Remington Williams
CIT262 - Darsh Joshi
Midterm - One Pager

Scuba Diving Log Application

Business Problem

Recreational scuba divers face significant challenges in managing their diving activities safely and efficiently. The manual process of logging dives and tracking essential data points creates risks of information loss and inconsistency. Calculating pressure groups and surface intervals manually is error-prone, potentially compromising diver safety. Without a centralized system, divers struggle to maintain accurate records of their dive history, personal experiences, and safety parameters. Additionally, planning consecutive dives while ensuring proper surface intervals and managing travel times between dive sites requires complex calculations that can be overwhelming. The lack of a comprehensive digital solution that combines dive logging, safety calculations, and travel planning creates unnecessary risks for recreational divers.

Overview

The Streamlit-based application provides an integrated solution that transforms dive management into a streamlined digital experience. The system features robust data management for storing and retrieving dive logs, ensuring all diving information is accurately recorded and easily accessible. Divers can maintain detailed personal journals and reflections for each dive, creating a comprehensive diving history that goes beyond basic metrics. The application implements PADI standard dive tables to accurately compute pressure groups and surface intervals, ensuring strict adherence to safety guidelines. For multi-dive planning, the system assists in calculating safe travel times between dives, helping prevent decompression sickness risks. All these features are accessible through an intuitive, modern dashboard where divers can seamlessly manage their entire diving experience. This comprehensive approach transforms dive planning and logging from a manual, error-prone process into a safety-focused digital platform that serves both recreational divers and instructors.

Module Division & Structure

1. **dive_log.py**: Manages dive log data storage and retrieval using JSON.
2. **dive_journal.py**: Handles user-generated journal entries tied to specific dives using JSON.
3. **dive_table.py**: Performs dive safety calculations based on PADI standard dive tables.
4. **dive_travel.py**: Assists in planning travel between dives. This ensures that users avoid flight times the risk of decompression sickness.
5. **app.py**: Streamlit front-end integrating logging and calculation features.

User Interface (Streamlit App)

Core Layout

- Sidebar navigation for streamlined access
- Multi-column layout for organized data display
- Custom page configuration with wide layout
- Custom color scheme with turquoise theme
- Modern, responsive design
- Clear typography with Courier New font

Main Input Elements

- Text inputs for diver information and locations
- Number inputs for depth and pressure readings
- Date input for dive logging
- Sliders for temperature and time settings
- Checkboxes for equipment selection
- Radio buttons for gas type selection

Data Display

- Success/error messages for user feedback
- Interactive data tables for dive history
- Metrics display for important calculations
- Custom styled forms for data entry

Module Testing

- dive_table.py: Validated calculations against standard recreational dive tables.
- dive_log.py and dive_journal.py: Ensured accurate JSON data handling.
- app.py: Robust error handling and user input validation.

Benefits & Applications

- Enhanced Safety: Supports accurate tracking of no-decompression limits and surface intervals.
- Digital Dive History: Enables divers to maintain and review logs anywhere.
- Community Use: Useful for dive instructors, clubs, and students during training sessions.

Potential Future Enhancements

- User login to store personal dive logs in the cloud.
- Integration with wearable dive computers for automatic log updates.