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Contents

Introduction

MangaVerse is a project developed for the Large-scale and multi-structured databases course of the University of Pisa. This web application aims to provide users with a comprehensive platform to explore, search, and interact with a vast collection of manga and anime. Users can register, personalize their profiles, and engage in a community. The platform also offers a set of features for registered users, such as liking media contents, following other users, adding reviews and ratings. Additionally, users receive personalized suggestions based on their preferences and current trends. The site manager has access to detailed analytics about media contents and user activities.

Analisys

Actors

- **Unregistered User**: A visitor who has not created an account on the platform. They can browse media contents, search and filter, view media content details, and register/login.
- **Registered User**: A user who has created an account on the platform. They can perform all the actions of an unregistered user, as well as logout, manage their profile, explore other user profiles, interact with media contents/users, review media contents, and receive advanced recommendations.
- **Manager**: A registered user with administrative features. They can access an analytics dashboard, manage user accounts, content entries, and monitor trends.

Requirements

Unregistered User:

- Browse Media Contents:
  - View a list of available manga and anime on the home page.
  - Access basic details about each media content without logging in.
- Search and Filter:
  - Use the search bar to find specific manga or anime by title.
  - Utilize basic filtering options to refine the media content list.
- View Media Content Details:
  - Click on a media content to view detailed information, including synopsis and genre.
- Register/Login:
  - Access a registration page to create a new account.
  - Use valid credentials to log into the account.
- Explore Features:
  - Access information about the features available to registered users.

Registered User:

- Browse Media Contents:
  - View a list of available manga and anime on the home page.
  - Access basic details about each media content without logging in.
- Search and Filter:
  - Use the search bar to find specific media content by title.
  - Utilize basic filtering options to refine the media content list.
- View Media Content Details:
  - Click on a media content to view detailed information, including synopsis and genre.
- Logout:

  - Ends the user's session.
- Profile Management:
  - Edit and update personal information (e.g., profile picture, bio).
  - Change account password.
- Explore Other User Profiles:
  - View profiles of other registered users.
  - See their liked manga, anime and reviews.
- Interact with Media Contents/Users:
  - Like or dislike manga and anime to indicate preferences.
  - Follow/unfollow other users.
- Review Media Contents:
  - Add reviews and ratings to manga and anime.
  - View and edit own reviews.
- Advanced Recommendations:
  - Receive more refined media content suggestions based on detailed user interactions.
  - Receive users suggestions based on common interests.

Manager(Registered User with Administrative Features):

- Analytics Dashboard:
  - Access a comprehensive analytics dashboard with data on user engagement and media contents trends.
- User Management:
  - View and manage user accounts, including account activation and deactivation.
- Content Management:
  - Manage media content entries, including adding new manga and anime, updating information, and removing entries if necessary.
- Monitor Trends:
  - Monitor trends in user interactions, popular genres, and trending manga.

Non Functional Requirements

Performance

- Response Time: The system should have low latency, with pages loading within an acceptable timeframe.
- Scalability: The system should be able to handle an increasing number of users and data without significant degradation in performance.
- Concurrency: The application should support multiple users simultaneously without performance bottlenecks. For very high traffic scenarios, acceptable delays may be introduced.

Security

- Data Encryption: All user data, including passwords, should be securely encrypted during transmission and storage.

User Interface

- Responsiveness: The user interface should be responsive, providing a consistent and seamless experience across various devices and screen sizes.
- Intuitiveness: The interface should be user-friendly, with clear navigation and easily understandable features.

UML use case diagram

UML class analysis

UML class diagram

Design

Document Database

For the document database, we will use MongoDB. MongoDB is a NoSQL database that stores data in flexible, JSON-like documents. It is a popular choice for applications that require flexibility and scalability. MongoDB is a document database, which means it stores data in JSON-like documents. These documents are flexible, meaning they can have different fields and structures. This makes MongoDB a good choice for applications that require flexibility in their data model. MongoDB is also a scalable database, meaning it can handle large amounts of data and traffic. It is designed to scale out, meaning you can add more servers to handle more traffic. This makes MongoDB a good choice for applications that need to scale quickly.

Collections The database will have the following collections:

- Anime: This collection will store information about anime, such as titles, tags, and synopsis.
- Manga: This collection will store information about manga, such as titles, genres, and authors.
- Reviews: This collection will store user ratings and comments for media content.
- Users: This collection will store user data, such as usernames, passwords, email addresses, gender and location.

MongoDB document example

Anime:


```
{
  "_id": "65789bb52f5d29465d0abcfb",
  "title": "0",
  "type": "SPECIAL",
  "episodes": 1,
  "status": "FINISHED",
  "picture": "https://cdn.myanimelist.net/images/anime/12/81160.jpg",
  "tags": [
    "drama",
    "female protagonist",
    "indefinite",
    "music",
    "present"
  ],
  "producers": "Sony Music Entertainment",
  "studios": "Minakata Laboratory",
  "synopsis": "This music video tells how a shy girl with a secret love and
     curiosity...",
  "latest_reviews": [
    {
      "id": "657b301306c134f18884924c",
      "date": "2023-10-03T22:00:00.000+00:00",
      "rating": 4,
      "user": {
        "id": "6577877ce68376234760745c",
        "username": "Tolstij_Trofim",
        "picture": "https://thypix.com/wp-content/uploads/2021/10/manga-
           profile-picture-10..."
      }
    },
  ],
  "anime_season": {
    "season": "FALL",
    "year": 2013
  },
  "average_rating": 6.7,
  "avg_rating_last_update": true,
  "likes": 4
}
```

