bibliophilia

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Introduction

Bibliophilia is a role-based library management application that features a Vue.js frontend and a robust Flask backend. It is designed to provide book enthusiasts with a seamless and enjoyable experience. The application is managed by a single librarian who oversees all operations, including accepting requests, adding new books, and managing user accounts.

Technologies Used


Vue.JS


Flask


SQLite


Redis


Celery


Chart.JS

System Architecture

The **app.py** file is the nexus of the application, handling crucial API endpoints that retrieve data via Flask-SQLAlchemy and transmit it to the Vue.js frontend. Additionally, it encompasses the configuration for Redis caching and batch-scheduled tasks utilizing Celery.

Database Management

The database is powered by SQLite, serving as the foundational software system. The models, crafted through **Flask-SQLAlchemy**, are meticulously designed with appropriate constraints, ensuring the steadfast integrity and consistency of the stored data. Provided below is a succinct code snippet illustrating the structure of the Books model.

```python
class Books(db.Model):
    book_id = db.Column(db.String, primary_key=True)
    book_name = db.Column(db.String, nullable=False)
    img = db.Column(db.String, nullable=False)
    author_id = db.Column(db.String, nullable=False)
    author_name = db.Column(db.String, nullable=False)
    section_id = db.Column(db.String, nullable=False)
    genre = db.Column(db.String, nullable=False, default="Fiction")
    date_added = db.Column(db.DateTime, nullable=False, default = datetime.strftime(datetime.today(), "%d-%m-%Y"))
```

API Management

The database's CRUD operations are exclusively executed through APIs, leveraging Flask-Restful to implement essential functionalities such as **GET**, **POST**, **PUT**, and **DELETE** operations at specific endpoints. Flask-Restful facilitates the seamless integration of these operations, allowing for efficient communication between the application and the database. This approach ensures a robust and standardized mechanism for interacting with the database, promoting scalability and maintainability in the overall system.

User and Librarian Functionalities

User

- View all Books
- Request Books
- Return Issued Books
- View Dashboard and Stats
- Give Feedback

Librarian

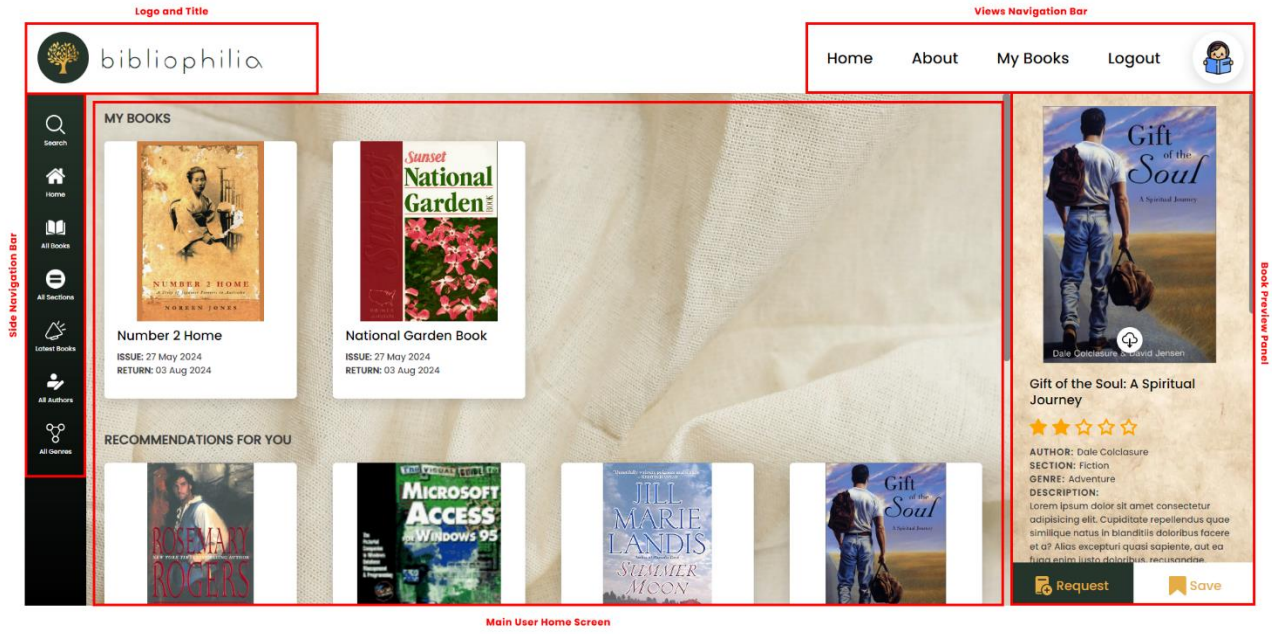
- Add/Edit/Delete Books, Authors, Sections, etc.
- Ban/Interdict Users
- View overall Statistics
- Manage Issue Requests

