Final Project - CS5200

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SLAPSCAPE

This application is a tool for cataloguing and sharing urban sticker art. Users can create, view, edit, and delete their profiles. They can make posts associated with a location, a title, multiple tags (tags can be created if they do not exist), a description, and multiple images (each with an editable caption). The User associated with a post can delete the post. Individual Images can be deleted from a post. Users can like, and comment on other User's posts. Likes can be deleted. The platform additionally supports searching posts by text and tags.

Technical Specifications of Project

- **System requirements:**
  - MacOS v14.11
  - Linux - Ubuntu 22.04
  - Windows - Compatible
- **Language:** Javascript - Node.js = v20+ https://nodejs.org/en/download/
- **Database:** MySQL= 8.0.28 or 8.0.35
- **Database connector:** mysql2 = 3.6.5 https://www.npmjs.com/package/mysql2
- **Frontend Framework:** Next.js = 14.0.4 https://nextjs.org/docs/getting-started/installation

A README.md file is provided along with the project submission. This file contains the necessary steps to get the application up and running.

The choice of backend for this application was next.js to allow us to quickly build the web application using the latest ReactJS features. The backend is hosted locally on the same machine as the webserver to enable visibility of the data while avoiding the need to implement complex security protocols which would be outside the domain of this subject.

Conceptual Design :

