Chirpin — Where Voice is Heard

Version 1.0.0

High-Level Design Document

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1 Introduction

1.1 Project Overview

Chirpin is an online social networking platform where users can express personal opinions, share life moments, and make interactions both publicly and privately. It detects users' actions and recommends relevant content users may like. Moreover, users can also see the current trend of hot topics over the whole platform and join discussions with people of the same interest freely. This web-based application is open for everyone who will be categorized as guests, normal users, business users, and administrators except for the slightly different user interfaces and functionalities. Overall, Chirpin is a powerful and attractive platform for gathering interesting people and collecting wonderful stories with great value to explore.

1.2 System Features

The following section is an overview of the planned features of the system. Firstly, a global database MongoDB will be deployed to store user data and tweets. As for the user interface, this project will have four main pages:

- Home Page: Users will be shown tweets from their followings and recommended contents
- Search Page: It will show the trend and allows users to search for information including topics and other users
- Profile Page: Each user will have this page to show their past tweets and interactions with other users such as like, dislike, and comments
- Notification Page: It alerts user notifications such as new comments, likes/dislikes, and private messages

The following lists the basic features of the system, which will be implemented in early releases:

- Topics
  Each tweet can be associated with certain topics using hashtags. Users can view tweets under specific topics
- User Authentication & Authorization
  Users can sign up, log in and log out of the system. Each user will be assigned a unique userID. The system initially has three different user categories, guest user, normal user, and admin user, with different functionalities and privileges
- Guest User
  Guest users are users without logins. They can only view tweets and other users' profiles, but they do not have their profiles and cannot make interactions.

- Admin User
  The admin user can view all user information and add or delete a user if needed
- Normal User Operations
  1. Search for users
     A user can search for other users based on username or unique userIDs
  2. Follow/unfollow other users
     A user can follow another user by clicking the "follow" button. New posts from the followed user will be pushed to the user's home page. A user can also unfollow a following user by clicking the "unfollow" button. New posts and feeds from the unfollowed user will not be pushed to the user
  3. See following users' tweets
     A user can see all the tweets posted by users he/she follows on the main page
  4. Like/dislike a tweet
     Each tweet is associated with a like counter. For each post, a user can increase/decrease the counter by clicking the like/dislike bottom
  5. Comment a tweet
     A user can leave a comment below a tweet. The comment is available to everyone who reads this tweet
  6. Retweet a tweet
     A user can retweet a tweet with the original user's information
  7. Post a tweet
     A user can post a tweet with texts, images, and videos
  8. Save a tweet
     A user can save tweets. The saved tweets are only visible to the user
  9. Delete a tweet
     A user can delete tweets. The deleted tweets will no longer exist in the database

The following are the advanced features for better user experience in later releases:

- User Recommendation
  The application will recommend accounts for a user according to his/her interests
- Tweet Recommendation
  The application will recommend popular tweets for a user according to his/her interests on the main page
- Dark Mode
  The application will provide an alternative darker color scheme that is more suitable for reading at night
- Trend
  It will show topics being searched the most at present

- Real-time
  Under each topic, the real-time section will show the latest tweets from all users
- Business User
  Business users are mainly created for people with large fan bases and who need business promotion such as public figures, celebrities, and brands. Business users need to go through stricter verification during sign-up and will have the following additional operations besides normal users:
  1. Post Commercials
     Business users can attach links to their sites in tweets
  2. Sell Products
     Business users can sell products to their followers on the platform
- Additional User Operations:
  1. Search for Topics
     A user can search for certain topics by keywords. The system will return the most relevant results
  2. Private Chat
     Users can send private messages to each other
  3. Block Other Users
     A user can block another user by clicking the "block" button. Posts from the blocked user will not be shown to the user, and the blocked account can no longer view the user's tweets nor send messages to him or her
  4. Report a tweet
     A user can report a tweet if he/she finds the contents disturbing. A tweet with report counts exceeding a threshold will be hidden temporarily for further review
  5. Privacy Control
     Users can set the visibility of their tweets. For example, hidden from non-followers, or only shown to specific followers, etc.

2 System Architecture

2.1 Technologies

The adopted technologies in this program include HTML, CSS, JavaScript (TypeScript), Bootstrap, MongoDB, Node, React, Express, and Git.
For the front end, this program uses HTML and JavaScript to build the web structure and the interaction on the client side. CSS and Bootstrap are utilized for implementing the UI design. We choose MERN (MongoDB, Express, React, Node) stack as the full-stack solution, as shown in Figure 1. React enables building up complex interfaces, connecting them to data on the back-end server, and rendering them as HTML. Running inside a Node server, Express has powerful models for URL routing and handling HTTP requests and responses. MongoDB provides high-performance data storage solutions for WEB applications.

