Medalyze: Deliverable #4 – User Interface Design

1. Introduction

This document presents the User Interface Design for Medalyze as required for Deliverable #4. It builds on the analysis artifacts created in previous deliverables, specifically use case diagrams, system sequence diagrams, and activity diagrams.
The goal is to design the user and system interfaces supporting the five selected core use cases and produce the menu structure, storyboards, and system output designs.

2. Identification of Interfaces

2.1 Selected Core Use Cases

The system contains many use cases. The following five core use cases were selected due to their importance and frequency:

1. Book Appointment
2. View Electronic Health Record (EHR)
3. Issue Prescription
4. Manage Billing and Payments
5. View Doctor Schedule

These use cases involve the primary user categories: Patients, Doctors, and Administrators.

2.2 Identification of User Interfaces

The table below lists all user interfaces required to support the five selected use cases.

Table: User Interfaces

Use Case	Required User Interface
Book Appointment	Login Page, Patient Dashboard, Appointment Booking Page, Appointment Confirmation Page
View EHR	Login Page, Patient Dashboard, EHR Viewer Page
Issue Prescription	Login Page, Doctor Dashboard, Prescription Entry Page, Prescription Review Page
Manage Billing and Payments	Login Page, Patient Dashboard, Billing Summary Page, Payment Details Page
View Doctor Schedule	Login Page, Doctor Dashboard, Schedule Overview Page

This represents the complete set of screens prior to applying UI design principles.

2.3 Identification of System Interfaces

System interfaces describe the interactions between Medalyze and external systems or databases.

Table: System Interfaces

Interface Type	Description	Inputs/Outputs
Database Interface	Reads/writes patient records, appointments, EHR data, prescriptions, billing info	CRUD operations on Patients, Doctors, Appointments, Records, Prescriptions, Bills
Pharmacy System Interface	Sends electronic prescriptions to pharmacies	Output: Prescription data package
Insurance System Interface	Sends claims or receives verification data	Output: Billing claim file, Input: Verification result

Notification System	Sends automated reminders and updates	Automated output: Email/SMS notifications
Authentication System	Validates login credentials	Input: Username/password, Output: Token/session data

These interfaces are derived from system sequence diagrams and activity diagrams.

3. User Interface Design

3.1 Menu Design

3.1.1 Use Case Grouping Table

Use cases are grouped based on user roles, task type, and frequency.

User Role	Menu Category	Included Use Cases
Patient	Appointments	Book Appointment
Patient	Medical Records	View EHR
Patient	Billing	Manage Billing and Payments
Doctor	Schedule	View Doctor Schedule
Doctor	Prescriptions	Issue Prescription
Administrator	Reports	System Reports (derived from D4 system output tasks)

3.1.2 Menu Hierarchy and Navigation Structure

Top-Level Menu Structure

1. Patient
    a. Dashboard
    b. Appointments
        i. Book New Appointment
        ii. Upcoming Appointments
    c. Medical Records
        i. View EHR

    d. Billing
        i. Billing Summary
        ii. Payment History
2. Doctor
    a. Dashboard
    b. Schedule
        i. Daily Schedule
        ii. Weekly Schedule
    c. Prescriptions
        i. Create Prescription
        ii. Sent Prescriptions
3. Administrator
    a. Dashboard
    b. Internal Reports
    c. External Reports
4. Common
    a. Login
    b. Logout

A navigation tree diagram will be included in the final PDF, based on this hierarchy.

3.2 Storyboards

3.2.1 Storyboard Template

Storyboard Frame Structure (Textual Format):

- **Frame Number:**
  (Number each frame sequentially, e.g., Frame 1, Frame 2...)
- **Screen / UI State:**
  Name of the screen the user sees.
- **User Action:**
  What the user does (e.g., clicks, enters data, navigates).
- **System Response:**
  What the system shows or returns immediately after the action.
- **Data Elements Displayed:**
  List of important fields shown on the screen based on domain model.

- **Alternative / Exception (if any):**
  What happens if validation fails or an alternate path occurs.