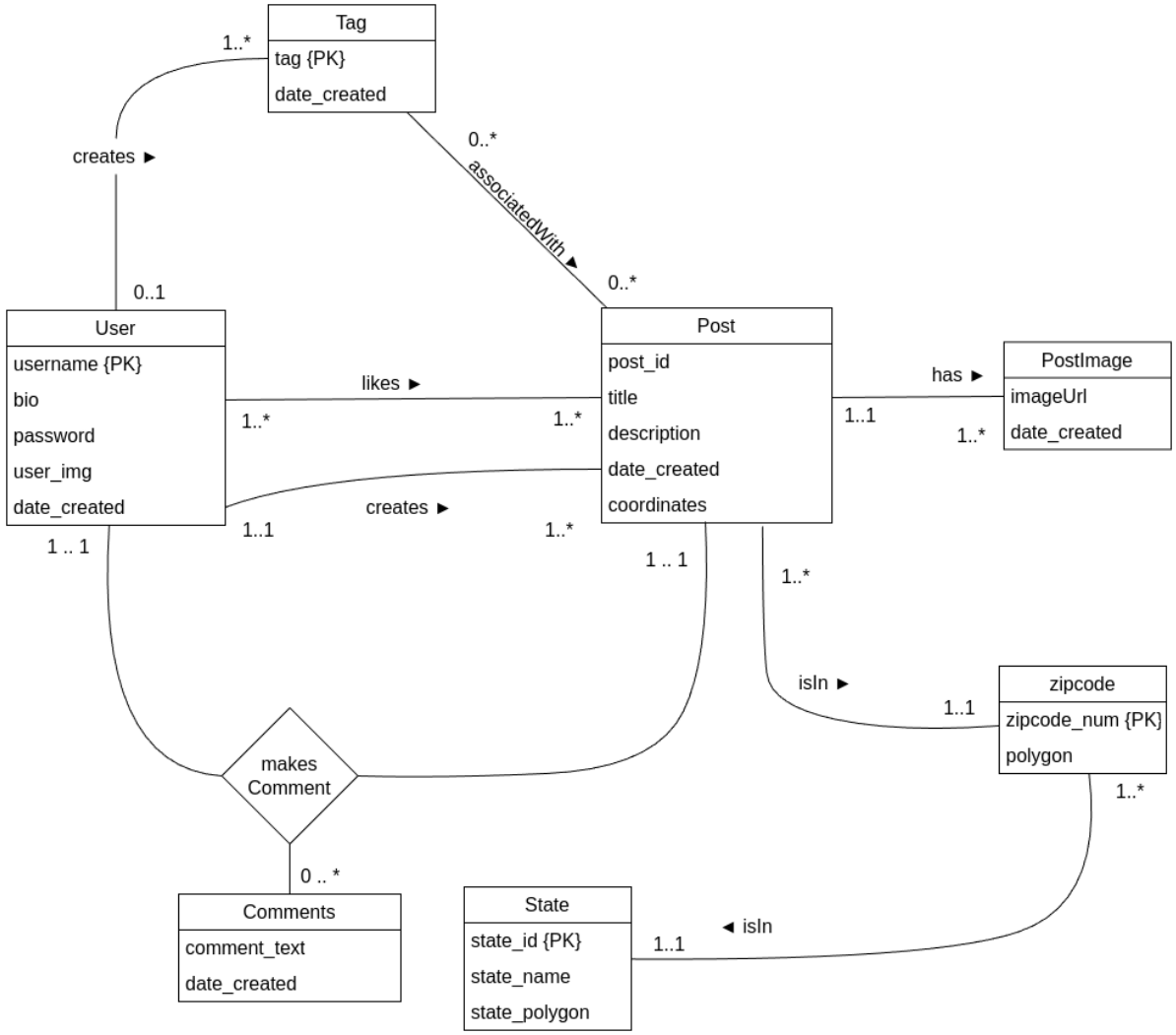


Fig 1. Conceptual Diagram - Data

Logical Design:

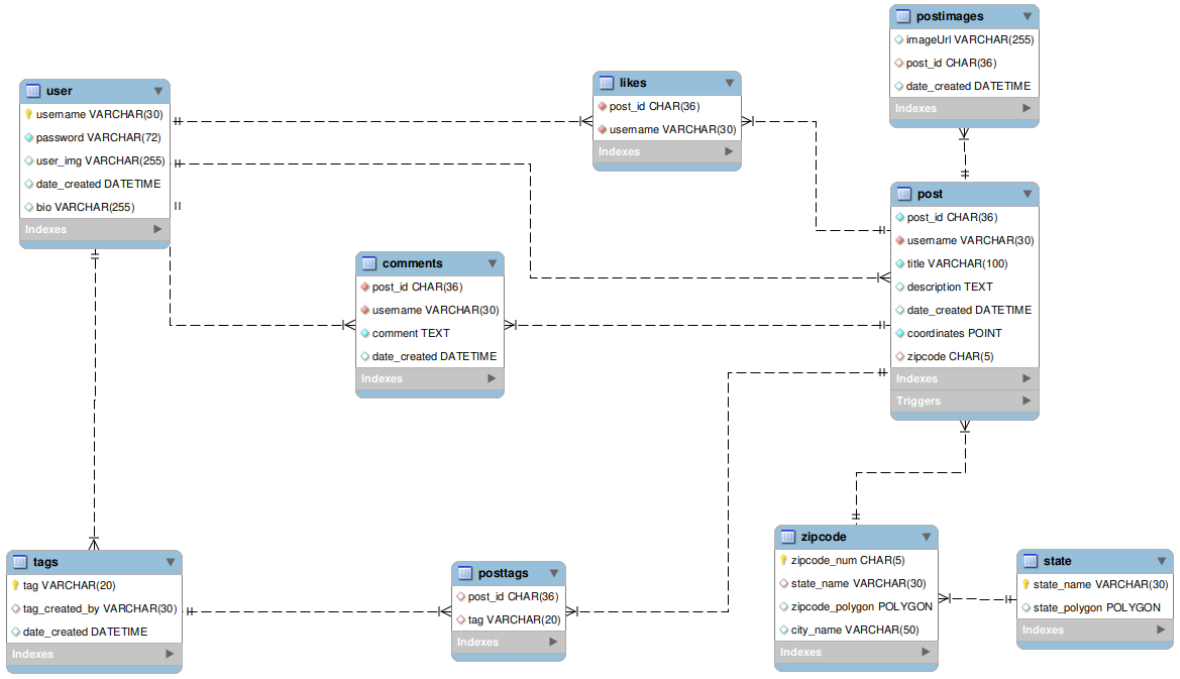


Fig 2. Logical Diagram - Reverse Engineered from MySQL Workbench

Entities

1. User
    a. username(VARCHAR(30), PK) : A unique identifier for each user
    b. password(VARCHAR(72)) : The hash of the user's password
    c. user_img(VARCHAR(255)) : Unique UUID that is the filename of the user's image stored
    d. date_created(DATETIME) : The timestamp of the user's account creation
    e. bio(VARCHAR(255)) : A short bio or description of the user
2. Post
    a. post_id (CHAR(36), PK) : A unique identifier for each post.
    b. Username(VARCHAR(30), FK) : The user who created the post
    c. title(VARCHAR(100)) : The title of the post
    d. description(TEXT) : A long textual description of the post by the user
    e. date_created(DATETIME) : The timestamp when the user saves the post to the database
    f. coordinates(POINT) : The latitude and longitude at which the user pins the post to
    g. zipcode(CHAR(5)) : 5-digit zip code of the area the coordinates belong to
3. PostImages
    a. imageURL(VARCHAR(255)) : The unique UUID refers to the filename of the Image.
    b. post_id (CHAR(36), FK) : The post that the image belongs to.
    c. date_created (DATETIME) : The time that the image was captured.
4. Tags
    a. tag (VARCHAR(20), PK) : The tag name
    b. tag_created_by (VARCHAR(30), FK) : The username of the user who first created the tag.
    c. date_created (DATETIME) : The timestamp at which the tag was first created.
5. Zip Code
    a. zipcode_num(CHAR(5), PK) : The 5-digit zipcode assigned to the region

