Flask Blog Post API

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Overview

This is a RESTful API built using Python Flask for managing blog posts. It includes features for creating, retrieving, updating, and deleting blog posts. The API also implements JWT-based authentication to secure these operations. SQLAlchemy is used for in-memory database management.

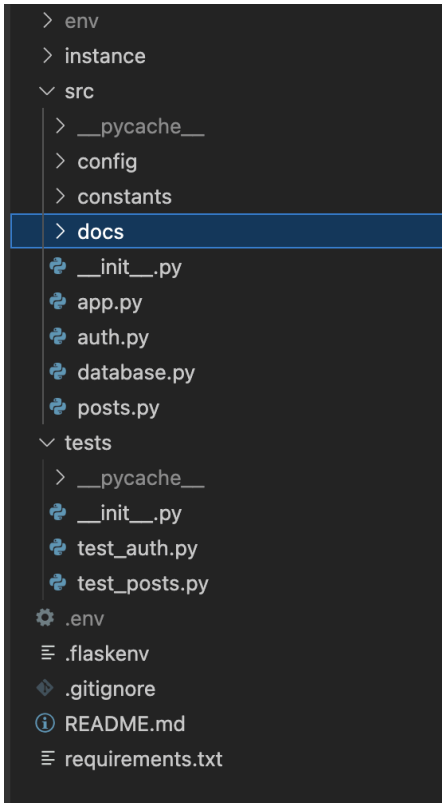
Features

- **JWT Authentication**: Users can sign up, sign in, and authenticate their requests.
- **CRUD Operations for Blog Posts**:
    - Create a new blog post
    - Retrieve a list of all blog posts
    - Retrieve a single blog post by its ID
    - Update an existing blog post
    - Delete a blog post

Technologies/Tools Used

- **Python Flask**: Web framework for building the API.
- **SQLAlchemy**: ORM for database management.
- **JWT**: Authentication mechanism.
- **Pylint**: For linting
- **Unittest**: For testing
- **Swagger**: API Documentation

Project Structure



Setup and Installation

- **Clone the repository**:
    - git clone <repository-url>
    - cd <repository-directory>
- **Create and activate a virtual environment**:
    - python -m venv env
    - source env/bin/activate (On Windows use `env\Scripts\activate`)
- **Install the dependencies**:
    - pip install -r requirements.txt
- **Set up environment variables for Mac**:

    Create a .flaskenv file and add the following variables:

- export FLASK_APP=src
- export FLASK_RUN_PORT=8000
- export FLASK_ENV=development
- export FLASK_DEBUG=1
- export SQLALCHEMY_DB_URI=sqlite:///posts.db
- export JWT_SECRET_KEY=your_secret_key

Create a `.env` file and add the following variables:

- export SECRET_KEY=your_secret_key

Running the Application

To run the application, use the following command:

flask run

Testing the Application

python -m unittest discover -s tests

System Architecture

Scalability

- **Paging**: Implemented paging when fetching API data ensures that the system can efficiently handle large volumes of data by loading only a subset of records at a time.

Maintainability

- **Modular Design**: The application is organized into modules (auth, posts, config, etc.), making it easier to maintain and extend individual components without affecting others.
- **Code Quality**: Used pylint tool for linting to help maintain code quality over time.
- **API Documentation:** Used Swagger for API documentation, to read and understand the code in a better way.

Extensibility

- **API Versioning**: Implemented API versioning can help manage changes and upgrades without breaking existing clients.

Design Decisions and Trade-offs

Design Decisions

1. **Framework Choice**:
    - **Flask** was chosen for its simplicity and flexibility, which is suitable for building lightweight APIs quickly.
2. **Database Management**:
    - **SQLAlchemy** was selected as the ORM for its ease of integration with Flask and its capability to handle in-memory databases efficiently during development and testing.
3. **Authentication**:
    - **JWT (JSON Web Tokens)** was implemented for secure authentication, ensuring that each request is properly authenticated without maintaining session states on the server.
4. **Documentation:**
    - **Swagger** Added detailed API documentation using Swagger to make it easier for developers to understand and use the API.
5. **Testing**
    - **Unit test library** Used Unittest a built-in testing framework to write unit test cases.

Trade-offs

1. **In-memory Database**:
    - In my opinion, using an in-memory database with SQLAlchemy is efficient for development and testing but not suitable for production due to the lack of persistence. For production, a more robust database like PostgreSQL or MySQL should be used.
2. **Simplicity vs. Scalability**:
    - The tool Flask is good for simple applications but may require additional configuration and extensions for handling larger, more complex applications.

Potential Improvements with More Time

1. **Database Integration**:
    - Can integrate a robust database such as PostgreSQL or MongoDB to handle data persistence more effectively.

2. **Enhanced Error Handling**:
    - To improve reliability and user experience by implementing more comprehensive error handling and validation throughout the application
3. **Automated Testing**:
    - Can expand the test suite to include more test cases, ensuring greater coverage and reliability of the API.
4. **Deployment**:
    - Can set up a deployment pipeline using Docker and a CI/CD tool to automate testing and deployment processes.
5. **Rate Limiting**:
    - Can implement rate limiting to prevent abuse and ensure fair usage of the API.
6. **Testing**
    - Used inbuilt testing library, can shift to more robust and reliable testing tools like pytest.
7. **Frontend**
    - We can create a website to show blog posts by integrating with the APIs created.