



**An-Najah National University**  
**Faculty of Engineering and Information Technology**  
**Department of Computer Engineering**

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# **T U R A T H I**

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This report is submitted in partial fulfillment of the requirements for the degree of  
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# **Disclaimer**

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# Abstract

In a time when globalization, modernization, and political challenges threaten the survival of cultural identities, preserving heritage has never been more urgent. Palestinian heritage—rich with traditions, stories, and artistry—is at risk of being forgotten. Countless elements, from historical landmarks to folklore, are in danger of fading away with each passing generation.

Turathi is a comprehensive mobile application and website designed to protect, promote, and celebrate the richness of Palestinian culture. By harnessing the power of modern technologies such as Artificial Intelligence (AI) and Augmented Reality (AR), Turathi offers users an immersive platform where the past is not only remembered, but brought vividly to life.

At its core, Turathi offers an interactive experience where users explore traditional Palestinian clothing, food, music, and heritage sites. With AI-powered artifact recognition and AR-based virtual try-ons, the app brings culture to life while deepening personal connections to Palestinian roots.

The app also offers a real-time AI chat assistant that answers cultural inquiries and guides users through the platform. Integrated maps are a cornerstone of the experience—providing live location tracking that allows users to discover nearby heritage-rich locations, such as traditional restaurants, or historic hotels. Additionally, users can rate and review the places they visit, creating a community-driven database of experiences that help others navigate and appreciate their cultural surroundings.

Turathi includes a dedicated map of destroyed and depopulated Palestinian villages, offering historical context, detailed narratives, personal narratives, and updates on their current state—offering a powerful reminder of heritage, loss, and resilience across generations.

Turathi fosters active community participation by allowing users to share traditional recipes, personal stories, and family artifacts, enriching cultural preservation through lived experiences. Social features like heritage event listings and in-app chat deepen connections and cultural exchange.

To maintain quality and accuracy, Turathi provides an admin dashboard for content management and moderation. It also features a curated collection of Palestinian proverbs, adding cultural richness and poetic insight to the user experience.

By seamlessly combining technology with tradition, Turathi aims not only to archive the past but to inspire a future where Palestinian culture is celebrated, shared, and never forgotten. It is more than an app—it is a living archive, a community, and a bridge between generations.

# Introduction

In a world rapidly reshaped by globalization and modern challenges, the preservation of cultural heritage stands as a vital act of identity and resilience. Palestinian heritage, steeped in centuries of rich traditions, artistry, and history, faces the urgent threat of being diminished or forgotten. Protecting this legacy demands more than memory—it calls for a living, evolving connection between past and present.

Turathi answers this call by blending tradition with innovation, creating a digital sanctuary where heritage is not only preserved but experienced. Through advanced technologies like Artificial Intelligence and Augmented Reality, Turathi invites users to explore and engage with the essence of Palestinian culture—its clothing, cuisine, music, and sacred sites—in immersive and personal ways.

More than a platform, Turathi is a vibrant community and a bridge across generations, empowering users to share stories, recipes, and memories. It transforms heritage preservation into a dynamic dialogue, ensuring that the soul of Palestinian identity thrives today and into the future.

## Background

Palestinian heritage, rich in history, traditions, and artistry, faces critical threats from globalization, modernization, and political challenges. These pressures risk disconnecting new generations from their roots as historical sites decline and cultural knowledge fades.

To address this, innovative digital solutions are essential. Technologies like Artificial Intelligence and Augmented Reality offer powerful ways to preserve, share, and bring Palestinian culture to life across time and space.

Turathi was created to meet this need—a dynamic platform that combines advanced technology with community engagement to protect and celebrate Palestinian heritage. By capturing traditional clothing, cuisine, music, and historic sites, Turathi empowers Palestinians worldwide to reconnect with their past and keep their culture vibrant for future generations.

## Objectives

The objective of Turathi is to preserve, celebrate, and revitalize Palestinian cultural heritage through an engaging digital experience that seamlessly blends tradition with modern technology. By leveraging AI and AR, the platform allows users to explore traditional clothing, cuisine, music, and heritage sites in immersive, interactive ways. Turathi fosters community participation by enabling users to contribute personal stories, recipes, and family artifacts, ensuring that culture remains a living, evolving narrative. It also serves as an educational resource, reconnecting younger generations with their roots, while features like heritage maps, in-app chat, and curated proverbs deepen cultural understanding and connection. Through a dedicated admin dashboard, content quality and authenticity are carefully maintained, making Turathi not just a platform, but a vibrant archive and a bridge between past, present, and future.

## Scope of the work

- 1. User Account Creation:** Users can register and create personal accounts, allowing them to access exclusive features, contribute content, and receive customized updates.
- 2. AI Interaction & Messaging:** The app integrates smart communication tools powered by AI to enhance user experience. Users can chat directly with an AI assistant for instant help, cultural insights, and platform guidance. They can also privately message other users to coordinate events or share ideas. All messages are automatically screened by AI to ensure respectful, ethical communication that aligns with cultural values. Additionally, users can upload photos of traditional artifacts, which the AI analyzes and describes with historical and cultural context.
- 3. Augmented Reality Try-On:** Users can virtually try on traditional Palestinian clothing using AR technology, enabling immersive interaction with heritage items in real time.
- 4. Cultural Exploration & Content Sharing:** Users can explore detailed sections about traditional food, garments, music, and historical sites. They can also create posts ( recipes ) and submit them to the platform for publication—pending admin approval.
- 5. Palestinian Seasonal Guide:** The app offers a dynamic calendar of traditional Palestinian seasons. It highlights the current season by date and allows users to

explore all months, each enriched with cultural meaning, agricultural importance, and visual elements that reflect the heritage–land connection.

**6. Maps & Location-Based Exploration:** The app features interactive heritage maps combining multiple tools: users can explore depopulated villages, cultural and religious landmarks, and nearby heritage sites based on real-time GPS. Each location includes historical info, visual records, and community ratings. Users can filter by category, switch to a view, check live weather, and even contribute new sites—building a shared archive that preserves Palestinian cultural identity.

**7. Heritage Events & Listings:** Users can browse, RSVP to, and engage with both local and virtual heritage events. Listings help strengthen cultural bonds through community participation.

**8. Curated Proverbs Library:** A specially curated section contains traditional Palestinian proverbs, presented with explanations, reflecting the wisdom, humor, and values of Palestinian society.

**9. Personalized Experience:** The app supports both Arabic and English languages, along with light and dark themes—allowing users to tailor the interface to their language preference and visual comfort.

**10. Admin Dashboard:** The admin panel enables full control over the platform’s content and structure. Admins review and approve user-submitted food posts, with users notified of acceptance or rejection. They can also manage all locations, events, user content, and app settings—ensuring cultural accuracy, security, and alignment with the platform’s heritage-preservation mission.

## **Significance**

Palestinian heritage faces growing risks of loss due to displacement and limited documentation. Traditional practices, sites, and artifacts are often inaccessible or scattered, making it hard—especially for youth and the diaspora—to stay connected to their roots.

This project offers a modern, inclusive platform that preserves and promotes Palestinian culture through AI-powered interaction, AR clothing try-on, smart heritage maps, and community contributions. With bilingual support, real-time communication, and strong admin oversight, the app ensures both cultural integrity and accessibility.

More than a digital archive, it's an evolving space that empowers users to explore, share, and protect Palestinian identity in a meaningful, interactive way.

# **Theoretical Background and Previous Work**

## **Theoretical Background of the project**

This project is built upon the principles of digital heritage preservation and interactive cultural engagement. As Palestinian heritage continues to face risks of erasure and fragmentation, there is an urgent need for accessible, community-driven solutions that safeguard cultural identity. Existing efforts in cultural archiving, such as websites or academic databases, often lack interactivity, inclusivity, or real-time user participation.

This project expands on those limitations by introducing an innovative mobile and web platform that merges AI, AR, geolocation, and user-generated content to create a dynamic cultural space. It draws inspiration from previous digital heritage platforms while advancing the field through real-time interaction, personalized experiences, and multilingual accessibility. By empowering users to explore, contribute, and share, the app transforms passive preservation into active cultural participation—bridging the gap between tradition and technology.

## **Previous similar works**

While several digital initiatives exist to document and preserve cultural heritage, many remain limited in scope, interactivity, or accessibility. Projects like Palestinian Memory, Visualizing Palestine, and cultural archive websites have provided valuable static resources, but they often lack real-time engagement, AI interaction, community-driven contributions, or immersive technologies like AR. Furthermore, these platforms are typically web-based and do not offer mobile-first experiences tailored to both local and diaspora users.

In contrast, this project introduces a comprehensive and interactive solution that combines smart maps, augmented reality, AI-powered artifact recognition, and multilingual support—creating a unique platform with no direct competitor in the Palestinian context. By merging cultural preservation with modern technology and user participation, it offers a novel and engaging approach that builds upon previous efforts while significantly expanding their impact and accessibility.

# Methodology

## Introduction

In this chapter, we outline the technical and procedural methodology employed in the design of Turathi, a cross-platform cultural preservation system that consists of both a mobile application and a web site. The system was developed under the principles of scalability, usability, and cultural sensitivity, utilizing contemporary stacks and cloud services to provide a rich interactive experience.

Turathi is developed and designed with clear separation between regular users and system administrators. While users are able to browse cultural content, engage with media, and provide feedback, administrative tasks like content management and system monitoring are done using a different set of interfaces reserved for administrators. Isolation improves system security and makes functionality straightforward for both user groups.

## **Standards and specifications**

The development of turathi adhered to several established standards and best practices so that the system is up to industry standards regarding quality, security, usability, and accessibility. The standards were chosen to facilitate the project objectives of cultural preservation, inclusiveness, and technological reliability. The main standards and specifications taken into consideration are:

### **1. Security Standards:**

1. Passwords are stored securely using hashing techniques.
2. OTP (One-Time Password) is sent to user emails for account verification.
3. A built-in content filter automatically blocks abusive, offensive, or politically sensitive terms, such as the word "Israel".

### **2. Authentication and Authorization**

1. The application is divided into two separate interfaces: one for regular users and another for administrators, each with its own functionality and access permissions.
2. Authentication tokens (JWT) are used to manage user sessions securely, protect private routes, and verify user identity across all interactions.
3. User authentication is handled via Firebase Authentication, supporting Google and Facebook login.
4. Account verification is required before allowing sign-in and access to main features.

### **3. UI/UX Standards**

1. The UI follows Minimal and User-Friendly Design principles for intuitive navigation.
2. Supports Arabic (RTL) and English (LTR) languages.
3. Provides both Light and Dark themes for better accessibility and user preference.
4. Built with responsive design using Flutter to support all screen sizes and platforms.

#### **4. Code Quality and Architecture**

1. The project follows modular architecture, separating frontend, backend, and database logic.
2. Git was used for version control with clear, structured commit messages and branching strategy.

#### **5. Database Standards**

1. The backend uses MongoDB, designed with flexible NoSQL schema to support dynamic data like food, clothing, historical sites, palestinian proverbs, songs, and events etc.
2. Collections are properly indexed and optimized for fast querying and scalability.

#### **6. Augmented Reality (AR) Standards**

1. Users can try on traditional clothing virtually, with real-time camera integration.
2. AR features follow cross-device compatibility standards for mobile and web.

#### **7. Performance Standards**

1. Images are uploaded and hosted on Cloudinary, to ensure fast loading times.
2. Notifications are sent via Firebase Cloud Messaging (FCM).
3. The app minimizes API calls and avoids unnecessary rendering to ensure fast and smooth performance.

## **Constraints**

Turathi was designed under a number of realistic design constraints that impacted the planning, implementation, and testing process. These constraints were founded on budget constraints, technical issues, availability of data, and experience of the team members, and are explained as follows:

### **Economy:**

Tight budget limited the use of paid APIs and premium features, particularly for interactive maps. We made use of free tiers and open-source tools primarily, which sometimes lacked certain critical functionality.

### **Data Validity and Accessibility:**

Accurate cultural data were limited and dispersed, which needed meticulous verification to confirm truthfulness and avoid false information.

### **Test Challenges:**

Testing AR features and ensuring data consistency across apps with minimal test tools and non-uniform device capabilities was difficult.

### **Technical Learning Curve:**

We faced a technical challenge due to lack of experience with modern technologies such as Flutter, Firebase, and MongoDB, which required additional time to learn during the development process.

### **Ethics and Cultural Sensitivity:**

Being respectful and faithful to the representation of cultural heritage was crucial, and this guided review and content moderation.

### **Sustainability:**

Future upgrades and maintainability were taken into account while designing the system with modular code and proper separation of admin and user applications. These limitations defined the project scope and demanded innovative approaches to provide a stable and culturally appropriate platform.

## Used Technology

1. **The back-end Development:** is built with Node.js, offering a scalable and efficient server environment. Development is carried out using VS Code, while Postman is used to test and validate API endpoints. This stack ensures smooth database interaction, reliable logic handling, and responsive communication between server and client.
2. **The front-end Development:** is developed using Flutter, providing a responsive and engaging interface for both mobile and web platforms via VS Code. Additionally, HTML and JavaScript were used to implement the AR Try-On feature, enabling users to virtually interact with traditional clothing in real time.
3. **Database Management:** The system utilizes MongoDB as its primary database, offering a flexible and scalable NoSQL solution for efficiently storing and managing user data, content, and dynamic application records.
4. **Notification System:** We use Firebase to power real-time chat and push notifications, delivering instant updates both inside and outside the app—ensuring users stay informed and connected at all times.
5. **AI-Powered Features:** We integrated pre-trained AI tools to power key features. Google AI Studio was used for image recognition and chat interaction, while the Groq SDK handled content filtering, bilingual translation, and recipe moderation—ensuring smart, safe, and culturally aware user experiences.
6. **Cloud Storage:** We used Cloudinary to store and manage image uploads, enabling efficient media handling and fast delivery. Images are seamlessly linked to a MongoDB cloud database, ensuring flexible, scalable, and organized data management.

# User Experience Flow – Turathi App

## 1. Onboarding & Welcome Screen

1. When the user opens the app for the first time, a welcoming screen appears that introduces the purpose and spirit of the Turathi project.
2. A prominent button labeled "**Start Exploring**" invites the user to begin.
3. After tapping the button, the user is taken to the Log In screen.