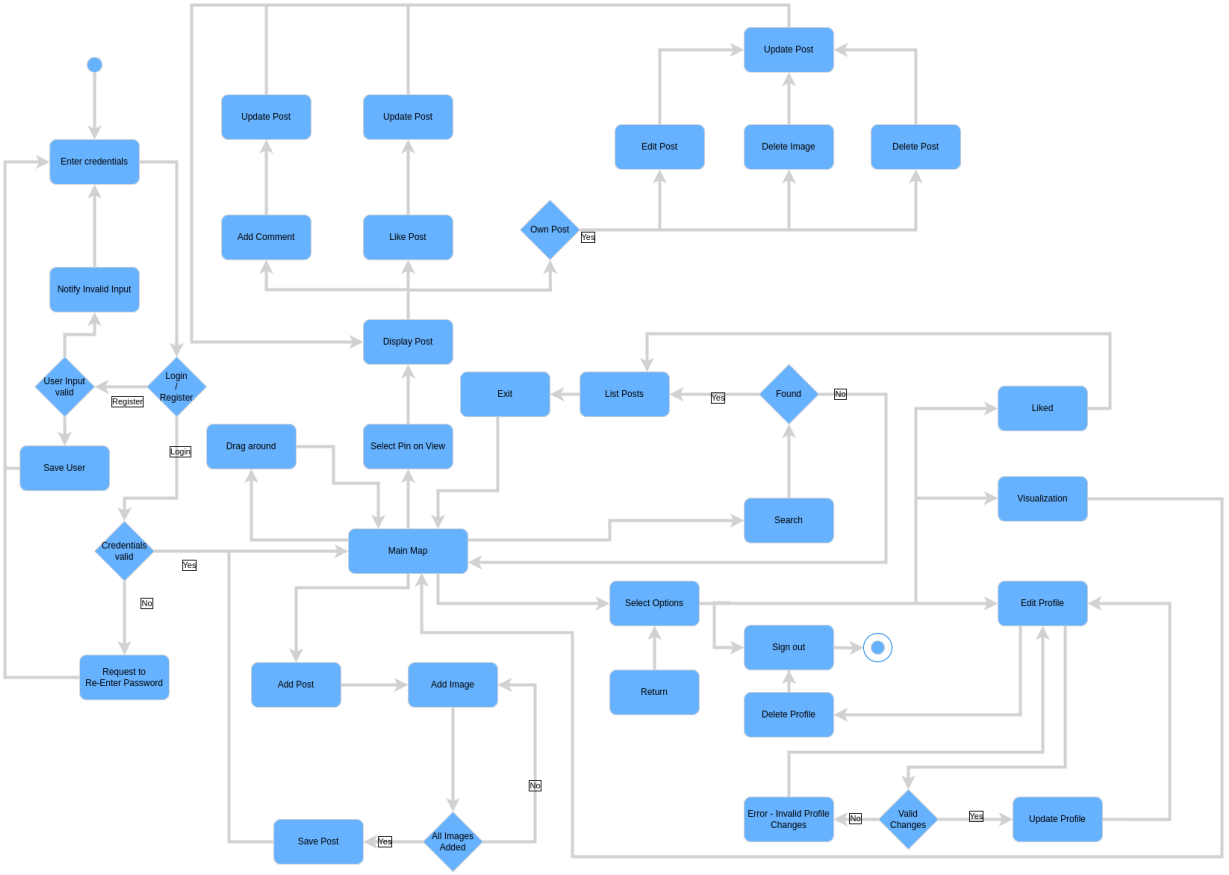
b. state_name(VARCHAR(30), FK) : The state the zipcode belongs to
c. zipcode_polygon(POLYGON) : The polygon shape made of lat and long marking the region of the zipcode.
d. city_name(VARCHAR(50)) : The city name of the zipcode

6. State
    a. state_name(VARCHAR(30), PK) : The name of the state
    b. state_polygon (POLYGON) : The polygon shape made of lat and long marking the region of the state.

