

## DEVELOPMENT OF AN ONLINE CLIENT BOOKING TOOL FOR SMALL SERVICE BUSINESSES

Khoshaba Oleksandr Myroslavovych, Associate Professor of the Department of Software Engineering, Candidate of Technical Sciences, Associate Professor, Vinnytsia National Technical University, pzmag2022@gmail.com

Osadchuk Oleksandr Vitalyovych, student of the group 3PI-22b, Department of Software Engineering, Vinnytsia National Technical University, pzmag2022@gmail.com

**Анотація.** У тезах представлено програмний засіб онлайн-запису клієнтів на послуги для малого сервісного бізнесу (салони, майстерні, студії). Система надає клієнту веб-інтерфейс для вибору послуги, майстра та вільного часу з урахуванням тривалості й перерв між записами. Для бізнесу реалізовано кабінет адміністратора з керуванням розкладом, переліком послуг, тарифами та робочими змінами персоналу. Передбачено автоматичні підтвердження, нагадування та можливість скасування або перенесення запису із контролем правил і штрафів. Алгоритми перевірки доступності запобігають накладанню слотів, а журнали подій забезпечують прозорість змін у розкладі. Запропоноване рішення зменшує кількість телефонних звернень, підвищує завантаження майстрів і покращує клієнтський досвід.

**Abstract.** This paper presents an online booking tool for small service businesses, such as salons, workshops and studios. Clients can self-book by selecting a service, a staff member and an available time slot calculated from service duration and buffer rules. On the business side, an administrative workspace supports service catalogue management, staff schedules, working shifts and capacity planning. Automated confirmations and reminders reduce no-shows, whilst rescheduling and cancellation follow configurable policies. Availability checks prevent overlapping appointments and maintain data consistency under concurrent bookings. The proposed solution streamlines customer communication and improves utilisation of specialists through a unified timetable view.

## **1. Introduction.**

Small service businesses often manage appointments via phone calls, social media messages and paper diaries. This approach leads to missed calls, double bookings and limited visibility of staff workload. Online self-booking has become an expected customer convenience, yet many small teams need a lightweight, affordable tool that still enforces scheduling rules and provides operational control.

## **2. Aim and functional requirements.**

The aim of the project is to design and implement software that enables customers to book services online and enables the business to manage timetables and staff utilisation. Core requirements include: a public booking page; a service catalogue with durations and prices; staff profiles and working hours; a rule engine for buffers and blocked periods; booking creation, rescheduling and cancellation; notifications; and analytics for load and demand. Non-functional requirements focus on usability, responsiveness on mobile devices, and protection of personal data.

## **3. Data model and scheduling logic.**

The system stores entities for services, staff members, working shifts, appointments and customers. Each appointment reserves a continuous time interval derived from the service duration, optionally extended with a pre- or post-service buffer. Availability is computed by intersecting staff working shifts with existing appointments and exclusions (breaks, holidays, maintenance). To avoid race conditions under concurrent requests, booking is performed as an atomic transaction with a final conflict check before commit.

## **4. Customer booking flow.**

The client interface provides step-by-step selection of service, preferred staff member and date. Available slots are generated in real time, filtered by business rules (minimum notice, maximum lead time) and by staff capacity. After entering contact details, the customer receives a confirmation and can manage the appointment via a secure link. Optional deposit support can be introduced to decrease no-shows in high-demand services.

## **5. Business workspace and workload management.**

Administrators configure services, assign them to staff members and define working shifts. A unified calendar shows bookings per day and per employee, supporting drag-and-drop rescheduling and quick creation of offline appointments. Operational controls include block-out periods, overbooking prevention, and appointment tagging by channel. Audit logs record schedule changes, enabling accountability and dispute resolution.

## **6. Notifications and reporting.**

The notification subsystem sends confirmations, reminders and status updates via email and, when integrated, messaging platforms. Reminder timing is configurable to match service context, for example, 24 hours and 2 hours before a visit. Reporting provides monthly statistics on the number of bookings, cancellation rate, peak hours, and utilisation by staff member. These metrics support decisions on staffing, extended hours and promotional campaigns.

## **7. Testing and conclusions.**

Functional testing covers slot generation, conflict prevention, rescheduling rules, and notification delivery, including edge cases such as shift changes and overlapping buffers. The MVP demonstrates reduced manual coordination and improved transparency into staff load through a single timetable source of truth. Future development includes integration with payment gateways, multi-location support, and advanced demand forecasting.