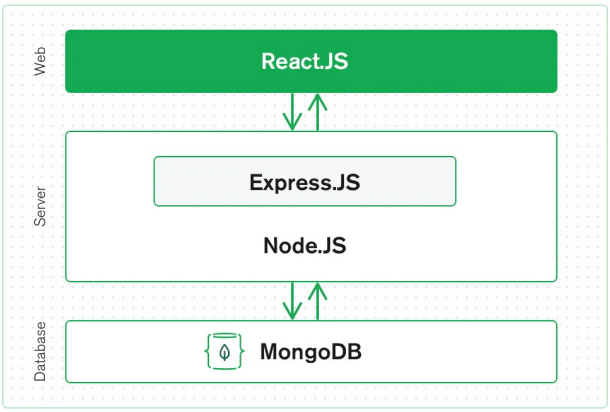

Figure 1: Stack [1]

2.2 Architecture Diagram

Our system employs a client-server architecture, as shown in Figure 2

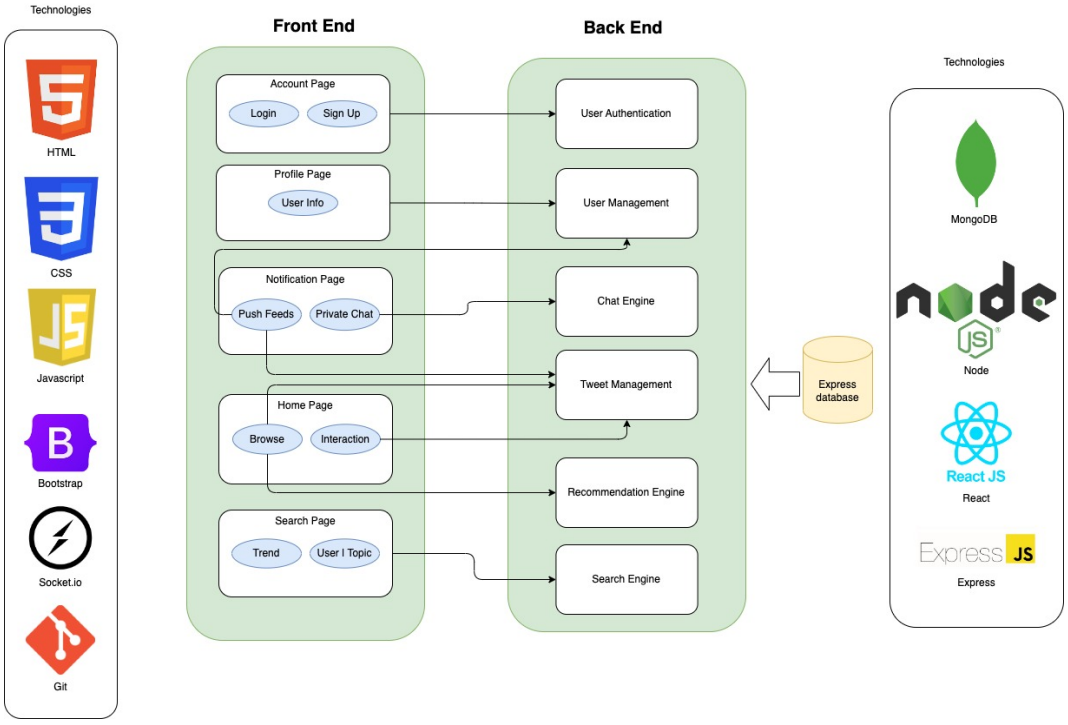

Figure 2: System Architecture

2.3 System Components

The client side and server side consist of different components. For the front end, there are five main pages, as shown in rectangular, and each page has corresponding user operations, as shown in circles.
On the Account Page, users can choose to sign up, log in, and find the password. The User Authentication module from the back end is responsible for collecting new account information, user identity verification, and assigning privileges accordingly.
On the Notification Page, users can send and receive private messages, be notified of the feedback on their posted tweets (e.g. likes, comments, retweets, etc.), and new followers. Private messages are supported by Chat Engine in the back end, tweet feedback is pushed by the Tweet Management component, and new follower notifications are pushed by the User Management component.
On the Search Page, users can find the trends and search for their interested users and topics. The Search Engine from the back end supports all search actions. The trends are controlled by the Tweet Management component.
On the Profile Page, the user's personal information is displayed, such as user name, followers, past tweets, liked tweets, comments, etc. A user has complete access to information on their own profile page, but only partial information will be shown to other users according to his/her privacy settings. The User Management component stores and updates user information and supports privacy settings.
On the Home Page, users could browse the tweets from their following accounts, tweets recommended by the system, and recommended users. Users can post, comment on, retweet, like, dislike, save, and report a tweet. The Recommendation Engine is responsible for determining which tweets and users should be recommended and the Tweet Management component is responsible for user operations on a tweet.

References

[1] MongoDB, "What Is The MERN Stack?." https://www.mongodb.com/mern-stack. Acessed February 3, 2023.