Relationships

1. Comments
    a. post_id(CHAR(36), FK) : The ID of the post the comment is made on
    b. username(VARCHAR(30), FK) : The username of the user making the comment on the post
    c. comment (TEXT) : The text of the comment
    d. date_created (DATETIME) : The timestamp at which the user made the comment on the post
2. PostTags
    a. post_id(CHAR(36), FK): The post_id that the particular tagging associates to
    b. tag(VARCHAR(20), FK): The tag type of the post
3. Likes
    a. post_id (CHAR(36), FK): The ID of the post that the like applies to
    b. username (VARCHAR(30), FK): The username of the user that has made the like

Activity Diagram - User Flow:



Commands to test : Please refer to the README for setting up the db and starting the front end, use the activity flow above to follow along. There are no commands that can be used as is on a CLI.

Lessons Learned:

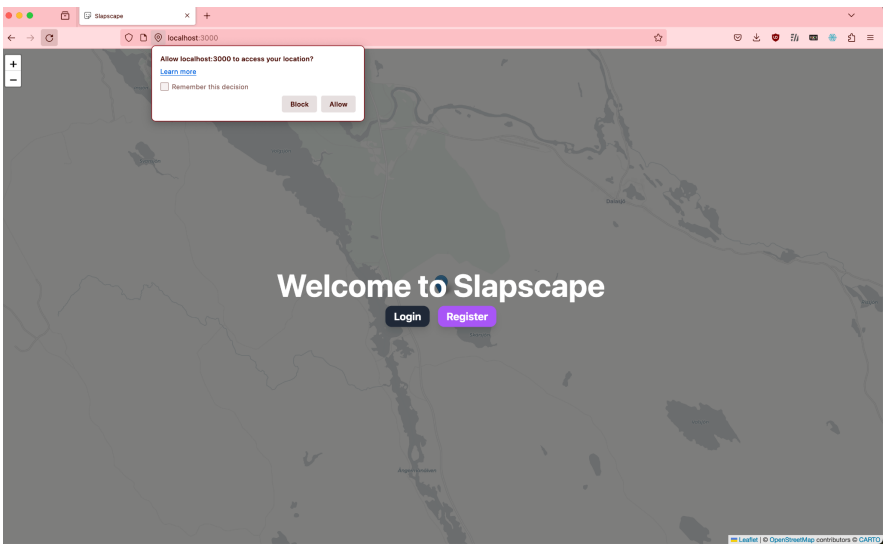
1. Computing the spatial presence in state and zipcode are computationally intensive at the moment. PostgreSQL is suggested for spatial applications which was not part of the allowed database choices for the project.
2. We found that it was extremely cumbersome to load spatial geometry data and manipulate them
3. The clarity of operations on the front end is essential to reducing the amount of possible bugs that may leak through to the backend.
4. We gained significant technical expertise in connecting front-ends to our data sources with minimal server-side translations
5. MySQL Workbench does not appear to export blob data correctly. We had to resort to a third-party tool called DBeaver to enable the HEX option to export Blob data correctly.

Future Work:

1. The application's spatial capabilities are to be strengthened by moving to a more capable database vendor.
2. Expand on the more powerful spatial capabilities by building location-based analytics on the visualisation dashboard.
3. Create an Image Selection mechanism that allows images to be uploaded independently of the Create Post screen.
4. Enable support for regions(states and zip codes) that are geographically split into multiple segments - Example: Alaska

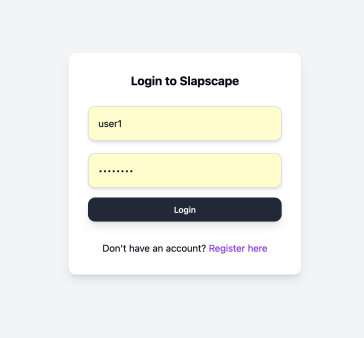
Snapshots from the application:

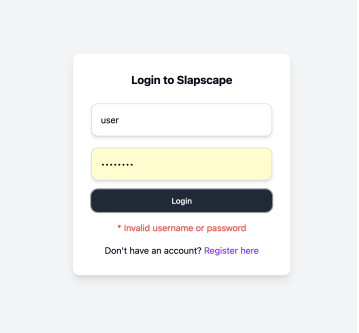
Landing Page

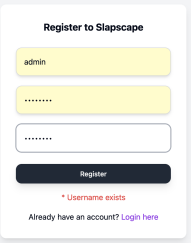


(allow location here)

