**AI-Enabled Appointment Scheduling and Service Management System**

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**Abstract**

This capstone project presents the design and implementation of an AI-powered appointment and service management system for the beauty and wellness industry. The solution addresses inefficiencies in appointment scheduling, service ordering, payments, and analytics using Microsoft Power Apps, SQL Server, and Power BI. Customer login, appointment scheduling, service ordering, multi-mode payments, admin dashboards, and AI-driven insights like peak-hour forecast and service recommendations are all features of the system. The result is an integrated, low-code application that enhances operational efficiency, improves customer experience, and supports data-driven decision-making for salon and wellness businesses.

**Organization/Industry Description**

The beauty industry encompasses salons, spas, and wellness centers that deliver a wide range of personal care services. These businesses operate in a highly customer-facing environment where service quality, booking convenience, and operational efficiency are essential. Small and medium-sized businesses (SMBs) in this sector often struggle with managing appointments, service workflows, and payments using manual or outdated methods.

This industry is depending more and more on low-code platforms to automate daily tasks, cut down on errors, and obtain insights through analytics as digital transformation becomes essential. This project simulates a contemporary service management system designed to optimize customer interactions and backend operations for a mid-sized salon.

**Problem Description**

The primary business challenges faced by beauty and wellness organizations include:

* **Inefficient Appointment Scheduling**: Manual scheduling often leads to double-booking, missed appointments, and administrative confusion.
* **Disconnected Systems**: Customer data, service history, and payment records are often stored across different platforms, causing delays and poor customer experience.
* **Lack of Real-Time Insights**: Businesses lack visibility into revenue trends, peak service hours, and staff performance.
* **Limited AI-Driven Personalization**: There is no mechanism to recommend services based on a customer’s past preferences or predict booking surges.
* **Inadequate Security Controls**: Role-based access and customer data security are typically not enforced in basic appointment systems.

Building a centralized, AI-supported solution that automates orders, payments, and scheduling while providing strong analytics and security was the project's goal in order to solve these issues.

**Organizational Sponsors / Stakeholders**

The beauty salon company is the hypothetical business stakeholder in this project, which is an academic capstone simulation with the Professor as the academic sponsor. During development, the following stakeholder roles are simulated:

* **Customer** – End-users booking services
* **Staff** – Employees managing appointments and orders
* **Admin** – Business owner monitoring reports and analytics

**System Capabilities**

The system was built using **Microsoft Power Apps**, **SQL Server**, and **Power BI** offers the following core capabilities:

**Core Functionalities:**

* **Secure Signup & Login**: Role-based authentication for customers
* **Appointment Management**: Booking, viewing, editing, and canceling
* **Service Ordering**: Selection of multiple services with review screen
* **Multi-Mode Payments**: Supports credit card, cash, and check payments
* **Admin Dashboard**: Interactive reports with insights on revenue, staff load, and service popularity
* **AI Features**:
  + *Peak-Hour Prediction*: Identifies high-demand booking times
  + *Service Recommendations*: Based on previous orders

**Technical Features:**

* Low-code implementation with Power Apps
* Backend integration with SQL Server for data storage and retrieval
* Real-time analytics via Power BI

**Business Benefits**

The system delivers several strategic and operational benefits to the business:

* **Increased Operational Efficiency**: Automates manual order, payment, and appointment processing.
* **Improved Customer Experience**: Intuitive interfaces and personalized recommendations enhance satisfaction.
* **Data-Driven Decision-Making**: Admin dashboard allows management to track performance in real time.
* **Revenue Optimization**: Targeted promotions and staffing are made possible by knowledge of top services and peak periods.
* **Security and Compliance**: Role-based access control ensures sensitive data is only accessible by authorized users.
* **Scalability**: Because it is based on the Microsoft ecosystem, adding new features or integrating it with other platforms is simple.

**Project Deliverables**

Over the course of this project, a full-featured appointment and service management system was developed, combining frontend, backend, automation, and analytics components. The key deliverables included:

**1. Database Development (SQL Server)**

* Created 15+ normalized tables (Customers, Appointments, Services, Orders, Payments, etc.)
* Implemented relationships using foreign keys to maintain data integrity
* Populated with test data (30+ records per table)

**2. Power Apps Frontend (Canvas App)**

* **Customer Interface**: Signup/Login, Book Appointment, Place Order, Make Payment
* **Staff Interface**: View and manage appointments/orders
* **Admin Interface**: Dashboard with revenue, trends, and service analytics
* Integrated Patch functions for custom logic and data manipulation

**3. Authentication & Role-Based Access**

* Secure customer login via CustomerLogin table
* Role logic using variables like varCustomerID for filtered data access
* Navigation logic based on login verification

**4. Multi-Payment Integration**

* Payment screens dynamically adjusted based on method: Cash, Credit Card, Check
* Logic to collect and patch values into respective tables (e.g., CC\_Payment, CHK\_Payment)

**5. AI & Automation Features**

* **Service Recommendations**: Gallery shows top services based on customer history
* **Peak-Hour Prediction**: Line chart using Power BI to visualize appointment volume by hour

**6. Power BI Dashboard**

* Revenue by Payment Method
* Staff Appointments Load
* Service Categories Ordered
* Peak Booking Hours

**Feasibility Analysis**

**• Technical Feasibility**

Made use of the readily available and scalable Microsoft Power Platform (Power Apps, SQL Server, and Power BI) technologies.

**• Operational Feasibility**

The interface is low code, less training is necessary.