3.2.2 Storyboards for Selected Use Cases

Below are complete textual storyboard descriptions.

Storyboard 1: Book Appointment

Frame 1
Screen: Patient Dashboard
User Action: Selects "Appointments" → "Book New Appointment".
System Response: Loads the appointment booking interface.
Data Elements Displayed: Doctor dropdown, Specialty filter, Date picker, Time slots section.

Frame 2
Screen: Appointment Booking Screen
User Action: Patient selects a doctor and a desired consultation type.
System Response: System fetches the doctor's available dates.
Data Elements Displayed: List of available dates.

Frame 3
Screen: Available Dates
User Action: Patient selects a date.
System Response: Time slots for that date appear.
Data Elements Displayed: Available time slots, unavailable slots are grayed out.

Frame 4
Screen: Time Slot Selection
User Action: Patient selects a time slot and clicks "Confirm Appointment".
System Response: System checks availability and validates the selection.

Frame 5
Screen: Confirmation Status

User Action: Patient waits.
System Response:

- If available → Booking is confirmed, confirmation number shown.
- Notification sent to patient (email + in-app).
  Alternative:
- If unavailable → System displays error and shows alternative time slots.

Frame 6
Screen: Appointment Summary
User Action: Patient views final appointment details.
System Response: Displays date, time, doctor name, location, and cancellation policy.

Storyboard 2: View EHR

Frame 1
Screen: Patient Dashboard
User Action: Clicks "Medical Records" → "View EHR".
System Response: Loads EHR overview.

Frame 2
Screen: EHR Overview
User Action: Scrolls through list of medical visits and lab results.
System Response: Displays grouped records by date.

Frame 3
Screen: Lab Results List
User Action: Chooses "Lab Results".
System Response: Displays all lab test results with:

- Date
- Test type
- Status (Available / Pending)
- Abnormal values highlighted

Frame 4
Screen: Lab Result Details
User Action: Opens a specific test result.

System Response: Shows detailed values, reference ranges, doctor comments.
Alternative:

- If abnormal → System displays advisory "Please consult your doctor".

Frame 5
Screen: Notifications
User Action: Patient checks notifications.
System Response: If new result uploaded → "New Lab Result Available" notification appears.

Storyboard 3: Issue Prescription (Doctor)

Frame 1
Screen: Doctor Dashboard
User Action: Selects "Prescriptions" → "Create Prescription".
System Response: Shows patient search interface.

Frame 2
Screen: Patient Search
User Action: Doctor enters patient name/ID.
System Response: Displays matching patient profiles.

Frame 3
Screen: Patient Profile Summary
User Action: Doctor selects patient.
System Response: Opens prescription form with patient data loaded.

Frame 4
Screen: Prescription Form
User Action: Doctor enters:

- Medication
- Dosage
- Duration
- Notes

System Response: Validates the entered fields.

Frame 5
Screen: Review Prescription
User Action: Doctor clicks “Send to Pharmacy”.
System Response:

- Prescription is transmitted to pharmacy dashboard.
- Patient receives notification.
- Prescription is logged in patient EHR.

Frame 6
Alternative Path (Inventory Issue)
Screen: Pharmacy Response
User Action: Pharmacy marks “Out of Stock”.
System Response: System notifies doctor and suggests alternative medications.

Storyboard 4: Manage Billing and Payments

Frame 1
Screen: Patient Dashboard
User Action: Navigates to “Billing” → “Billing Summary”.
System Response: Displays financial overview.

Frame 2
Screen: Billing Summary
User Action: Clicks on a pending invoice.
System Response: Shows invoice details:

- Service
- Doctor
- Charge
- Insurance coverage
- Amount due

Frame 3
Screen: Payment Options
User Action: Clicks “Pay Now”.
System Response: Displays available payment methods (card, wallet, insurance).

Frame 4
Screen: Payment Processing
User Action: Enters card details and clicks “Complete Payment”.
System Response:

- Processes payment
- Shows success message
- Sends receipt via email

Frame 5
Alternative Path:
Payment fails → System displays an error and requests retry.

