Project Proposal: Smart Hostel Laundry Management System

1. Project Title:

Smart Hostel Laundry Management System (SHLMS)

2. Problem Statement:

In most student hostels, laundry services are handled manually. This leads to a number of challenges including lack of transparency, item misplacement, disputes over extra charges, inconsistent pickup/return schedules, and poor record-keeping. There's a clear need for a smart, digital solution to manage weekly hostel laundry operations efficiently.

3. Objective:

To design and build a smart, scalable, and user-friendly MERN stack web application for hostel laundry management that allows:

- Students to submit laundry requests, select items, and track their status.
- Staff to manage weekly pickups, monitor extra items, and update payments.
- Admins to oversee multiple hostels, analyze reports, and manage settings.

4. Target Users:

- Hostel Students
- Laundry Staff
- Hostel Admins

5. Key Features:

1. Multi-Hostel Support:

- Each hostel has its own laundry policies, limits, and schedules.
- Admin dashboard to manage hostels.

2. Weekly Submission System:
- Fixed pickup/return days with dynamic scheduling.
- Students submit clothing type and count within allowed limits.

3. Extra Items with Charges:
- If students exceed the allowed items, charges are auto-calculated.
- Items outside the listed types (e.g., towel, sweater) are treated as "extra" with cost.

4. Two-Way Communication:
- Students and staff can both view weekly submissions and status.

5. QR Code Bag Tracking:
- Each laundry submission is assigned a QR code.
- Staff scan to verify pickups/returns.

6. Smart Payment System:
- Razorpay or Stripe integration.
- Students can pay directly.
- Staff mark items as paid after confirmation.

7. Real-Time Notifications:
- Email or SMS updates on pickup, return, charges, and payment.

8. Damage/Missing Item Reporting:

- Staff can log issues before return.

- Student notified instantly.

9. Analytics Dashboard:

- Admin/staff see clothes count, top users, revenue from extra charges.

- Weekly downloadable reports (CSV/PDF).

10. Reward System:

- Students earn credits after multiple paid washes.

- Encourages app engagement.

11. Progressive Web App (PWA):

- Mobile-friendly and installable like a native app.

6. Technology Stack:

- Frontend: React.js, SCSS, PWA features

- Backend: Node.js, Express.js

- Database: MongoDB

- Authentication: JWT + Role-based Access

- QR Generation: qrcode.react or qrcode npm

- Notifications: Nodemailer (email), Twilio (SMS)

- Payment Gateway: Razorpay or Stripe

- Hosting: Vercel (Frontend), Render/Heroku (Backend), MongoDB Atlas

7. System Modules:

- User Module: Student and staff login, profiles, role-based access

- Laundry Module: Submission, QR code, status updates

- Admin Module: Hostel config, reports, charge policies

- Payment Module: Online payment, webhook verification

- Notification Module: Triggers on status change

8. Database Models (Simplified):

- User:

  - name, email, password, role, hostelId, balance, rewards

- Hostel:

  - name, address, pickupDays, returnDays, clothLimit, extraCharges

- LaundrySubmission:

  - studentId, weekNumber, clothes, extraItems[], pickupDate, returnDate, status, qrCode

9. Project Roadmap:

| Phase | Task |

|-------|------|

| Phase 1 | Auth, Student form, Staff dashboard |

| Phase 2 | QR integration, Extra item tracking, Payment |

| Phase 3 | Reports, Notifications, Reward system |

| Phase 4 | Admin panel, Multi-hostel support, Final polish |

10. Future Scope:

- AI-based cloth recognition (photo upload)

- Android/iOS native app

- Multi-language support

- Vendor outsourcing module

11. Conclusion:

This Smart Hostel Laundry Management System brings automation, transparency, and digital efficiency to a traditionally manual process. With its scalable design and real-world utility, it is suitable for deployment in hostels, PGs, and even college campuses. Its feature set makes it a strong candidate for future business expansion or productization.

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