, going by subject, then place, and then description. Results can also be ordered by most recent if desired.

The SQL statement used for searching the database involves creating a statement which shows all public images, then finding the groups IDs that a user is a member of and including them in the previous SQL statement for permission, and then adding the keywords within the previous SQL statement, producing a single large SQL statement that satisfies all of the appropriate conditions. Users are redirected to the search results page, where they have the additional option of searching within a date range using the search terms they have previously used or any new terms they wish to use. Results can also be sorted from most recent or from least recent.

**Data Analysis:**

Administrators can view the records of the database through this module; this can include the generation and display of an OLAP report, the generation of a data cube information containing the number of images for the combination of three categories (such as user, time, subject, etc.), the number of images uploaded per user, or even the images uploaded in a certain month for each subject. Records can also be restricted to specific time periods of activity, such as weeks, months, years, etc.

Database records can only be viewed by the admin account; attempting to view records as a non-admin results in an error message preventing them from accessing records. When the admin navigates to the data page, two sql scripts are executed and the results are shown in two separate tables: one showing the number of images uploaded per users, and the other displaying images per subject. Rollout information for the database is displayed on another webpage accessed from the data page; this page shows the number of images uploaded within certain time periods which can be changed by the admin.

**References:**

Various parts of the code were designed and referenced from the examples on the CMPUT 391 page, mainly the source code examples located on <http://luscar.cs.ualberta.ca:8080/yuan/index.html>. This includes the UploadImage.java file, the DeletePic.java file, the GetBigPic.java file, and the GetOnePic.java file. Some jsp files were designed with elements from the examples found for the java files.