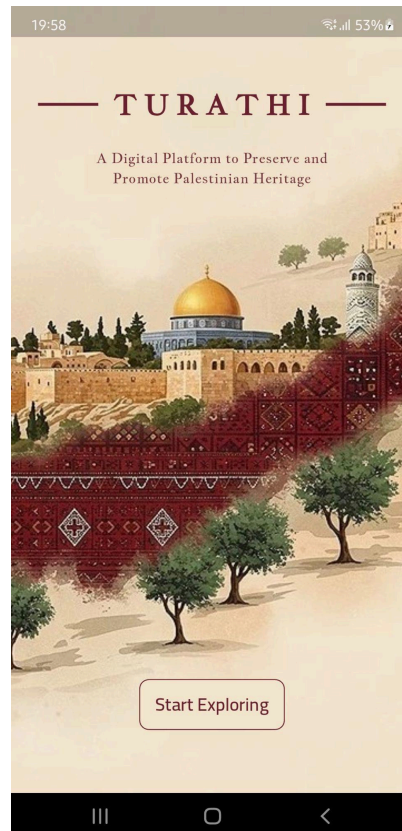


Figure 1: Welcome Screen

## 2. Login Screen

1. The user can log in using:
  2. Email and password.
  3. Or through Google or Facebook (handled via Firebase Authentication).
  4. If the user forgets their password, a "Forgot Password" option is available.
  5. If the user doesn't have an account, they can tap on "Sign Up" to create a new one.
6. Validation & Error Handling:
  - If the **email does not exist** in the system, show: "*Email not found.*"
  - If the **password is incorrect**, show: "*Incorrect password*"

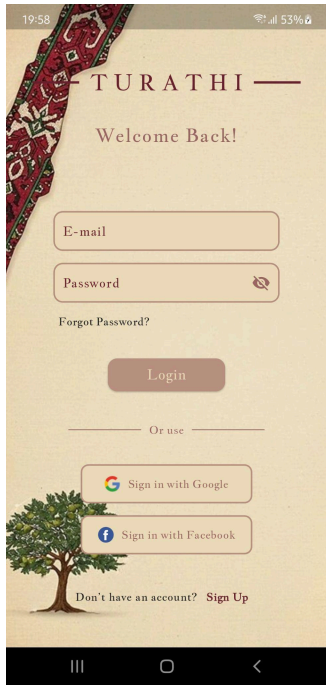


Figure 2: Login Screen



Figure 3: sign in with Facebook

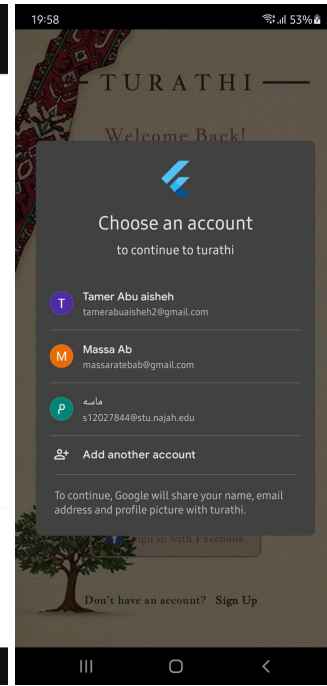


Figure 4: sign in with Google

Identifier	Providers	Created ↓	Signed In	User UID
masa.rateb@hotmail.c...		May 28, 2025	May 31, 2025	ciEVFhLPYbPsBhqU8fAsxWPJ...
massaratebab@gmail.c...		May 13, 2025	Jun 1, 2025	vo02XyPQmXcY7v03SPwhs...

Figure 5: Firebase Authentication

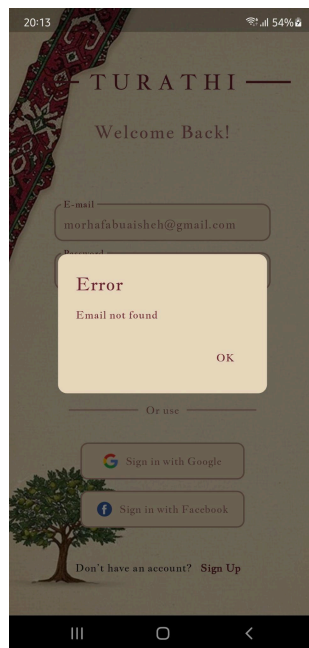


Figure 6: Email not found

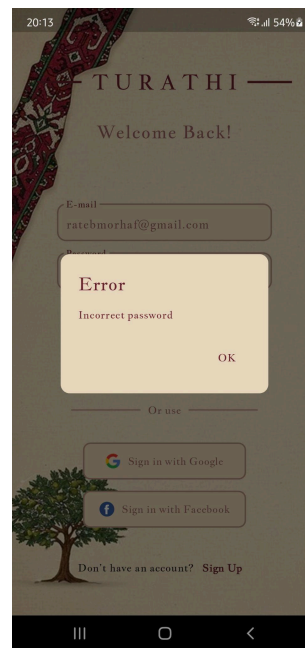


Figure 7: Incorrect password

### 3. Sign up Screen

The user fills in the following information:

1. Username
2. Email address
3. Password

The password is validated according to specific rules:

1. Minimum of 8 characters
2. Must contain at least one uppercase letter
3. Must include a number and a special character

After clicking "Sign Up", an OTP (One-Time Password) is sent to the provided email address for verification.

Validation & Error Handling:

1. If the email format is invalid, an error message is shown: *"Invalid Email format."*

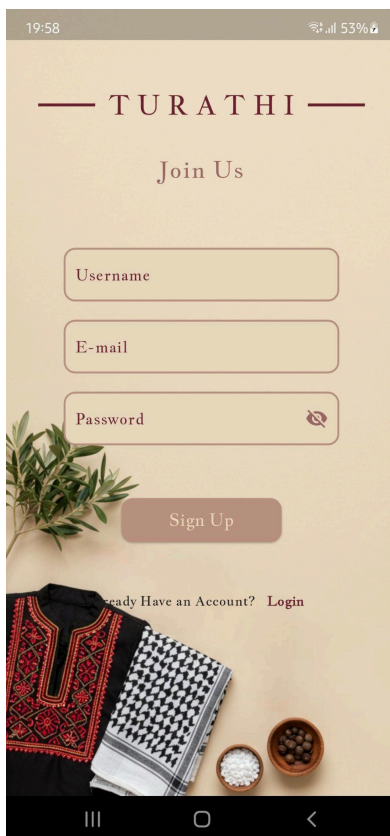


Figure 8: Sign Up Screen

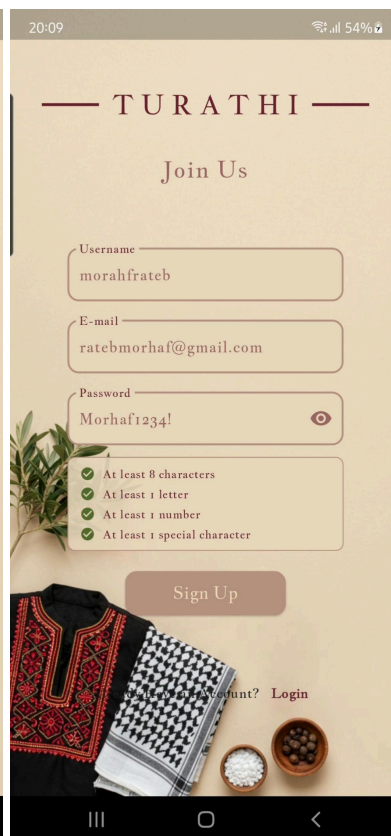


Figure 9: Password Validation Rules

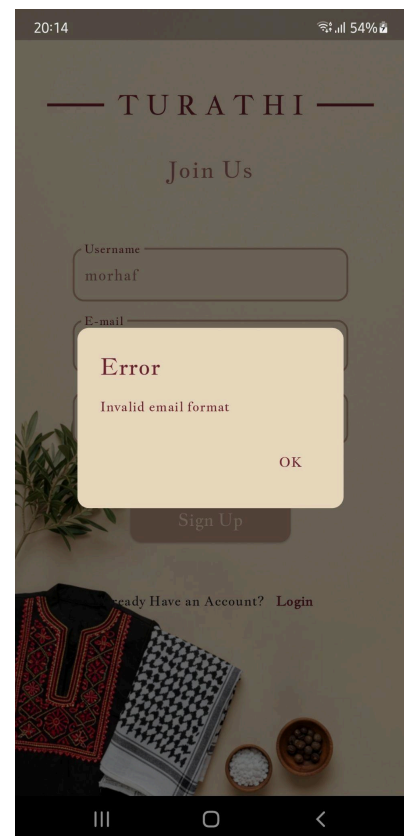


Figure 10: Invalid Email Format

## 4. OTP Verification

1. The user enters the verification code received via email.
2. If the OTP is correct, the account is activated and the user is automatically signed in.
3. If the code is not received, the user has the option to resend the code.

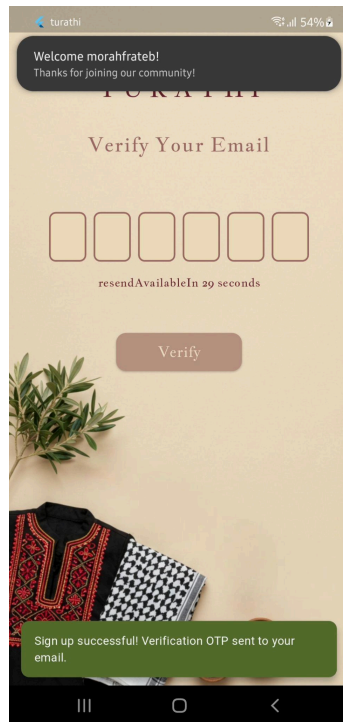


Figure 11: Successful Sign-Up Confirmation

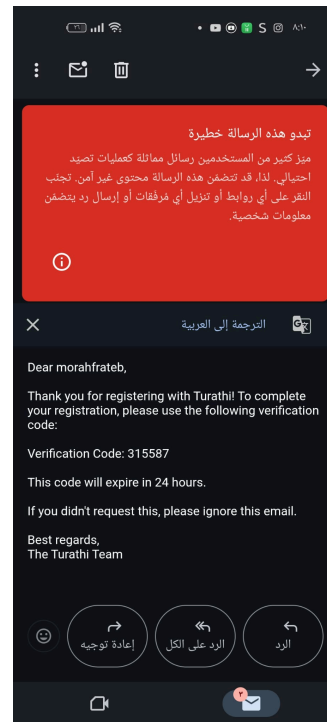


Figure 12: OTP Sent to User's Email for Verification

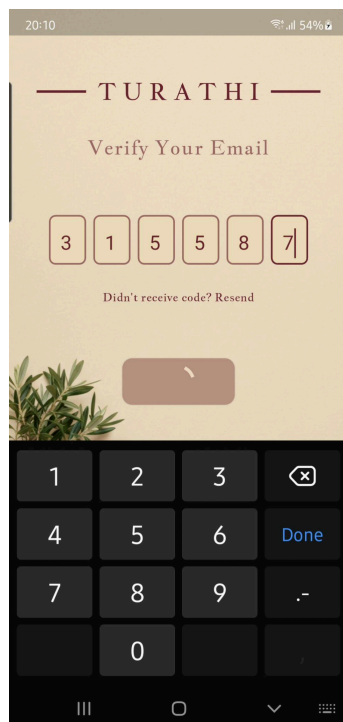


Figure 13: Enter OTP for Email Verification

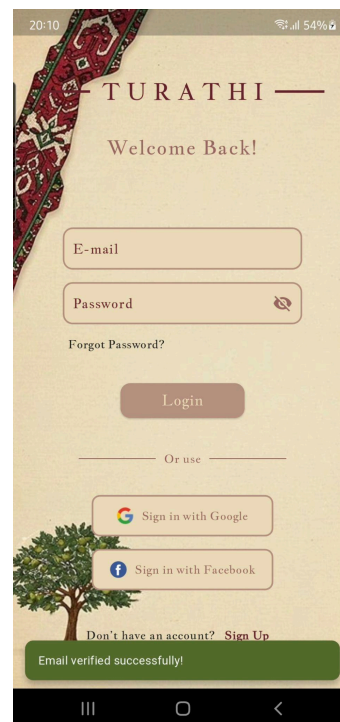


Figure 14: Email Verified Successfully

## 5. Password Reset via OTP

1. The user clicks on "Forgot Password" from the login screen.
2. They are prompted to enter their registered email address.
3. An OTP is sent to the provided email to verify identity.
4. The user enters the OTP and a new password that follows the password validation rules (e.g., minimum 8 characters, at least one capital letter, one number, and one symbol).
5. If the OTP is valid, the password is successfully updated and the user is redirected to the login screen.
6. If the OTP is invalid or expired, an error is shown, and the user can request a new code

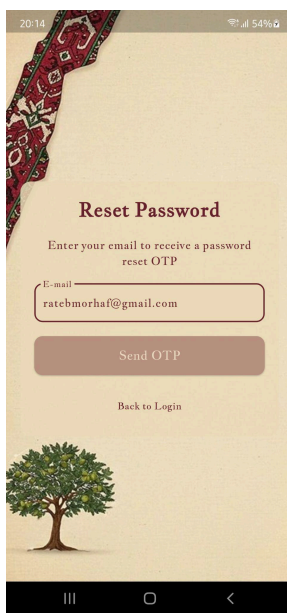


Figure 15: Password Reset – Enter Email

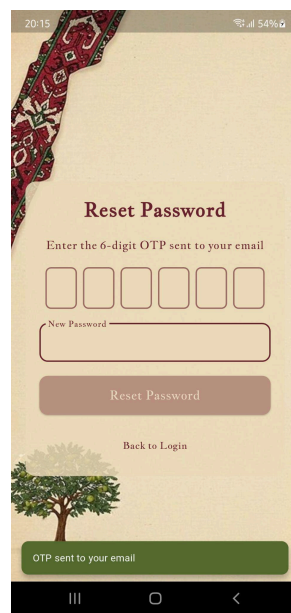


Figure 16: OTP sent

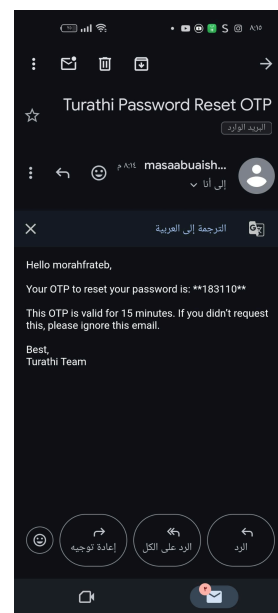


Figure 17: OTP Sent to User's Email for new password

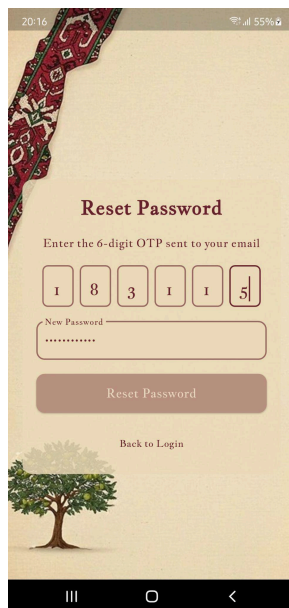


Figure 18: Enter OTP and New Password

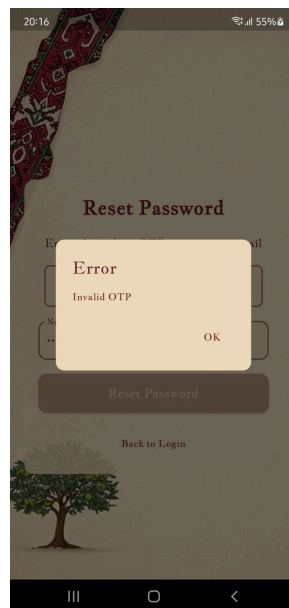


Figure 19: Invalid OTP

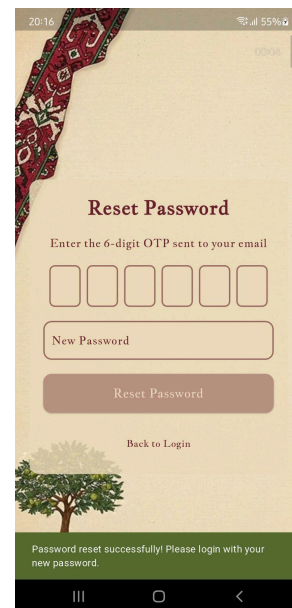


Figure 20: Password Updated

## 6. Profile

In the profile section, users can:

1. View and update their profile picture, name, username, and bio.
2. Tap an Edit Profile button to make changes.
3. Access two main tabs:
  - Saved Items: Displays the user's bookmarked or favourite cultural content.
  - My Posts: Shows cultural posts or recipes submitted by the user.
4. Access two quick icons:
  - Notifications: Opens the real-time alerts.
  - Settings: Navigates to app settings and activity preferences.
5. Users can also add a recipe or cultural post. If approved by the Turathi Team, recipes appear in the Food Section.