Manga:


```
{
  "_id": "657ac61bb34f5514b91ea223",
  "title": "Berserk",
  "type": "MANGA",
  "status": "ONGOING",
  "genres": [
    "Action",
    "Adventure",
    "Award Winning",
    "Drama",
    "Fantasy",
    "Horror",
    "Supernatural"
  ],
  "themes": [
    "Gore",
    "Military",
    "Mythology",
    "Psychological"
  ],
  "demographics": [
    "SEINEN"
  ],
  "authors": [
    {
      "id": 1868,
      "role": "Story & Art",
      "name": "Kentarou Miura"
    },
    {
      "serializations": "Young Animal"
    }
  ],
  "synopsis": "Guts, a former mercenary now known as the \"Black Swordsman
     ,\" is out fo...",
  "title_english": "Berserk",
  "start_date": "1989-08-25T00:00:00.000+00:00",
  "picture": "https://cdn.myanimelist.net/images/manga/1/1578971.jpg",
  "average_rating": 3.33,
  "latest_reviews": [
    {
      "user": {
        "id": "6577877be683762347605ce7",
        "username": "calamity_razes",
        "picture": "https://imgbox.com/7MaTkBQR"
      },
      "date": "2012-12-15T00:00:00.000+00:00",
      "comment": "An insult to the art of manga; avoid at all costs.",
      "id": "657b302206c134f18886f5ef"
    },
  ],
  "anime_season": {
    "season": "FALL",
    "year": 2013
  },
  "average_rating": 6.7,
  "avg_rating_last_update": true,
  "likes": 4
}
```

Reviews:


```
{
  "_id": "657b300806c134f18882f2f1",
  "user": {
    "id": "6577877be68376234760596d",
    "username": "Dragon_Empress",
    "picture": "images/account-icon.png",
    "location": "Columbus, Georgia",
    "birthday": "1987-07-29T00:00:00.000+00:00",
    "rating": 7
  },
  "anime": {
    "id": "65789bbc2f5d29465d0b18b7",
    "title": "Slayers Revolution",
    "date": "2023-07-23T06:27:54.000+00:00",
    "comment": "Above-average quality in animation and soundtrack."
  }
}
```


Users:


```
{
  "_id": "6577877be683762347605859",
  "email": "xdavis@example.com",
  "password": "290
      cb38a679d5eb68d11b9ea1e21f48234eba6de19f95612dbcb70ce0c7e4e78",
  "description": "Liberating the mind from stress with the power of anime
      zen.",
  "picture": "https://thypix.com/wp-content/uploads/2021/10/manga-profile-
      picture-44",
  "username": "Xinil",
  "gender": "Male",
  "birthday": "1985-03-04T00:00:00.000+00:00",
  "location": "Libya",
  "joined_on": "2014-05-29T00:00:00.000+00:00",
  "app_rating": 5,
  "followed": 40,
  "followers": 29
}
```


Indexes

We created two indexes in the reviews collection to improve query performance. One for the users id and another for the anime and manga id. This will allow us to quickly retrieve reviews for a specific user or media content.

Graph Database

For the graph database, we will use Neo4j. Neo4j is a graph database that stores data in nodes and relationships. It is a popular choice for applications that require complex relationships between data. Neo4j is a graph database, which means it stores data in nodes and relationships. Nodes represent entities, such as users or products, and relationships represent connections between nodes. This makes Neo4j a good choice for applications that require complex relationships between data. Neo4j is also a scalable database, meaning it can handle large amounts of data and traffic. It is designed to scale out, meaning you can add more servers to handle more traffic. This makes Neo4j a good choice for applications that need to scale quickly.

Nodes

The database will have the following nodes:

- User: This node will store information about users, such as id, usernames, and picture.

- Anime: This node will store information about anime, such as id, titles and picture.
- Manga: This node will store information about manga, such as id, titles and picture.

Relationships
The database will have the following relationships:

- LIKE: This relationship will connect users to anime and manga nodes. It will store the date when the user liked the media content.
- FOLLOW: This relationship will connect users to other users.

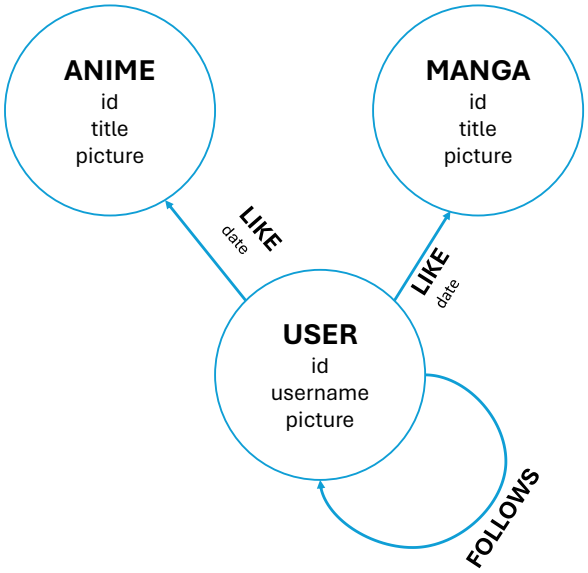

Figure 3.1: GraphDB

Implementation

Implementation 1

Implementation 2

Conclusion

Conclusion 1

Conclusion 2