IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, April 2026
Impact Factor: 8.2

To-Do List

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Abstract: *This project presents the design and development of a web-based To-Do List System built using the Flask framework and SQLite database. The primary objective of the system is to provide users with a simple, efficient, and secure platform to manage their daily tasks in an organized manner. In today's fast-paced environment, effective task management is essential for improving productivity and time management, and this system aims to address that need through a digital solution.*

The application allows users to register and log in securely using authentication mechanisms that include password hashing and session management. Once authenticated, users can perform various task-related operations such as adding new tasks, specifying start and end dates, updating task details, marking tasks as completed, and deleting tasks when they are no longer required. Each task is associated with a specific user, ensuring data privacy and personalized task management.

A key feature of this system is its dynamic task status tracking. The application automatically categorizes tasks into different states such as Upcoming, Ongoing, Completed, and Expired based on the current date and user actions. This real-time status update helps users easily monitor their progress and prioritize their work effectively without manual tracking.

The system is designed to be lightweight, scalable, and user-friendly, making it suitable for individual users as well as small-scale applications. It demonstrates the practical implementation of web technologies, including frontend design, backend processing, and database management, in solving real-world problems. Additionally, the modular structure of the application allows for future enhancements such as task prioritization, notifications, search functionality, and mobile responsiveness.

Overall, this project highlights the importance of integrating secure authentication, efficient data handling, and dynamic logic to build a reliable and effective task management system.

Keywords: *task management system.*

I. INTRODUCTION

In today's fast-paced environment, managing daily tasks efficiently has become increasingly important for both personal and professional productivity. Traditional methods such as maintaining handwritten notes or relying on memory are often unreliable and can lead to missed deadlines and disorganized workflows. To address these challenges, this project focuses on the development of a web-based To-Do List that enables users to organize, monitor, and manage their activities in a structured digital format.

The system is developed using the Flask framework in Python for backend processing and SQLite as the database for storing user and task-related information. Flask provides a lightweight and flexible environment for building web applications, while SQLite ensures efficient data storage with minimal configuration. The application supports multiple users by allowing them to create individual accounts, log in securely, and manage their personal task lists independently. User authentication is implemented to ensure that each user's data remains private and protected.

The application offers essential task management features such as adding new tasks, specifying start and end dates, updating task details, marking tasks as completed, and deleting tasks when they are no longer needed. One of the key highlights of the system is its ability to automatically update task statuses based on deadlines. Tasks are categorized as Upcoming, Ongoing, Completed, or Expired, helping users quickly understand the progress and priority of their work without manual intervention.

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DOI: 10.48175/568

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Furthermore, the project demonstrates the effective integration of frontend technologies (HTML, CSS, JavaScript), backend logic (Flask), and database management (SQLite) to build a complete and functional web application. It serves as a practical example of how modern web technologies can be utilized to solve real-world problems in a simple, efficient, and scalable manner.

Software & Tools

1. Frontend
HTML
CSS
JavaScript

2. Backend
- Python Flask Framework.

3. Database
- SQLite.

4. Libraries Used
-Flask
-Flask-SQLAlchemy
-Werkzeug (Password Hashing)

Methodology

The system operates through a web-based interface where users manage their tasks efficiently. It begins with secure user authentication, where users register and log in using a username and password. Passwords are securely stored using hashing techniques, ensuring data protection and safe access to the application.

After logging in, users can perform various task management operations such as adding tasks with start and end dates, deleting tasks, marking them as completed, and clearing all tasks.

Each task is linked to a specific user through a unique user ID, enabling multiple users to manage their tasks independently.

A key feature of the system is its dynamic task status mechanism. Based on the current date, tasks are automatically categorized as Upcoming, Ongoing, Expired, or Completed. This real-time status update helps users track their progress and manage tasks effectively.

The application uses an SQLite database for storing data and SQLAlchemy ORM for handling database operations. Tables are automatically created when the system starts, making it easy to deploy.

Overall, the system provides benefits such as secure login, simple task management, date- based tracking, automatic status updates, and multi-user support, making it an efficient solution for daily task management.

End-User Benefits:

• Secure Login System.
• Easy Task Creation
• Date-Based Task Tracking
• Automatic Status Updates
• Task Deletion & Cleanup
• Multi-user Support

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Results:

The system was tested across multiple functionalities, including user registration, secure login, task creation, task deletion, and completion tracking. Each module was evaluated individually as well as in an integrated environment to ensure smooth interaction between components. The authentication system successfully validated users and maintained secure sessions, while preventing unauthorized access.

The application demonstrated efficient performance during testing, with quick response times for user actions such as adding, updating, and deleting tasks. All data operations were accurately reflected in the SQLite database, confirming the reliability of database integration. The dynamic task status feature functioned correctly by automatically updating task states (Upcoming, Ongoing, Expired, and Completed) based on date conditions, providing real-time feedback to users.

The system was also tested with multiple users to evaluate its ability to handle concurrent task management. Each user was able to access and manage their own tasks independently without any data conflicts, confirming proper implementation of user-specific data handling. During testing, no major errors or system failures were observed. Minor issues, such as input validation and UI responsiveness, were identified and resolved through debugging and optimization. Overall, the system proved to be stable, accurate, and user-friendly.

The results confirm that the application is reliable, efficient, and suitable for real-world usage, particularly for individuals seeking a simple and effective task management solution.

II. CONCLUSION

The developed To-Do List provides a simple yet effective solution for managing daily tasks in a structured and organized manner. The application successfully integrates key functionalities such as secure user authentication, task creation and management, and dynamic status tracking into a single, user-friendly platform. By allowing users to add tasks with defined start and end dates and automatically updating their status, the system helps improve productivity and time management.

This project demonstrates a strong understanding of web application development using the Flask framework, along with efficient database handling through SQLite and SQLAlchemy ORM. It also highlights the importance of implementing security measures such as password hashing and session management to protect user data. The smooth interaction between frontend, backend, and database components reflects a well-designed and functional full-stack application.

The system is lightweight, reliable, and easy to use, making it suitable for individuals who want to manage their daily activities digitally. It also serves as a foundational model for developing more advanced task management systems.

In the future, the application can be enhanced by adding features such as task prioritization, deadline reminders and notifications, search and filter options, and mobile responsiveness. Integration with cloud services and development of a mobile application could further improve accessibility and scalability. With these enhancements, the system has the potential to evolve into a more comprehensive and intelligent productivity tool

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