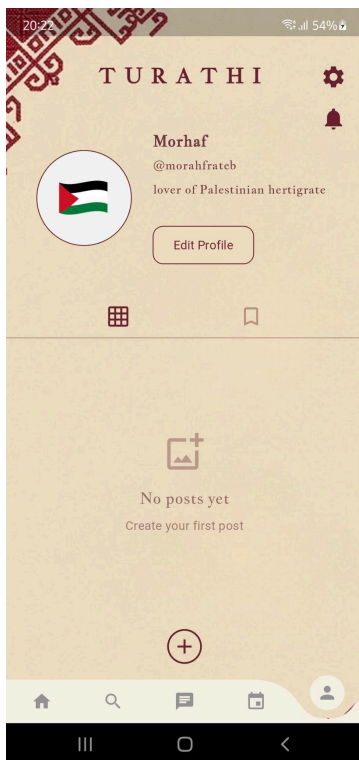


Figure 21: User Profile

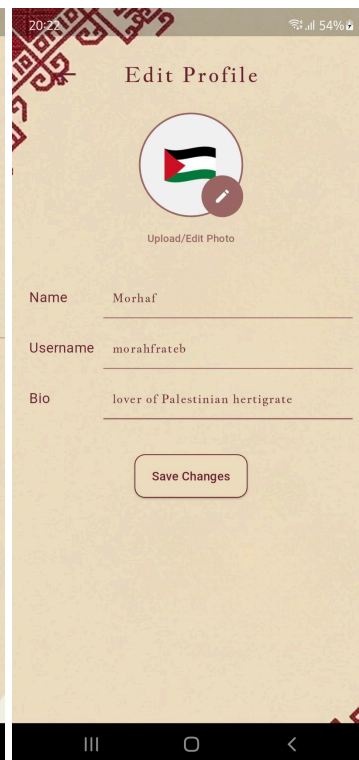


Figure 22: Edit Profile

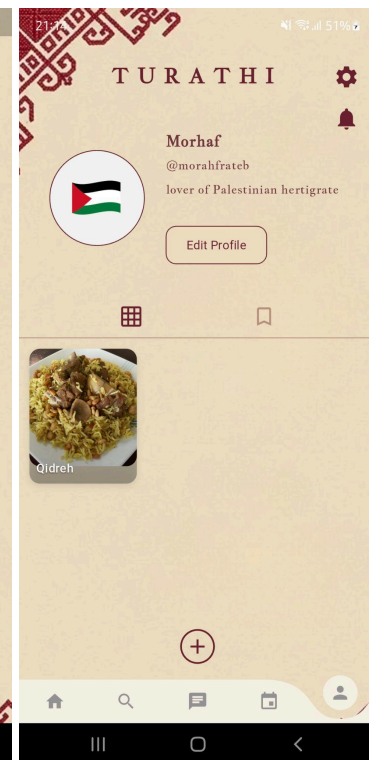


Figure 22.1: My Posts

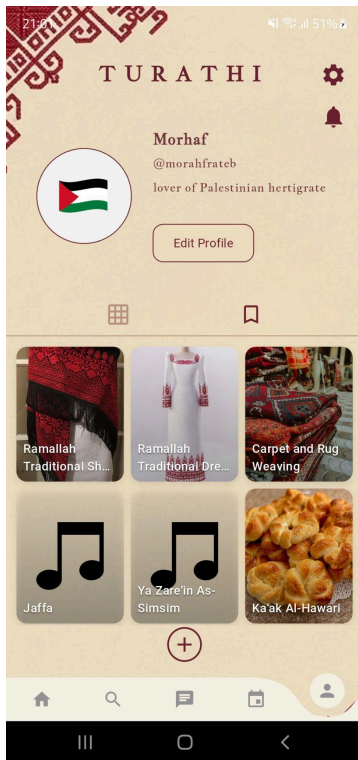


Figure 23: Saved Items

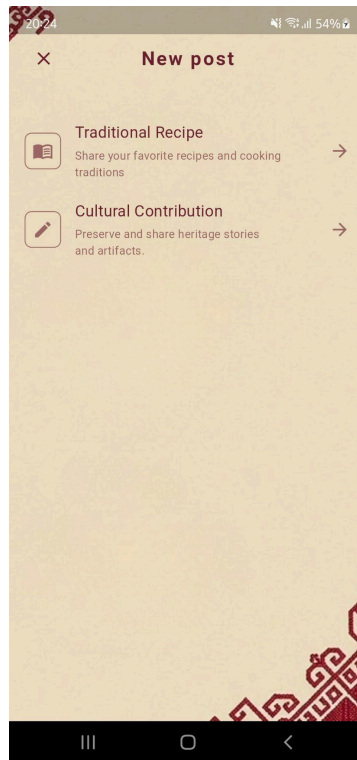


Figure 24: Add New Post - Recipe

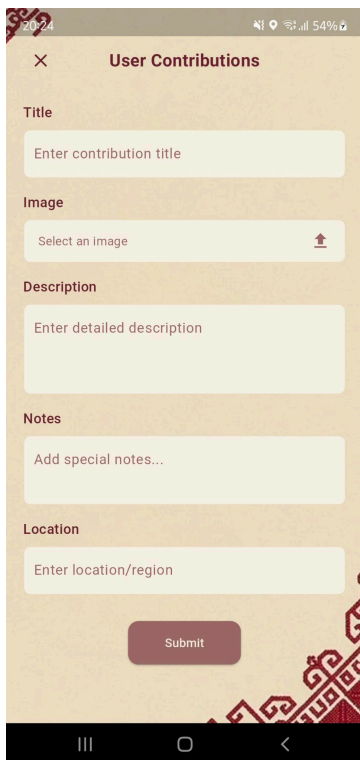
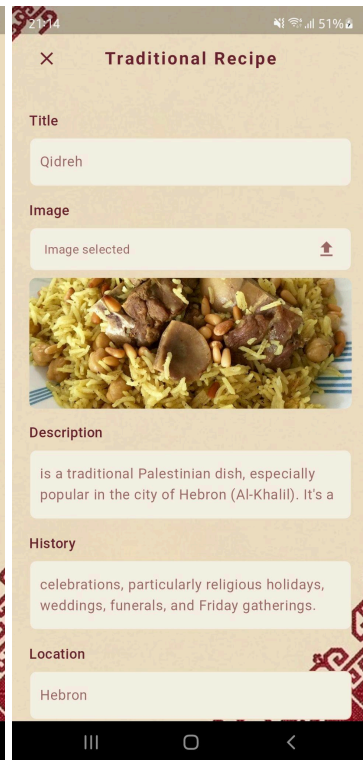


Figure 24.1: Add New Post - User Contributions

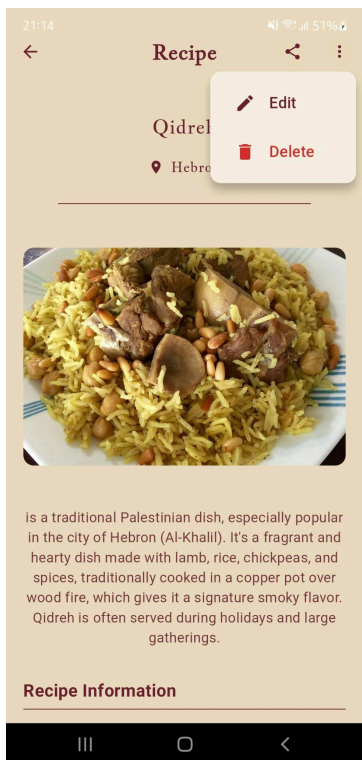
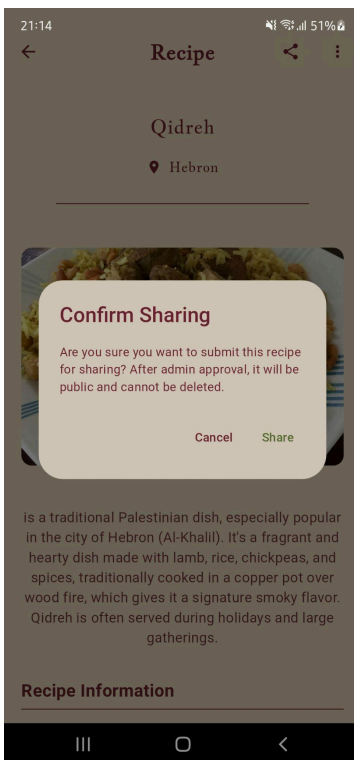


Figure 25: Edit, Delete, or Send Request to Add a Recipe



## 7. Settings & Activity

In this section, users can:

- Switch Themes: Choose between Light (default) or Dark mode.
- Select Language: Default is English, with Arabic as an option.
- Change Password: Requires current and new password inputs.
- Log Out: Securely sign out of the application.

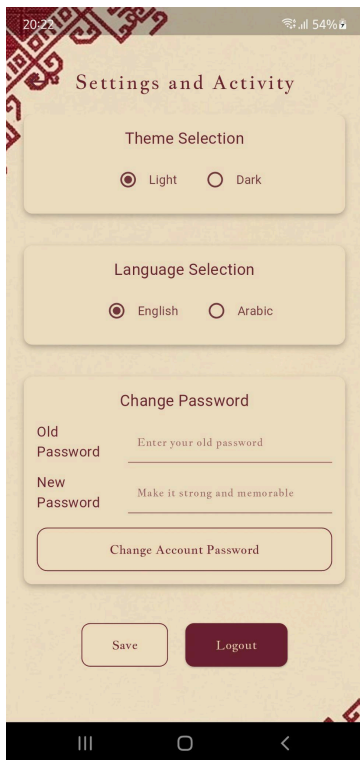


Figure 26: Settings and Activity

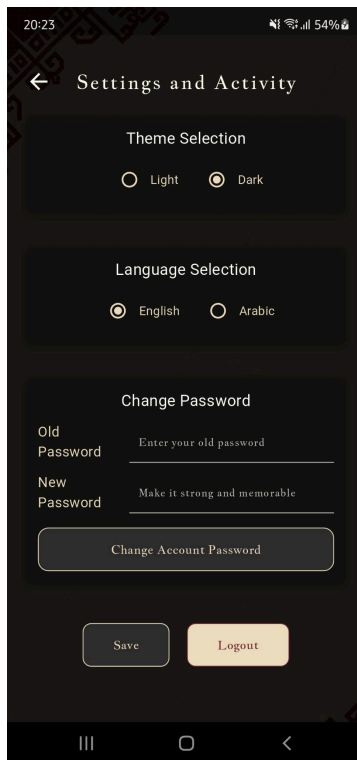


Figure 27: Dark Theme

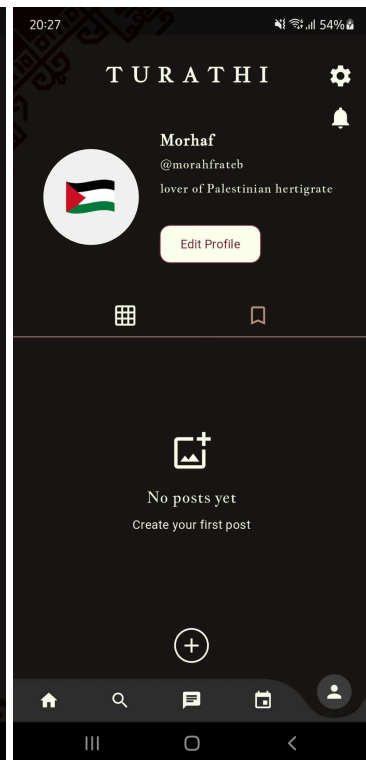


Figure 27.1: Dark Theme

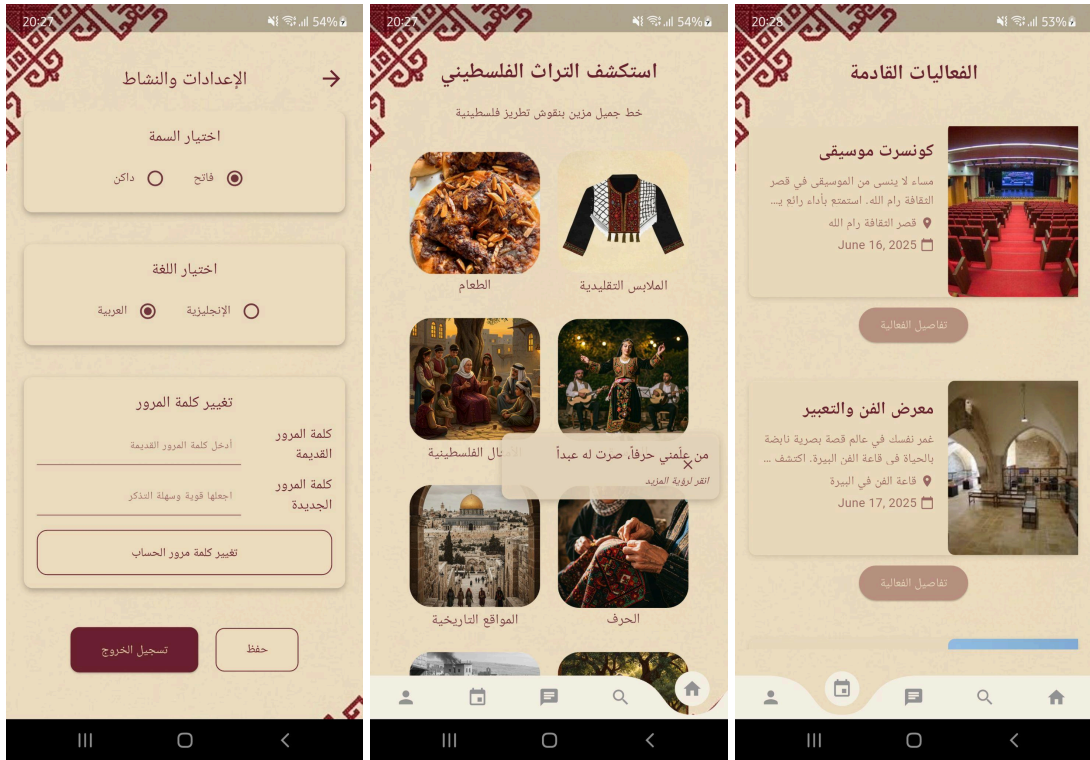


Figure 28: Arabic Language

Figure 28.1: Arabic Language

Figure 28.2: Arabic Language

## 6. Notifications

Notifications are powered by Firebase for real-time updates and include:

- Welcome Messages from the Turathi Team.
- Content Alerts: Updates about newly added items or cultural posts.
- Event Reminders: For events the user showed interest in (notified 3 days, 2 days, and the day of the event).
- Recipe Submission Status: If a user submitted a recipe, they receive updates on its approval status:
  - Under Review
  - Accepted
  - Rejected

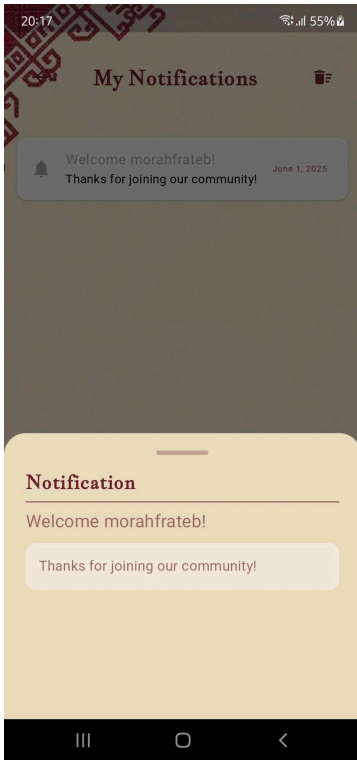


Figure 29: Welcome Notification



Figure 30: Event Reminders

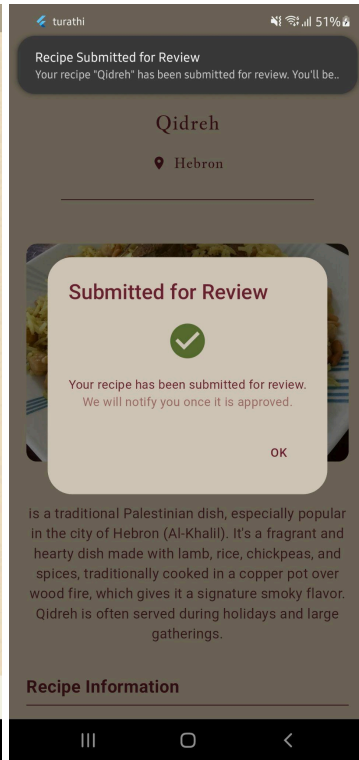


Figure 31: Recipe Submitted

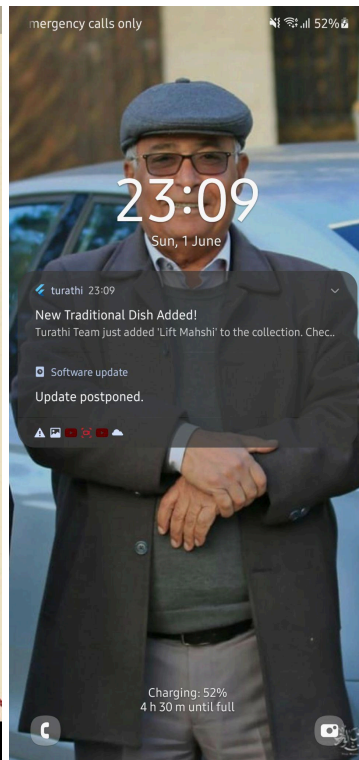
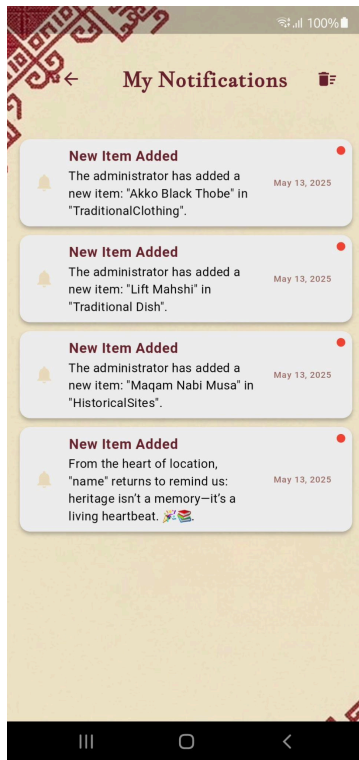
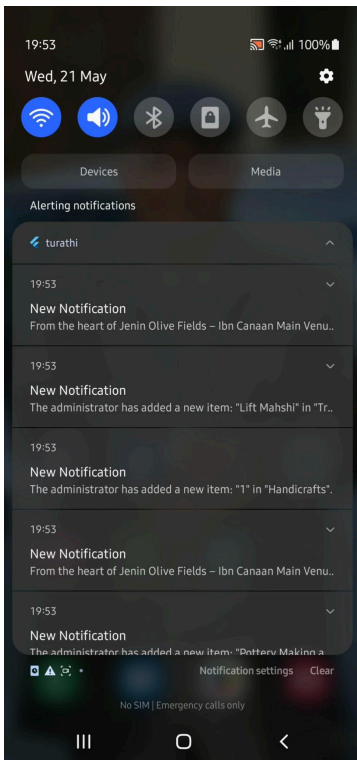


Figure 32: Content Alert

## 8. Main App Experience

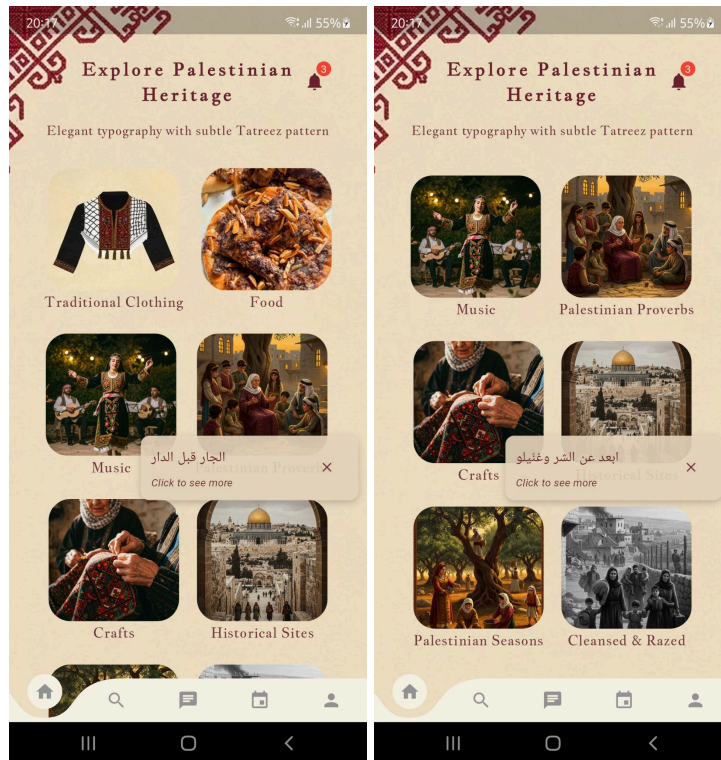


Figure 33: Main App Screen

The user can explore various rich cultural sections, including:

- **Traditional Clothing:**

This section showcases traditional Palestinian garments from various regions, each accompanied by historical context and cultural significance. Users can read detailed descriptions about each dress, including its origin, symbolism, and usage across different events and time periods.

The feature includes an Augmented Reality (AR) "Try-On" experience, which allows users to virtually wear traditional clothing in two interactive ways:

1. **Live Camera Mode:** When granted camera access, the AR system detects and tracks the user's body in real time. It overlays the selected dress and manually adjusts it to fit the user's posture and movement for a natural "try-on" experience.
2. **Fitting Mode (Freeze Frame):** Users can press the "Fitting" button to capture a still image. The app then freezes the camera view and applies the selected dress on the captured frame, allowing for more precise adjustment and easy visualization.

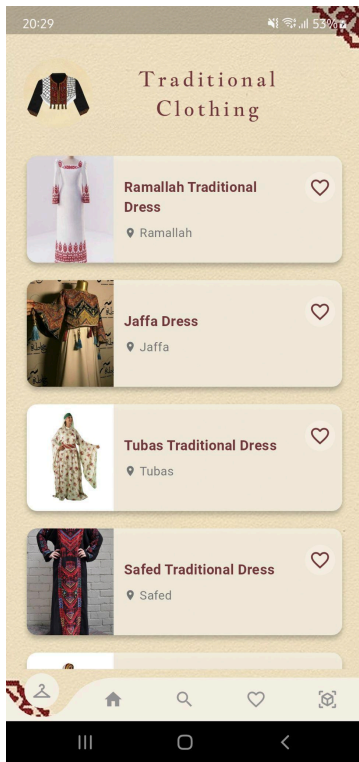


Figure 34: Traditional Clothing Section

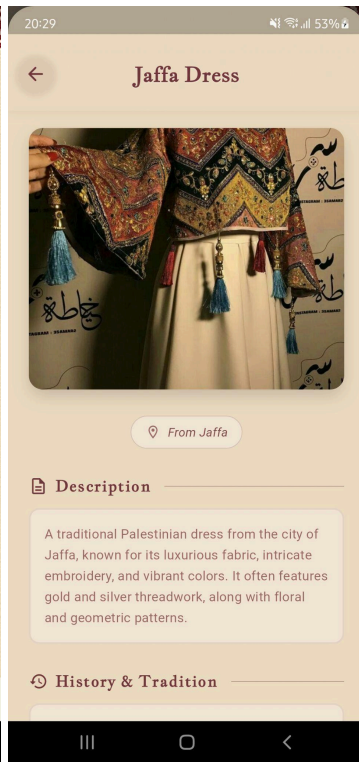


Figure 35: Detailed View of a Specific Traditional Clothing

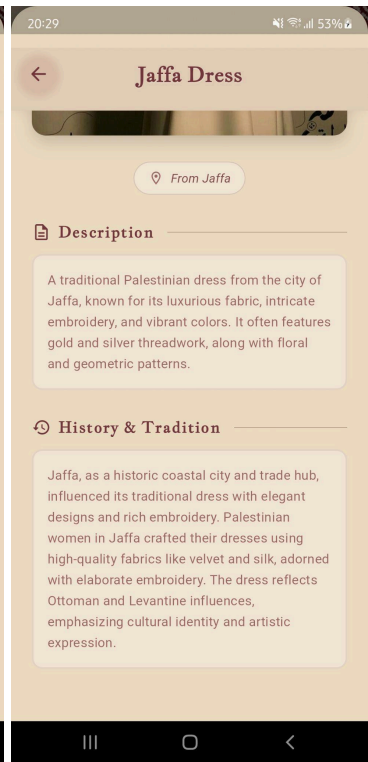


Figure 36: Specific Traditional Palestinian Dress

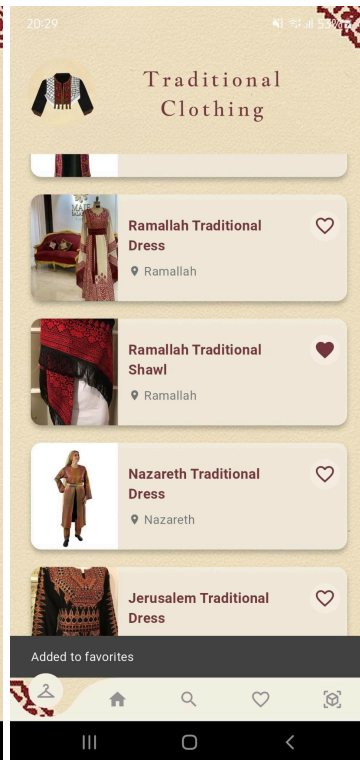
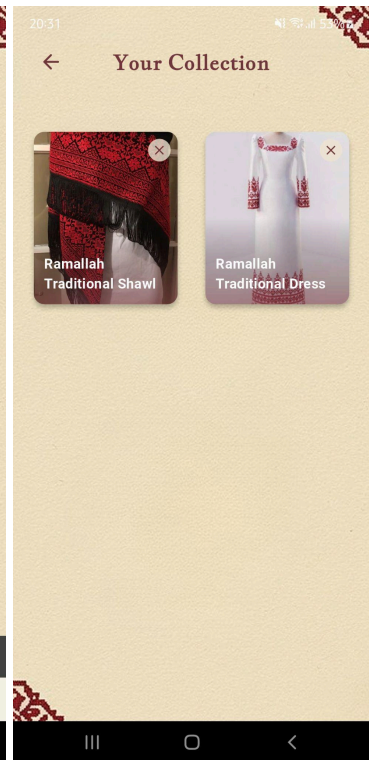