Celery Batch Jobs

Three types of Asynchronous batch jobs have been implemented

User Triggered | **Daily Task** | **Monthly Task**

Frontend



The frontend has been meticulously designed to offer a seamless and user-friendly experience for both patrons and librarians. Styling is implemented using **basic CSS** to ensure simplicity and efficiency. Data is dynamically populated via API calls, providing real-time updates. The **View Navigation Bar** allows users to navigate between different pages, while the **Side Navigation Bar** facilitates smooth transitions between various tabs on the same page. Additionally, the **Preview Panel** enables users to view comprehensive details of the selected book and offers options to either request the book for issue or save it for later.

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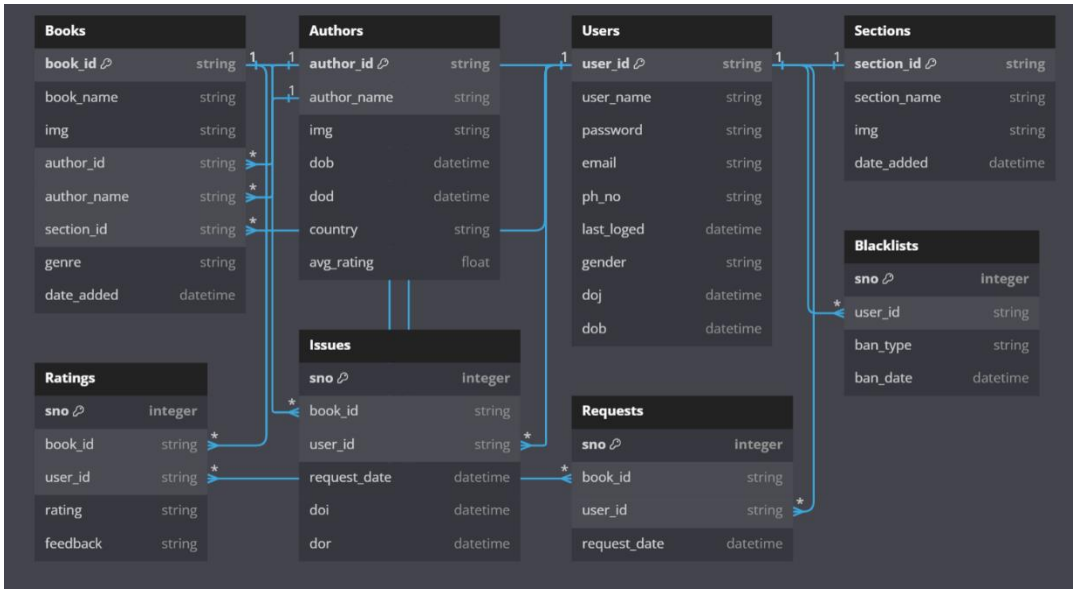
Database Schema



Additional Features

I have implemented a league/ranking system for users, determined by their activity level using a straightforward formula: **100 × Number of Books Issued + 250 × Number of Books Rated**
Users are categorized into four leagues in ascending order of rank: **Reader**, **Literati**, **Scholar**, and **Sage**. Advancement to higher leagues requires meeting specific criteria. All relevant information is displayed on the user's dashboard.

No League **Reader League** **Literati League** **Scholar League** **Sage League**

Conclusion and Extra Information

Overall, developing this application was an enjoyable and rewarding experience. Having prior experience with **ReactJS**, transitioning to **VueJS** was relatively straightforward. However, working with **Redis** and **Celery** was new territory for me, providing valuable hands-on experience and enhancing my skill set in these technologies.

- The sign-in process for the librarian involves two steps. Initially, a specific username and password are required to access the Librarian Sign-In Page.
- **How to start the app** (in the terminal execute these commands):
  - python app.py [In backend directory]
  - yarn run serve [In frontend director]
  - celery -A app.celery_app worker --loglevel INFO -P gevent [In backend directory]
  - celery -A app.celery_app beat --loglevel INFO [In backend directory]
- **Presentation Video Link:**
  https://drive.google.com/file/d/1u6c1jiQ3QPmCvZ7iAZFHSoC-_7nwuaia/view?usp=sharing