Introduction

The Restaurant Billing System is a Streamlit-based web application developed as part of an internship project. It provides a user-friendly solution for restaurant order management and billing processes, focusing on simplicity, flexibility, and real-time data handling.

Abstract

This project aims to streamline restaurant operations by offering a unified system to handle order placement, payment processing, bill generation, and data analytics. It utilizes a Python backend with an SQLite3 database and provides an interactive UI using Streamlit. The project also supports user authentication and QR-based payment functionality.

Tools Used

- **Python** (Backend & Logic)
- **Streamlit** (Web User Interface)
- **SQLite3** (Database)
- **Pandas** (Data Handling)
- **FPDF** (PDF Generation)
- **qrcode** (QR Code Creation)
- **Plotly** (Interactive Charts)

Steps Involved in Building the Project

1. **Database Design and Setup:**
   - Defined SQLite schema for menu, orders, and order_items tables.
   - Implemented functions (setup_database, get_connection) for table creation and database management.
2. **Core Data Management Functions:**
   - Developed CRUD (Create, Read, Update, Delete) functions for database interaction (get_menu_items, save_order_to_db, etc.).
   - Ensured data consistency and UI updates with error handling and cache clearing.
3. **Basic Streamlit UI Framework:**
   - Set up the Streamlit application (app.py) with wide layout and managed application state using st.session_state.
4. **Login Page Development:**
   - Implemented user authentication (hardcoded for demo).
   - Designed a visually appealing login page with custom CSS.
   - Integrated login/logout logic to control application access.
5. **Place Order Module:**
   - Created the "Place Order" UI for item selection and quantity input.
   - Implemented real-time calculations (price, GST, discount, tip) and

order summary display.

- Integrated payment methods (Cash, Card, UPI with QR code) and order submission.

6. **Menu Management Module:**
    - Developed an admin-accessible page for adding, editing, and deleting menu items.
7. **Order History and Reporting Modules:**
    - Created "Order History" with date filtering and detailed order views.
    - Developed "Analytics Dashboard" for sales metrics and interactive visualizations (daily sales, payment methods, categories, top items).
    - Added export functionality for order history (Excel) and individual bills (CSV, PDF).
8. **Utility Functions and Integrations:**
    - Implemented UPI QR code generation (generate_upi_qr_code).
    - Integrated fpdf for PDF bills and pandas for data handling and CSV exports.
    - Ensured robust image URL handling with fallbacks.
9. **Project Structuring and Documentation:**
    - Organized codebase into logical folders (db/, utils/, data/, receipts/, scripts/, ui/).
    - Authored a comprehensive README.md covering project details, setup, and schema.

Conclusion

The Restaurant Billing System demonstrates how Python and Streamlit can be used to build practical, real-time applications for small businesses. With a responsive UI, secure login system, and robust database integration, the solution offers a complete toolkit for efficient restaurant operations. This internship project also reinforced key concepts in full-stack development and deployment.