Figure 37: Dress Saved to Favorites



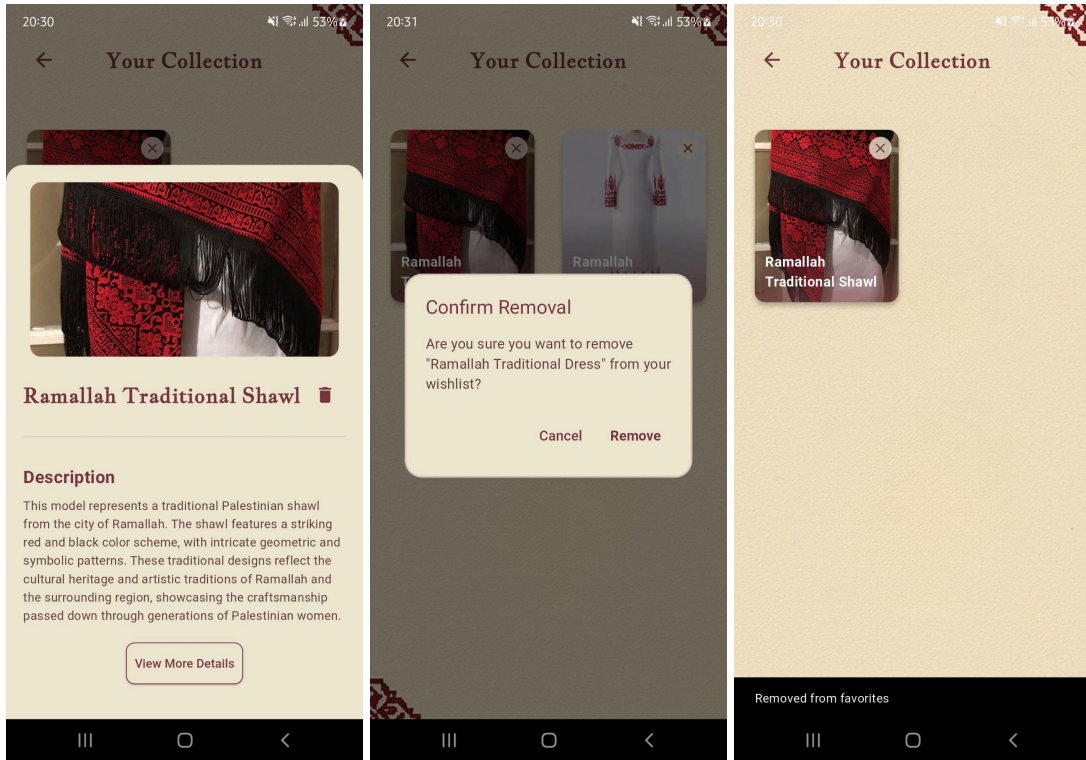


Figure 38: View and Remove Dress from Favorites

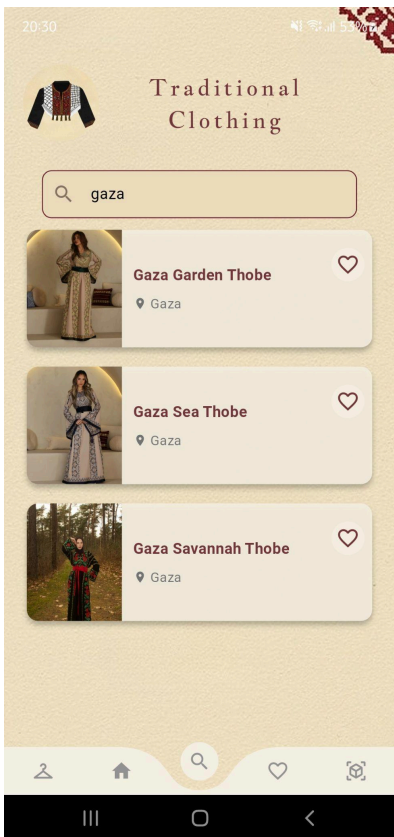


Figure 39: Search for a Dress by City

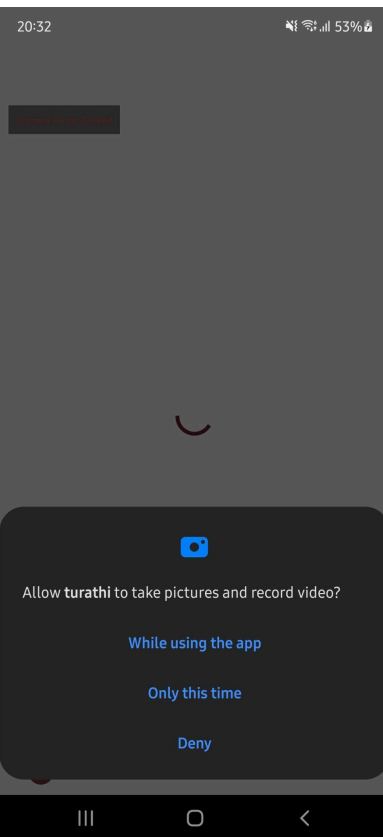


Figure 40: AR Permission Request and Try-On Main Screen

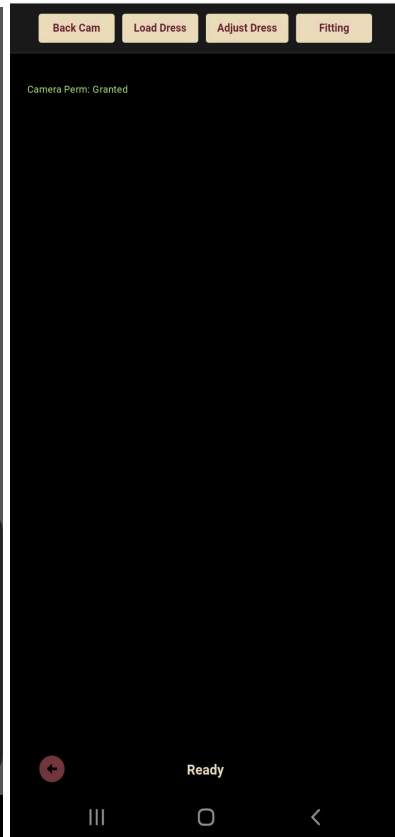




Figure 41: Detecting a Body



Figure 42: Trying on a Dress – Manual Adjustment



Figure 42.1: Trying on a Dress – Freeze Frame Mode

- **Palestinian Food:**

The Palestinian Food section provides users with an immersive culinary experience, showcasing a variety of traditional dishes from different regions of Palestine. Each dish includes high-quality images that visually capture the essence of the food, along with the city or area where it originated, offering cultural context and regional background. Users can view a full list of ingredients and follow clear, step-by-step recipe instructions designed to make preparation easy for everyone, regardless of cooking experience. Additionally, there's a save option that allows users to favorite dishes they love, making them easily accessible later in the profile's Favorites section.

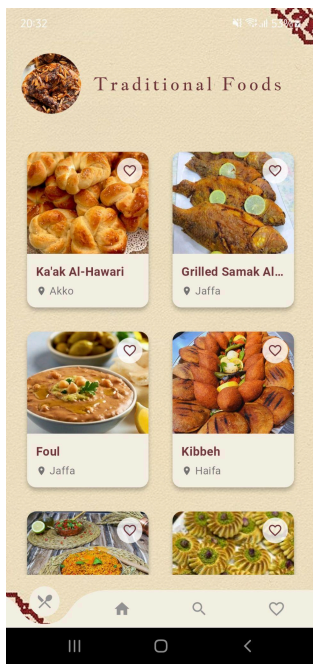


Figure 43: Palestinian Food Section

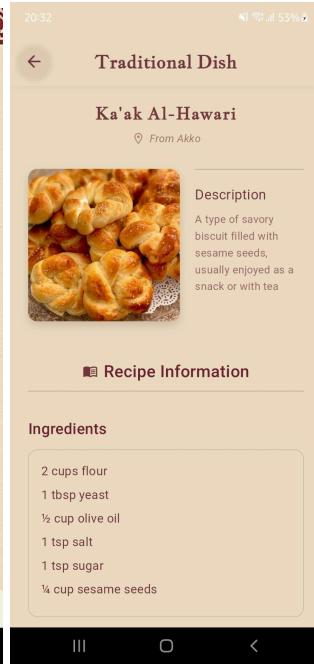
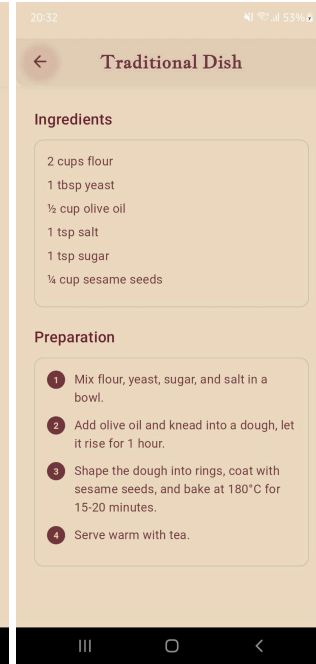


Figure 44: Detailed View of a Specific Palestinian Dish



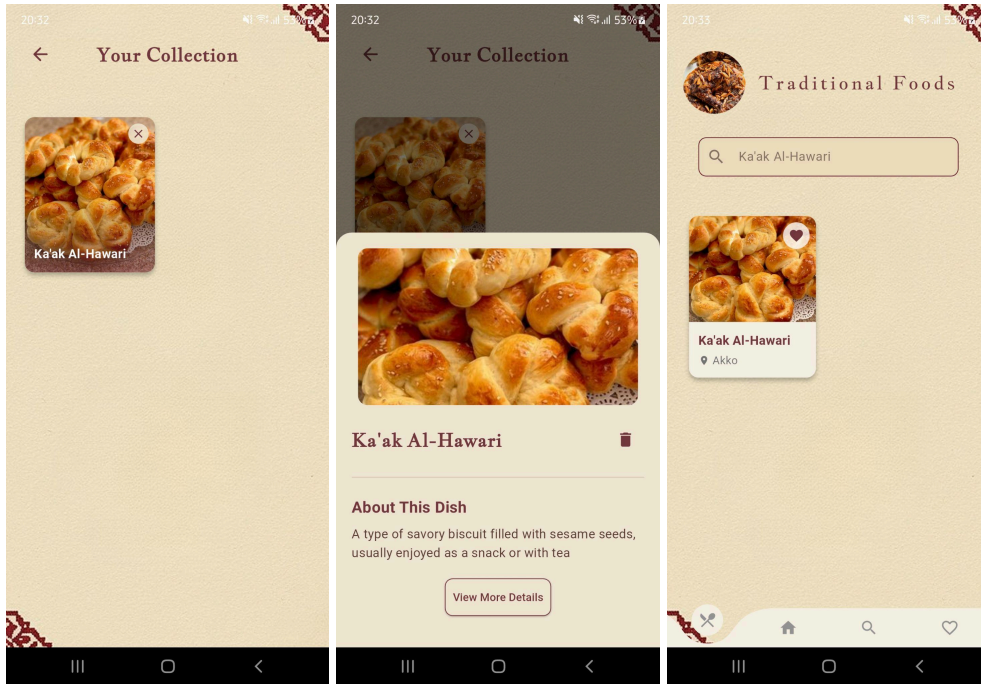


Figure 45: Dish Saved to Favorites – View Details

Figure 46: Search for a Dish by Name

- **Palestinian Music:**

The Palestinian Music section lets users explore a curated collection of traditional and modern Palestinian songs with built-in audio playback. Each track includes historical background to deepen cultural appreciation. Users can save favorites to their profile for easy access.

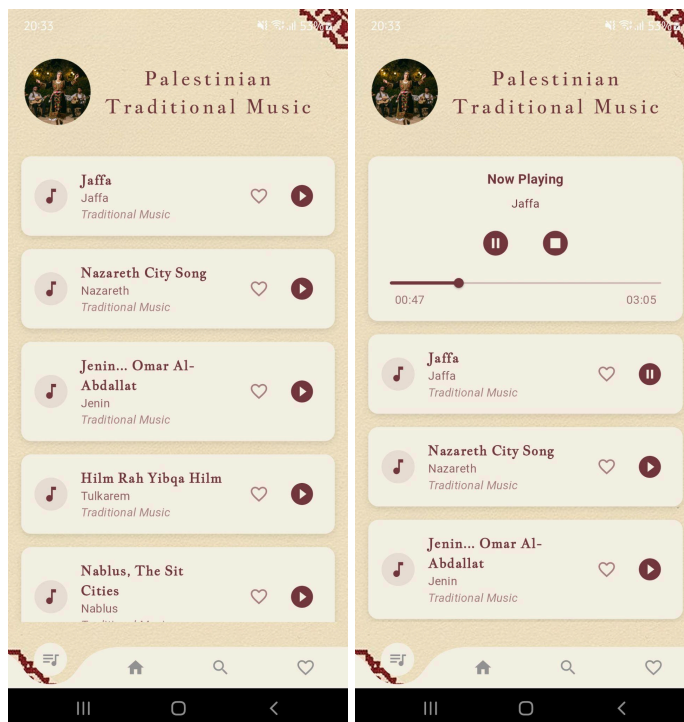


Figure 47: Palestinian Music Section    Figure 48: Listen to music

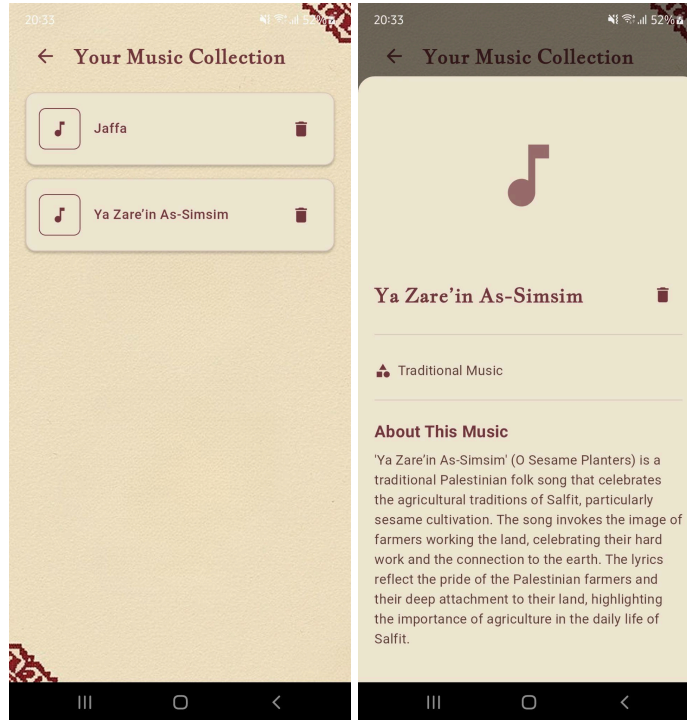


Figure 49: Musics Saved to Favorites – View Details

- **Historical Sites:**

1. Palestinian Cities: Each city is listed with a picture.
2. Historical Sites: Inside each city, you find its key historical site(s).
3. 360° Images: Some sites offer immersive 360° views.
4. Menu: Easy navigation to browse all sites.
5. View Site Details: Selecting a site reveals its name, image (or 360° view), GPS coordinates, and an Explore button that opens the location in a map application.
6. Report Feature: If a site isn't listed, users can report it by sending an email to Turathi.
7. About Section: Information on the site's history and significance.
8. Save favorite sites to a personal list for easy access later.