Storyboard 5: View Doctor Schedule

Frame 1
Screen: Doctor Dashboard
User Action: Selects “Schedule” → “Daily Schedule”.
System Response: Loads today’s appointments list.

Frame 2
Screen: Daily Schedule
User Action: Doctor scrolls through patient appointments.
System Response: Shows time slots, patient names, visit types.

Frame 3
Screen: Weekly Schedule
User Action: Switches to “Weekly View”.
System Response: Shows a grid layout of the entire week.

Frame 4
Screen: Appointment Details
User Action: Doctor clicks a specific booked slot.
System Response: Opens patient summary (name, medical history preview, notes).

Frame 5
Screen: Notifications

User Action: Doctor checks updates.
System Response: Shows:

- Appointment changes
- Cancellations
- New bookings

4. System Interface Output Design

4.1 Internal System Outputs

The following internal reports are generated inside Medalyze for administrative monitoring and system management. These outputs support internal decision-making but are not shared with external entities.

Internal Report 1: Appointment Statistics Dashboard

Purpose: Provide administrators with a real-time overview of appointment activity across all doctors.

Contents:

- Total number of appointments (per day / week / month)
- Upcoming appointments grouped by doctor
- Cancellation count and cancellation rate
- No-show rate
- Trend graph (last 30 days)

Format:

- Web-based dashboard + downloadable PDF summary
- Includes filters for date range, doctor, specialty, and branch

Target User:

- System Administrators

Triggers / Source Data:

- Appointment Management Module
- Real-time database queries (Appointments, Doctors)

Internal Report 2: System Activity & Audit Log

Purpose: Track all major system interactions for auditing and security.

Contents:

- Timestamp
- User ID and role
- Activity type (login, record viewed, data updated, prescription issued)
- Affected patient or resource ID
- Result (success, failure)

Format:

- Chronological log view with pagination
- Exportable CSV or PDF
- Includes search and filtering (user role, activity type, date)

Target User:

- Administrators and Compliance Officers

Triggers / Source Data:

- Authentication System
- EHR updates
- Prescription transmissions
- Billing updates

4.2 External System Outputs

These outputs are shared with external healthcare stakeholders and follow standardized data formats to support interoperability.

External Report 1: Insurance Claim Export File

Purpose: Submit patient billing claims for insurance verification and processing.

Contents:

- Patient ID, name, insurance provider
- Visit date and service codes (ICD / CPT style)
- Procedure description
- Total charge, covered amount, patient share
- Claim reference number

Format:

- Structured digital export (JSON or XML)
- Follows insurance system exchange format

Destination:

- Insurance Verification System (external)

Trigger Events:

- Patient completes payment
- Billing cycle generation
- Administrator initiates batch export

External Report 2: Electronic Prescription Package (E-RX Export)

Purpose: Transmit prescriptions electronically to partnered pharmacies.

Contents:

- Prescription ID
- Doctor ID, name, license number
- Patient ID, name, age
- Medication name, dosage, frequency, duration
- Special instructions

- Digital signature hash
- Timestamp

Format:

- JSON-formatted E-Prescription payload
- Conforms to pharmacy integration requirements

Destination:

- Partner Pharmacy System

Trigger Events:

- Doctor selects **“Send to Pharmacy”** in the UI
- System validates medication fields
- Prescription stored in EHR and pushed to pharmacy

5. Assumptions

1. External system integrations (pharmacy, insurance) are conceptual only.
2. Figma UI screens will follow the structure defined in this document.
3. Notifications are handled by an external service assumed to be always available.
4. All users access Medalyze through a web-based interface.
5. Appointment availability is pre-loaded into the system.

6. Conclusion

Deliverable #4 defines the user interface design for Medalyze through interface identification, menu structuring, storyboards, and system output design. These artifacts connect the analysis phase with the prototype UI work to be completed in Figma. The result is a cohesive structure guiding interface implementation in later development.