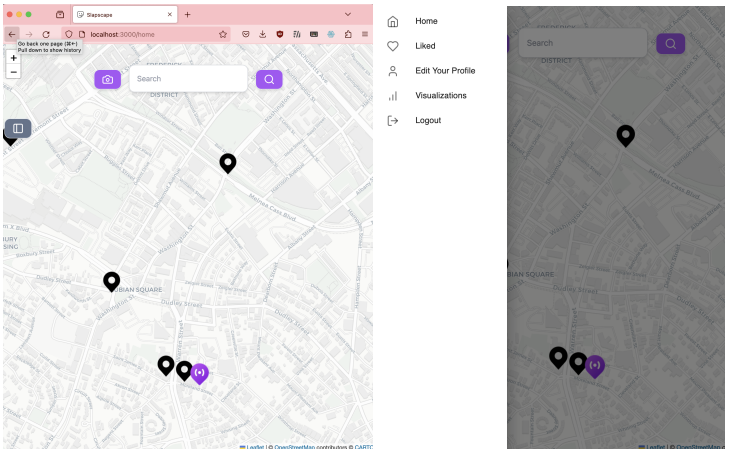
Login/Register



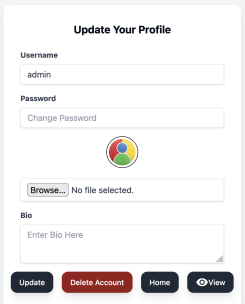


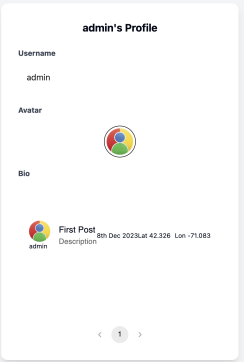


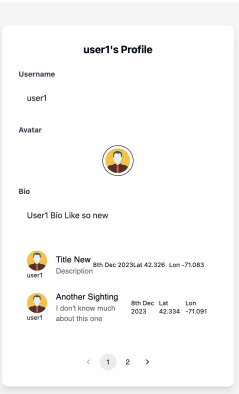
Home Screen



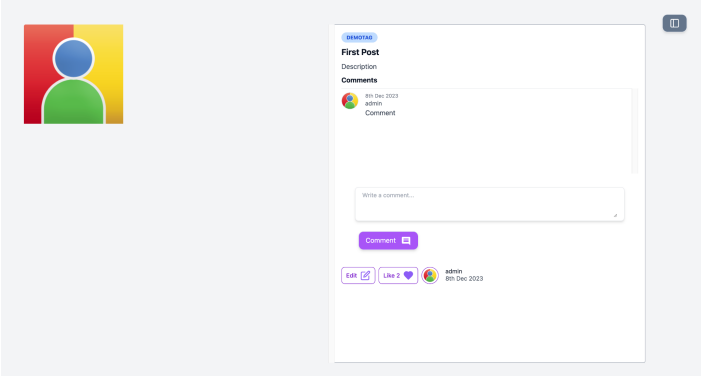
Update Profile, View Profile



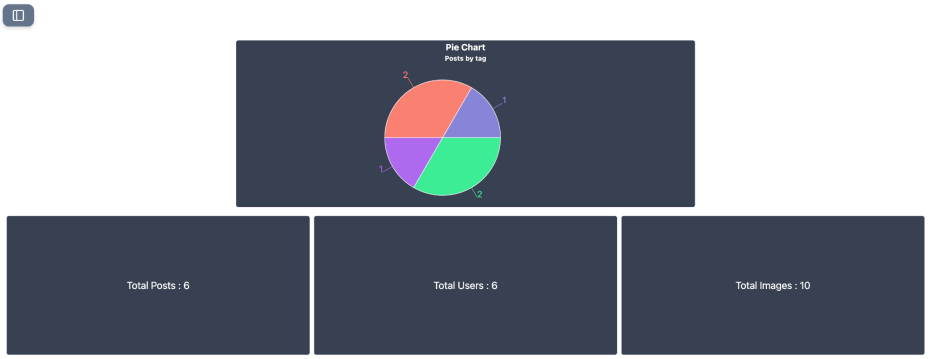




View Post



Visualisations



Total Posts : 6

Total Users : 6

Total Images : 10