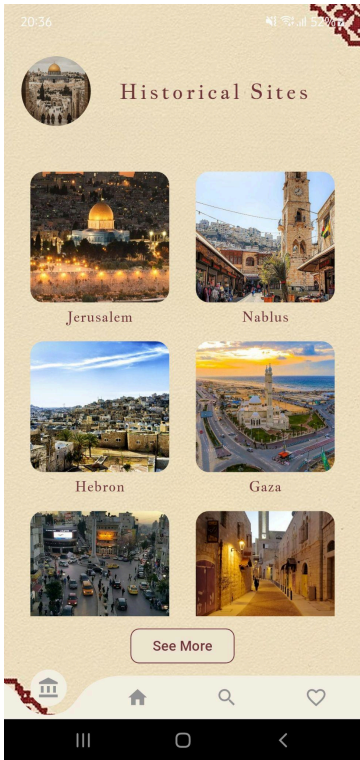


Figure 50: Historical Sites Section

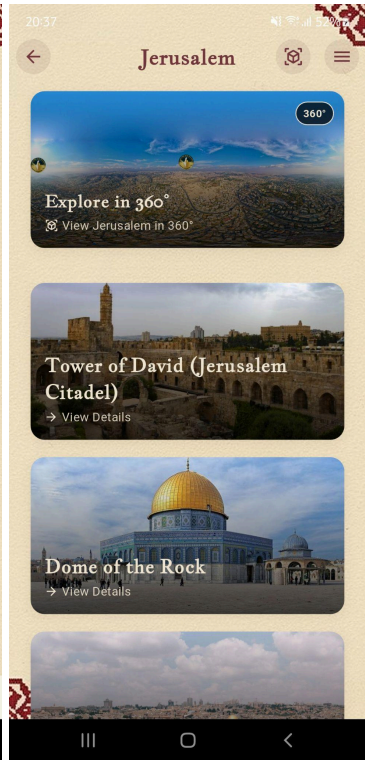


Figure 51: Detailed View of Jerusalem sites - Menu

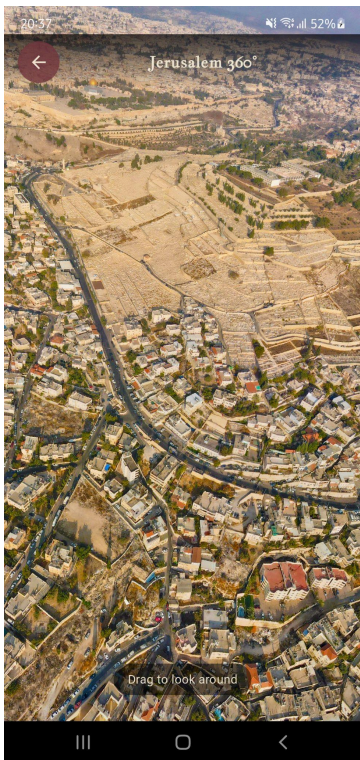
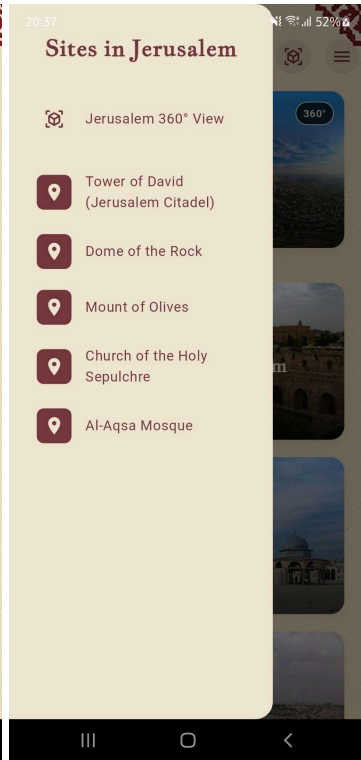


Figure 52: 360° Image of Jerusalem City

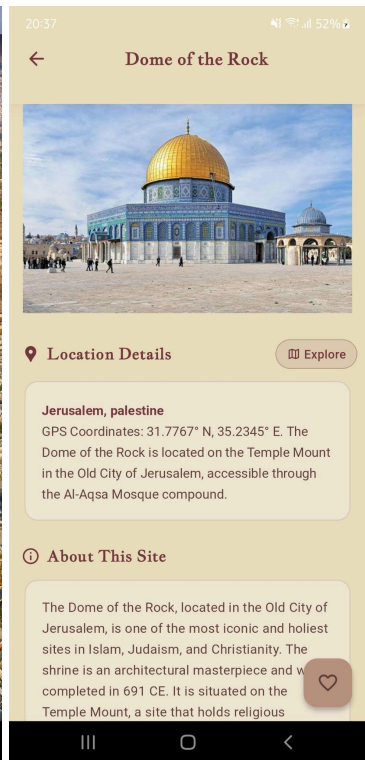
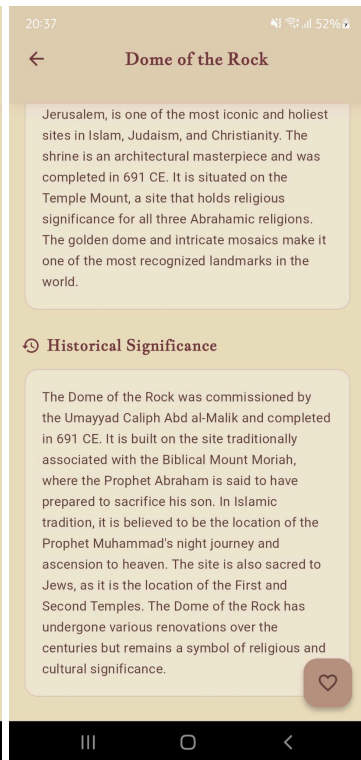


Figure 53: Detailed View of a Historical Site in Jerusalem



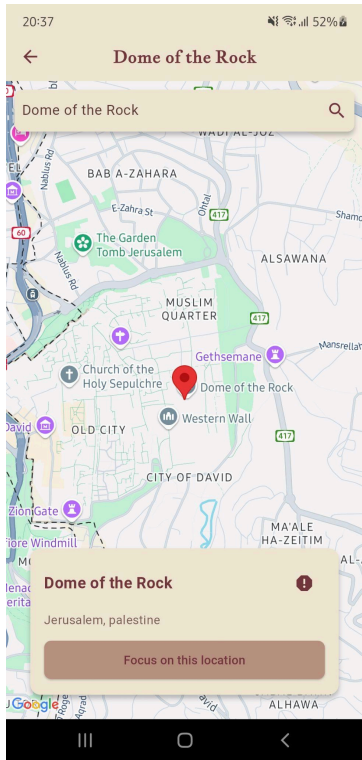


Figure 54: Site Location Displayed on Map

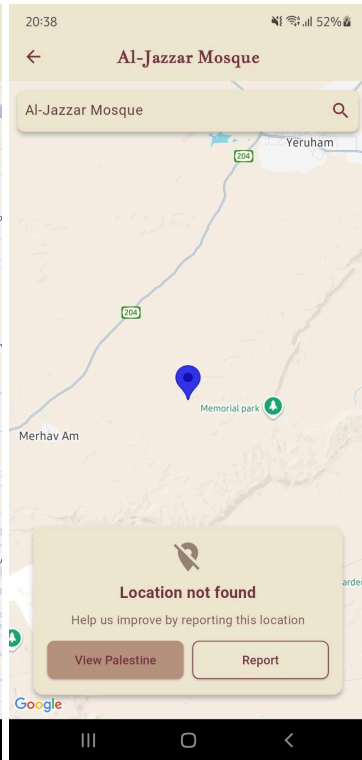


Figure 54: Report Feature for Non-Existing Site

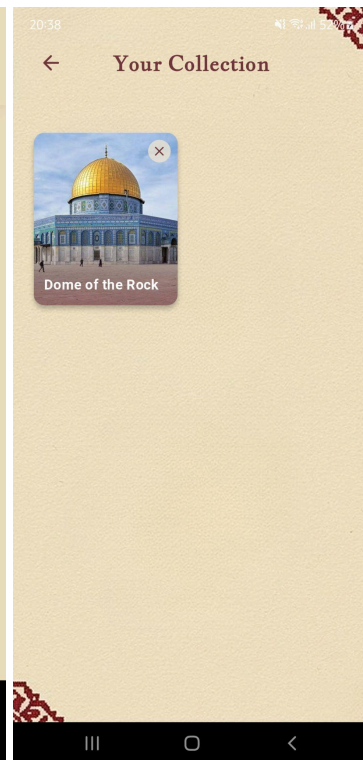
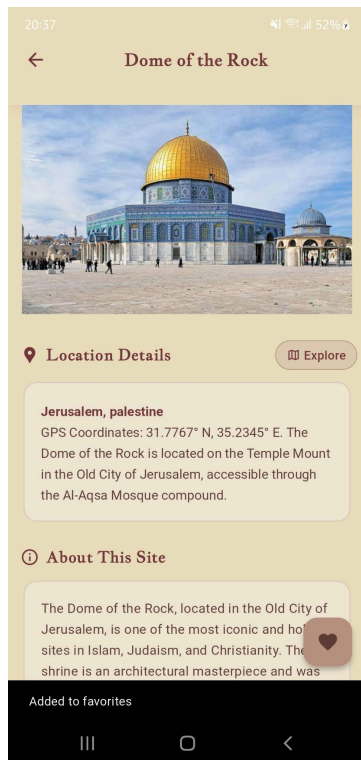
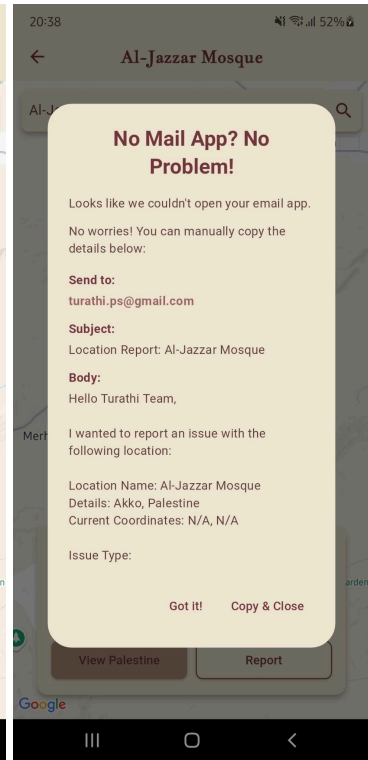


Figure 55: Added to Favorites and Favorites Screen View

- **Palestinian Crafts:**

Explore traditional crafts with images, historical background, and region-specific origins. Users can learn about each craft and easily add favorites for quick access.

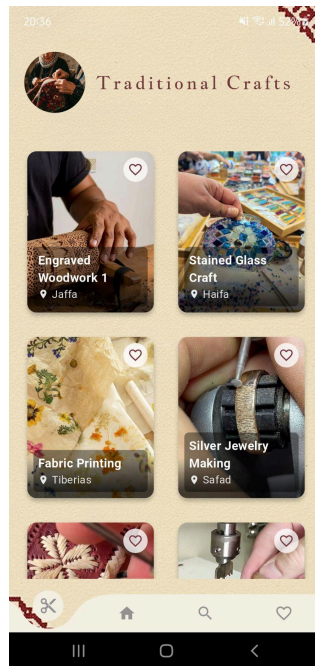


Figure 56: Traditional Crafts Section



Figure 57: Detailed View of a Specific Craft

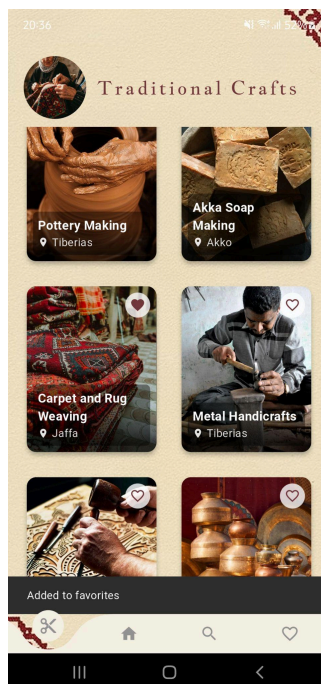


Figure 58: Craft Saved to Favorites – View Details



- **Palestinian Proverbs:**

Features audio playback and stories explaining the origin of each proverb. Users can search by keyword or category and add favorites for easy access.

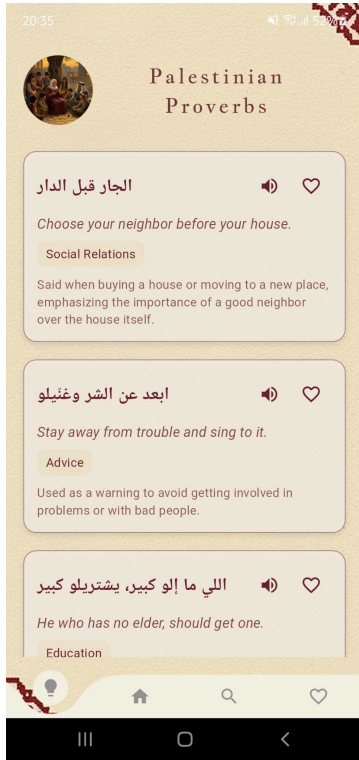


Figure 59: Palestinian Proverbs

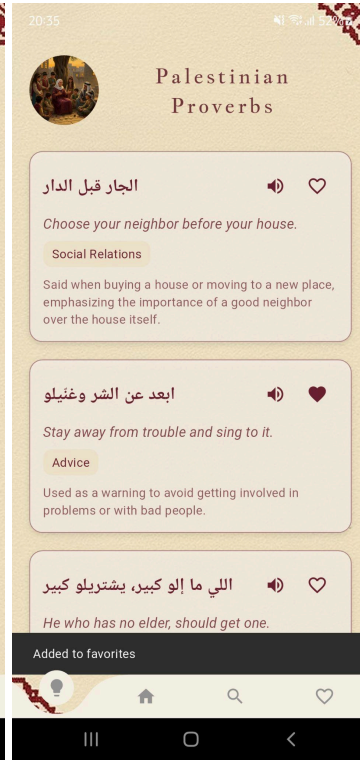
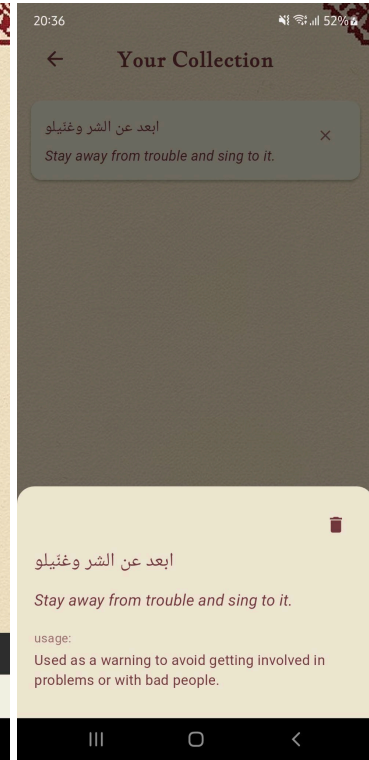


Figure 60: Proverbs Saved to Favorites – View Details



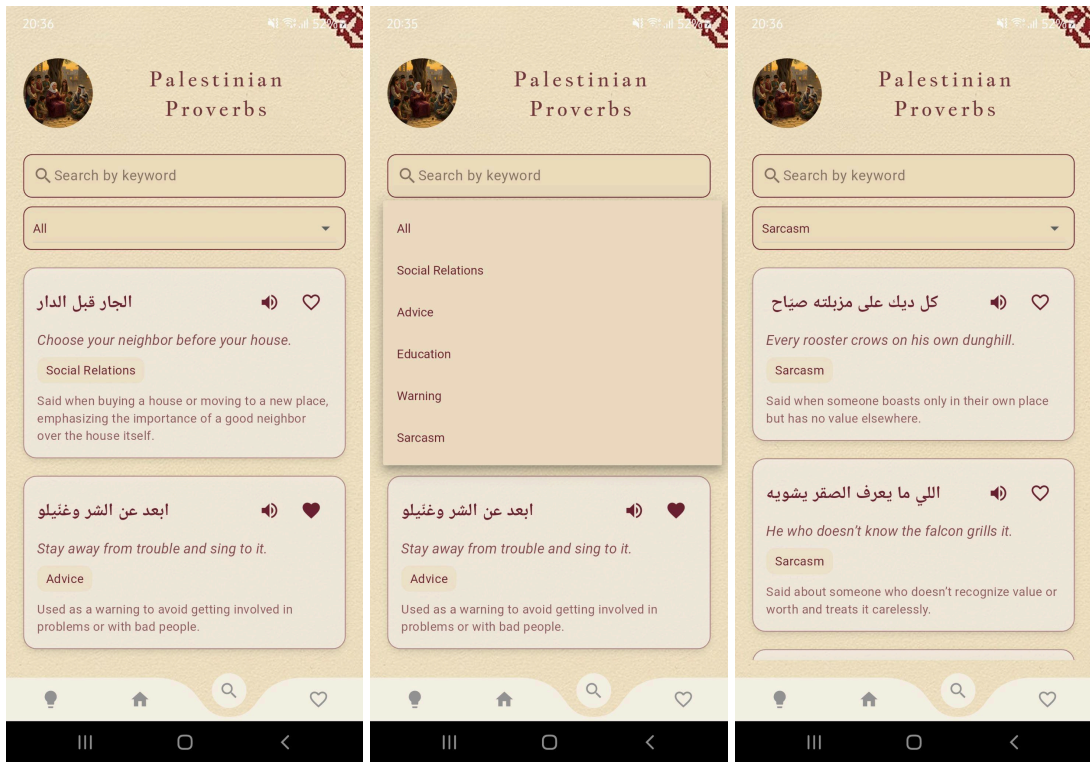


Figure 61: Proverbs Search by Keyword and Category

- **Interactive Map of Destroyed and Depopulated Villages and Towns:**

Explore destroyed and depopulated Palestinian villages with location markers showing names, photos, and a “**Show Details**” button.