**• Economic Feasibility**  
Less manual work is required for scheduling, billing, and reporting.

**Solution Evaluation**

The completed system resolved all key issues initially identified:

|  |  |
| --- | --- |
| Problem | Solution Delivered |
| Appointment conflicts | Real-time appointment scheduling form |
| Manual order tracking | Service order form with multi-service selection |
| Payment issues | Integrated screen with dynamic fields for payment types |
| Lack of analytics | Interactive dashboard with real-time charts |
| Limited personalization | AI-powered service recommendations based on order history |
| Unsecured access | Role-based control using Power Apps logic |

**Evaluation**:

* Manual system testing (CRUD operations across forms)
* SQL queries to verify backend integrity
* Simulated walkthroughs to test user experience

**Lessons Learned**

* Creating a fully functional system using Power Apps requires deep customization with Patch functions and variable management.
* Integration between Power Apps and SQL Server requires careful field type mapping (especially for dates and numbers).
* Conditional formatting and dynamic screen behavior with visibility significantly enhance usability.
* Power BI is a strong tool for live dashboarding, but for optimal results, clean, relational data is needed.

**Limitations & Future Work**

**Limitations:**

* Currently limited to customer login only (staff login not implemented)
* Promotions logic and inventory stock updates were not deeply integrated
* AI recommendations are basic (filter logic); no machine learning algorithm applied

**Future Enhancements:**

* Implement **staff/admin login with role-specific dashboards**
* Add **Power Automate reminders** for appointments and payments
* Enhance AI with **service frequency ranking** or collaborative filtering
* Allow **mobile responsiveness** and SMS integration

**References**

* Microsoft Docs: Power Apps, Power BI, SQL Server
* Course Readings: System Development Lifecycle and Low-Code Platforms
* Instructor-provided materials and templates

**Appendix:**

1. Use Case Model for Service Management System  
   **Tool**: Visio tool

* This diagram outlines the primary use cases of the system categorized by user roles.

A diagram of a person

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B) Brief Use Case Descriptions

* Summary of each key use case and its associated user/actor.

|  |  |  |
| --- | --- | --- |
| Use Case | Actor | Description |
| Book Appointment | Customer | Schedule an appointment with preferred service and staff. |
| Cancel/Reschedule Appointment | Customer | Modify or cancel existing bookings. |
| Place Service/Product Order | Customer | Order salon services or products for immediate or future fulfillment. |
| Make Payment | Customer | Pay for orders using credit card, cash, or check. |
| Provide Feedback | Customer | Submit reviews and ratings after availing a service. |
| View Order/Appointment History | Customer | View previous appointments and order details. |
| Manage Appointments | Staff | View, update, or cancel customer appointments. |
| Process Service/Product Orders | Staff | Fulfill and update status of incoming service or product orders. |
| Update Availability | Staff | Modify their available working hours or shift details. |
| Manage Inventory | Staff | Update product/service stock levels. |
| Assist with Payment Processing | Staff | Support customers in completing in-store payments. |
| Manage Users | Administrator | Oversee customer and staff accounts and their access roles. |
| Manage Services & Products | Administrator | Add, update, or remove services and inventory items. |
| Manage Promotions | Administrator | Create or update promotional offers linked to services or products. |
| Generate Reports | Administrator | Generate business reports and summaries using Power BI. |
| Monitor System Performance & Security | Administrator | Ensure secure access and system performance through audits and controls. |

C) Entity Relationship Diagram (ERD)

* Shows all tables and relationships in the system, including Customers, Appointments, Services, Orders, and Payments.

A computer screen shot of a computer diagram

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D) Prototype Screens – Signup & Login

* Signup and Login Screens (Power Apps)
* Shows how customers register and log into the system securely.

A close-up of a hand

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A screenshot of a website

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E) Main Screen – Beauty Salon Scheduler (Power Apps Interface)

**Description:** This is the main screen of the Beauty Salon Scheduler application developed using Microsoft Power Apps. It serves as the central hub for user interaction, allowing customers to:

* Book or view appointments
* Place service orders
* View or add customer details
* Access order history
* Make payments for appointments and services

A beauty salon website with makeup brushes and flowers

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F) Appointment Booking Interface

* Demonstrates customer interaction with the appointment scheduling form.

A screenshot of a beauty website

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G) Book Appointment Details Screen

* This screen displays the **details of a successfully booked appointment** in the Beauty Salon Scheduler app. It provides essential appointment information to the user.

A close-up of a product

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H) Edit Appointment Form Screen:

* This screen allows customers to **reschedule or modify** existing appointments with flexibility and ease.

A screenshot of a appointment form

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I) Service Order: Service Order Selection Screen

* This screen allows customers to browse available salon services and place service orders. It acts as a service catalog and entry point into the order workflow.
* Improves usability by giving customers a quick and visual way to explore available treatments and book instantly.

A screenshot of a service

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J) Review Service Order Screen (Power Apps)

* This screen is part of the customer’s journey to confirm service details before placing an order. It enhances clarity and user control in the service ordering process.
* This screen prevents order errors and improves customer satisfaction by offering a clear, final confirmation before payment.

A close up of a makeup brush

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K) Payment Screens

* This screen enables customers to complete their payment using the selected method (Credit Card, Cash, or Check). The form dynamically displays relevant fields based on the payment option chosen.

A screenshot of a computer

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A screenshot of a login box

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A screenshot of a computer

AI-generated content may be incorrect.L) Admin Dashboard (Power BI)

* The Admin Dashboard provides a centralized, visual overview of key business metrics. It supports strategic decision-making with real-time insights and is developed in **Microsoft Power BI**. It contains four critical analytics charts:

A screenshot of a computer

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