Markers can be filtered by type to focus on either destroyed or depopulated sites.

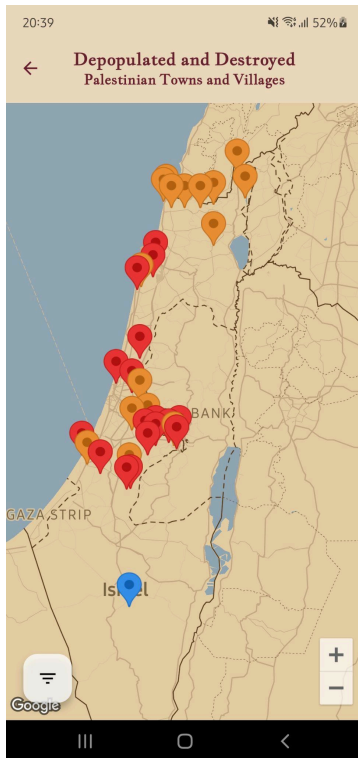


Figure 62: Interactive Map

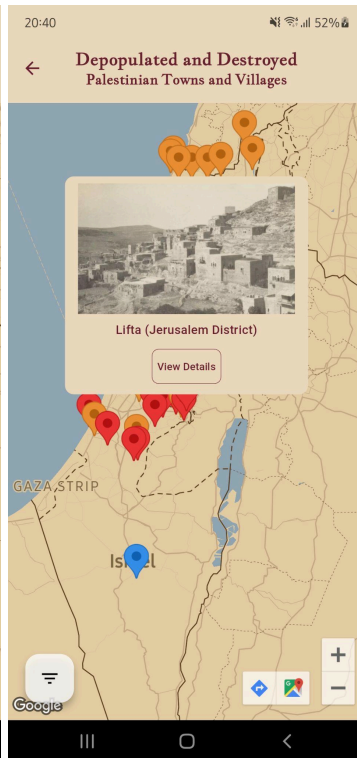


Figure 63: Specific Location View

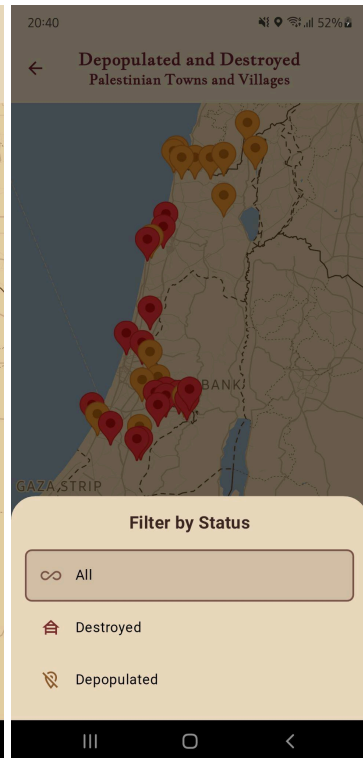


Figure 64: Filtered Markers

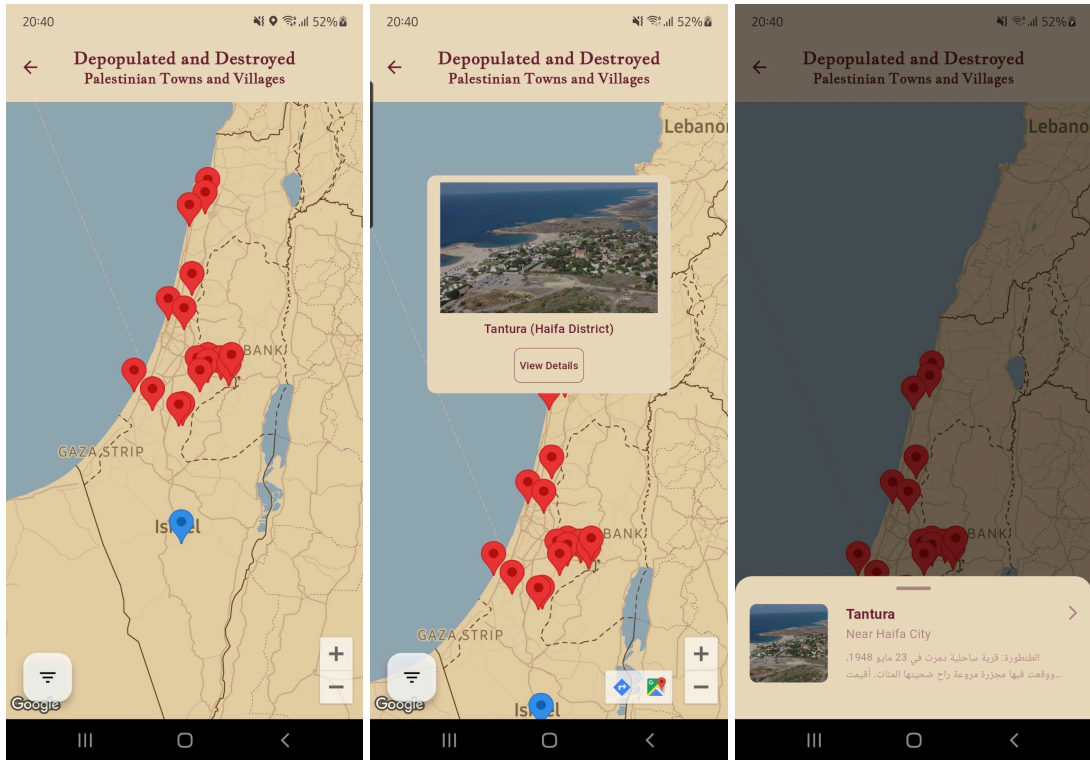


Figure 65: Destroyed Village and Towns - View Details



Figure 65.1: Destroyed Village and Towns - Additional View

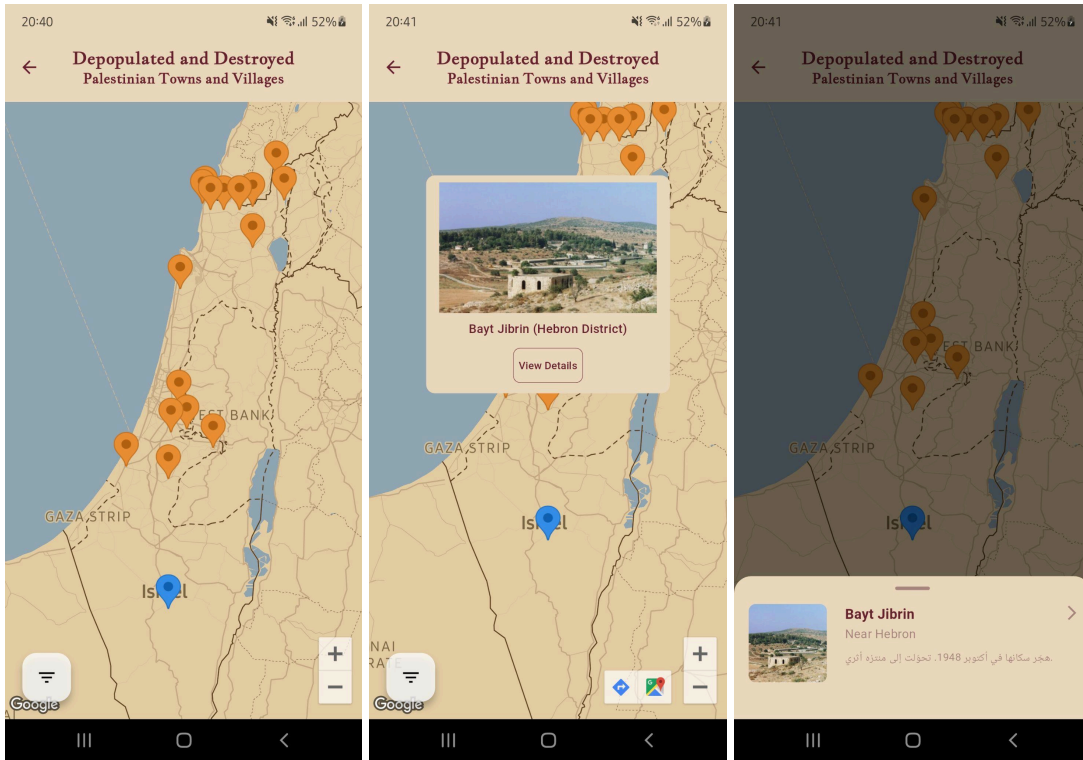


Figure 66: Depopulated Village and Towns - View Details

- **Seasonal Calendar:**

Displays Palestinian seasons and highlights significant monthly cultural events.

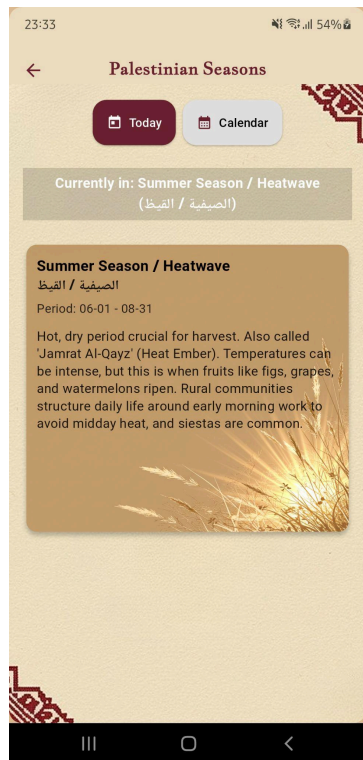


Figure 67: Palestinian Seasons



Figure 68: Specific Monthly Cultural Events

All the following features are accessible via the **Navigation Bar**:

- **Chat Experience: AI & Palestine in Q&A**

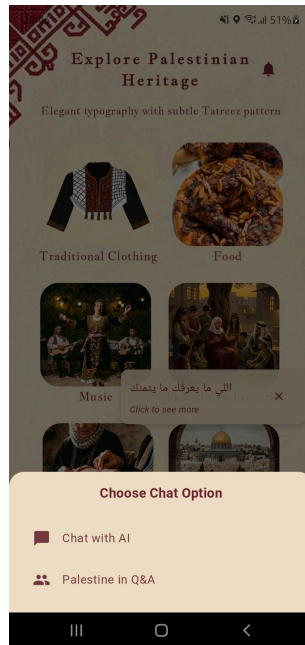


Figure 69: Chat Option

### AI Interaction:

Users can engage with an AI assistant to ask questions about Palestinian culture, traditions, and history, or upload images for further context and discussion.

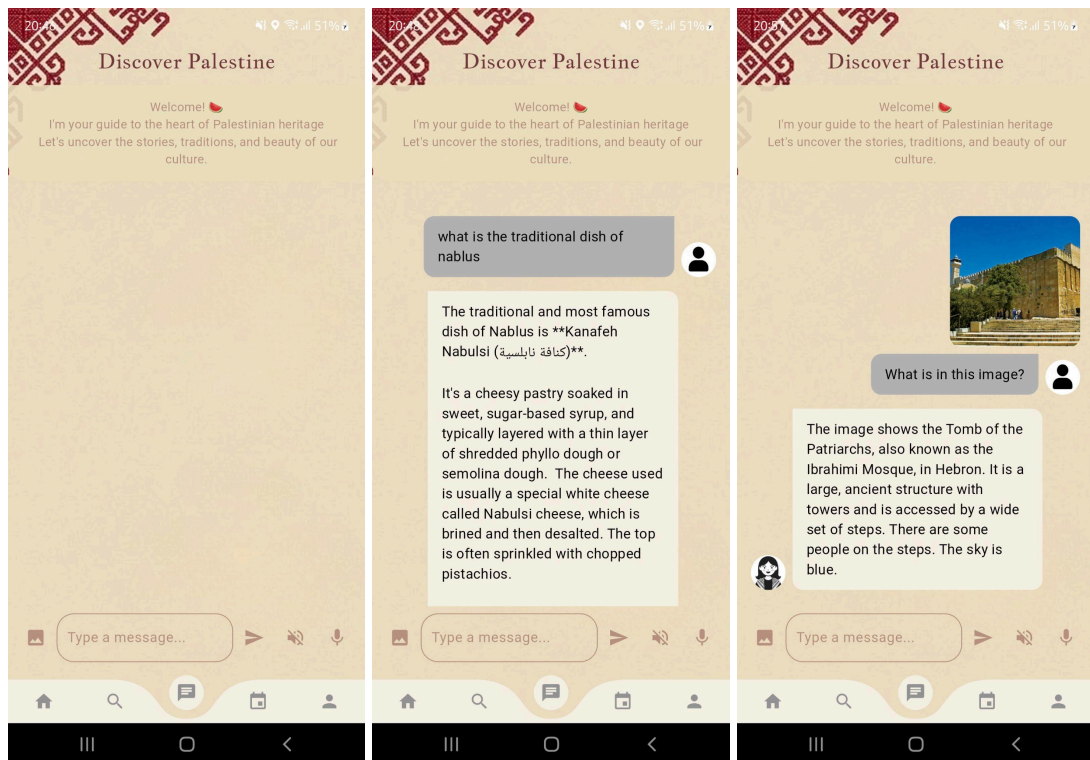


Figure 70: Chat with AI – Ask General Questions and Upload Photos for Recognition

## Palestine in Q&A:

Users can chat with each other in a Q&A-style format focused on Palestinian topics. A strict filtering system blocks offensive language and restricted terms (such as “Israel”) to maintain respectful conversation.

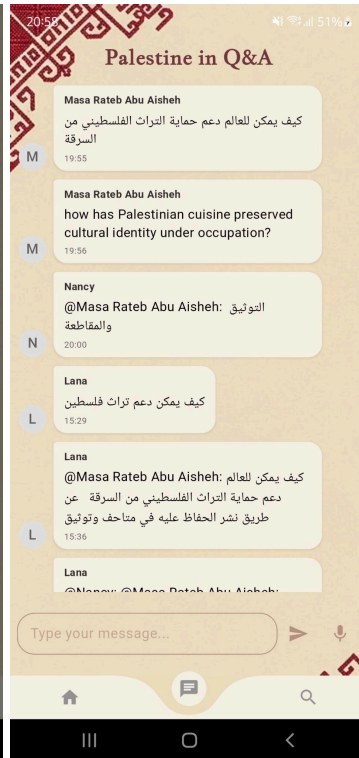
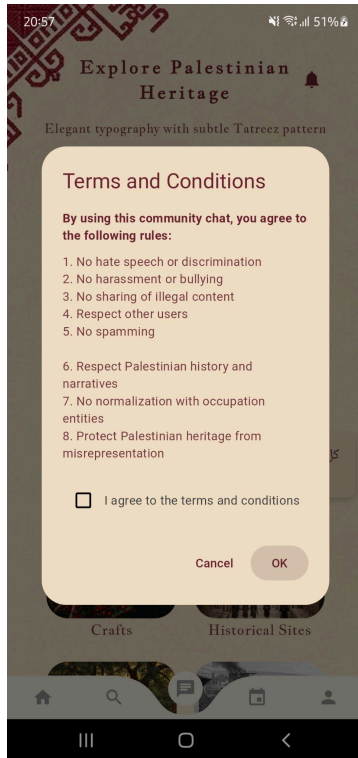


Figure 71: Palestine in Q&A – Terms and Conditions    Figure 72: Palestine in Q&A – View and Send Messages



Figure 73: Reply to Messages    Figure 74: Search Within Specific Messages    Figure 75: Filtering System That Blocks Offensive Language

- **Search Page.**

**The Search Page offers a rich and engaging cultural discovery experience:**

**Random, New, and Recommended Items:**

Users can explore a diverse range of cultural content right from the main search screen, including the latest additions and personalized recommendations tailored to their interests.

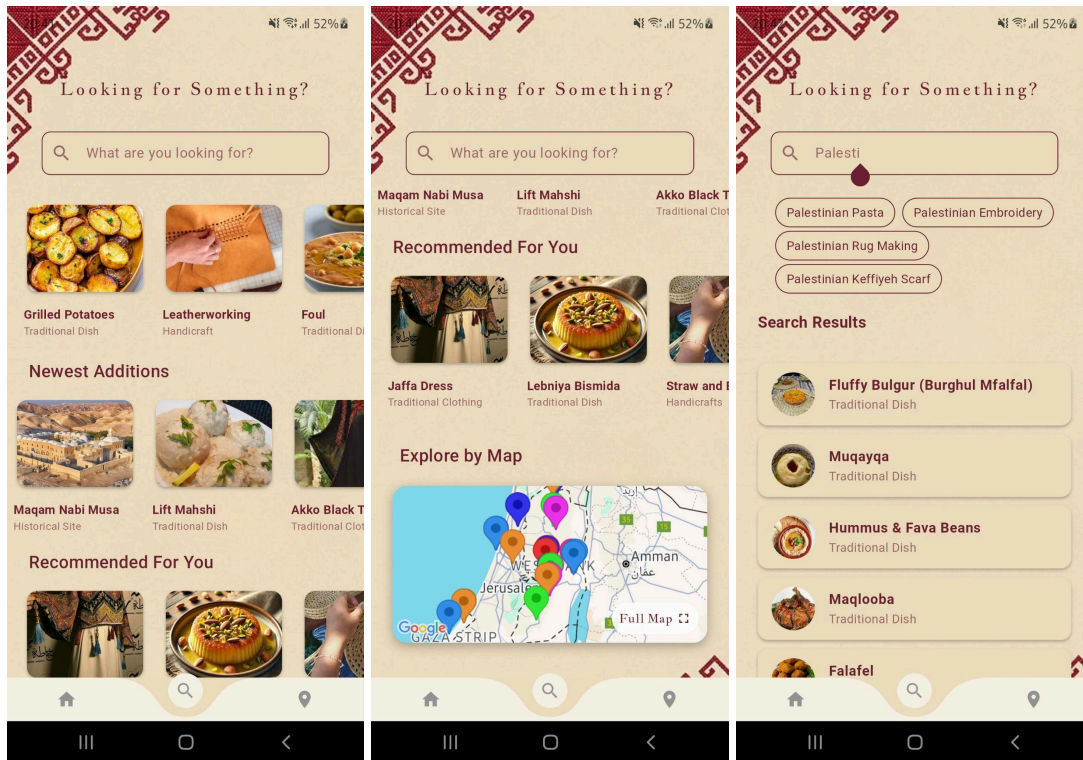


Figure 76: The main search screen

### Explore by Map:

An interactive map sits at the heart of the page, dotted with custom markers highlighting important Palestinian sites. Each marker comes with a custom info window showcasing detailed information and images. Users can easily filter these sites by categories such as mosques, churches, museums, historical landmarks, and

more.

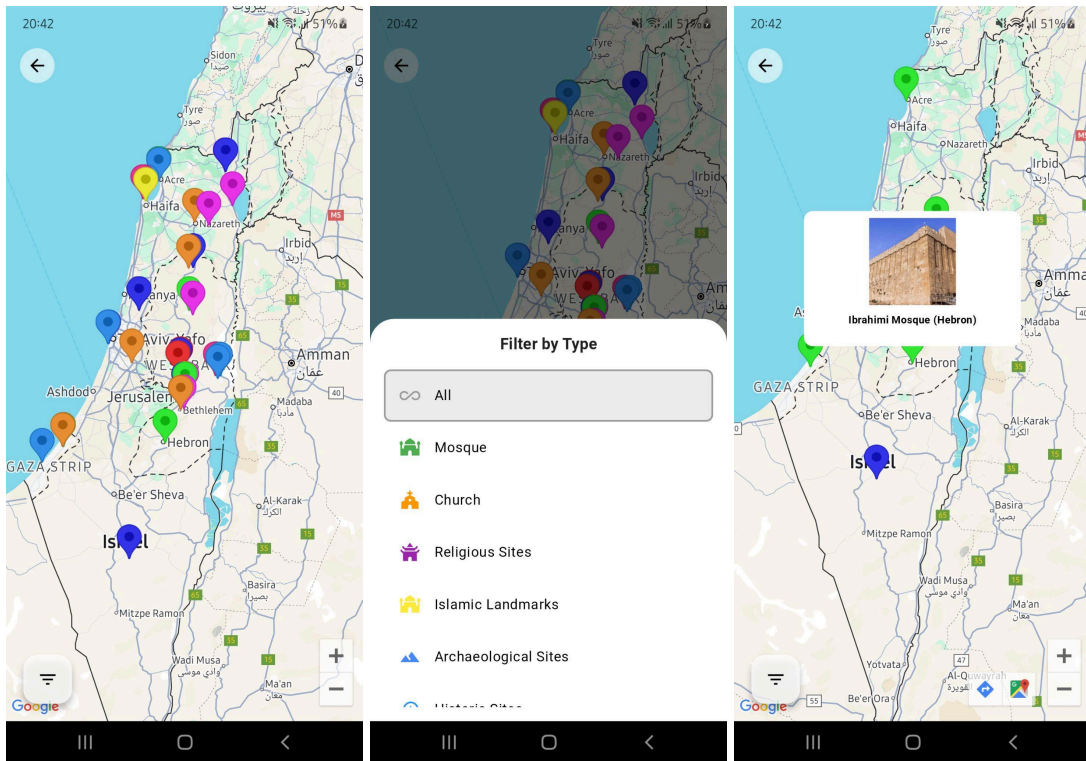


Figure 77: The main search screen    Figure 78: Filtered Markers    Figure 79: Specific Location View

### Where I am Map:

An interactive map shows the user's current location along with nearby services like restaurants and hotels, satellite view, and live weather updates—including current temperature and conditions.

Users can also add custom markers, write reviews, and view community ratings and comments.

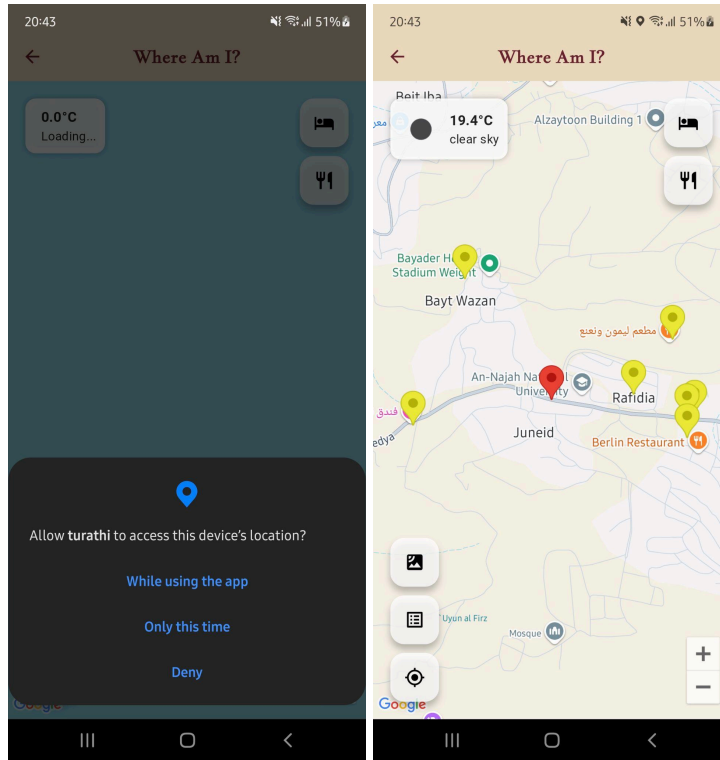


Figure 81: Location Permission Request    Figure 82: Live Marker Showing User's Current Location

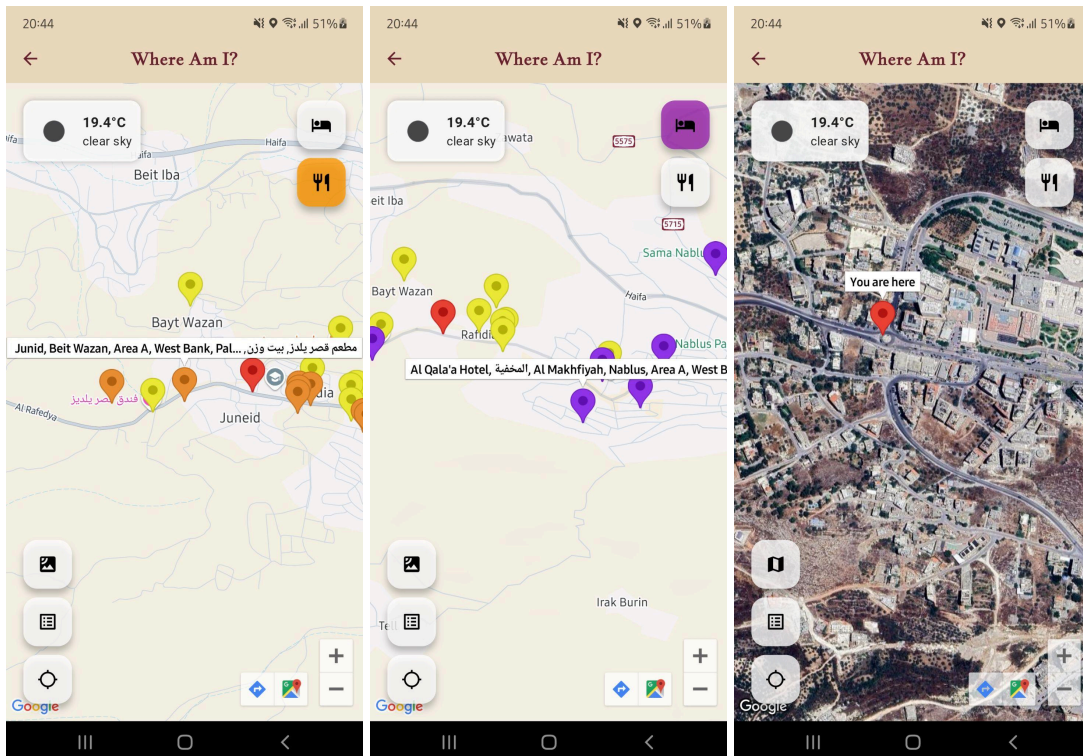


Figure 83: Nearby Hotels -Nearby Restaurants Displayed on Map    Figure 84: Live Location View with Satellite Imagery

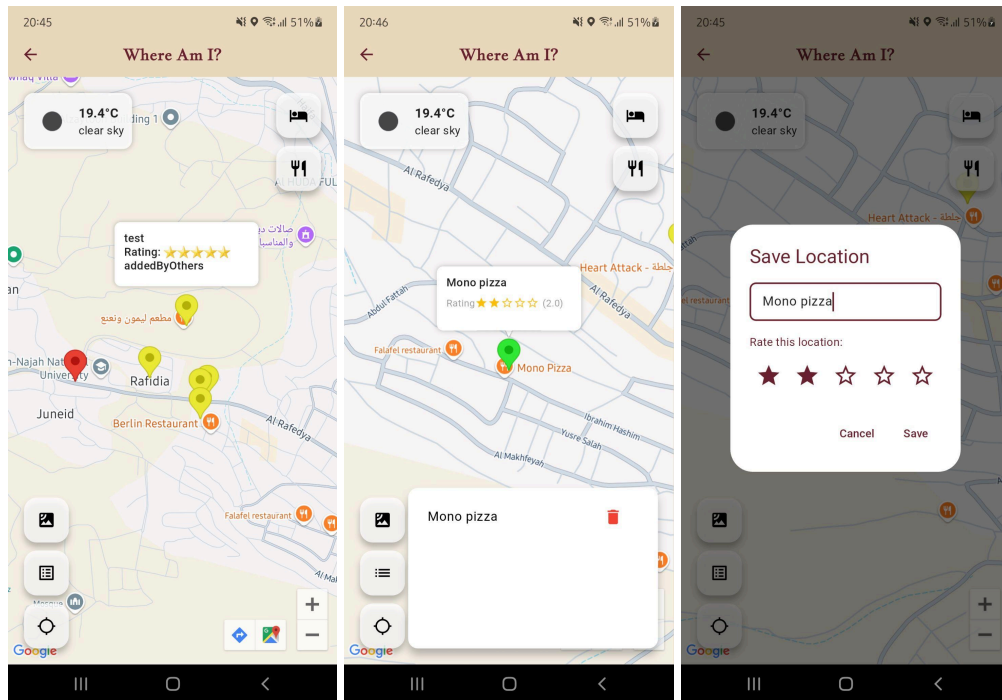


Figure 85: Community Ratings, User Comments, and Custom Location Markers with Submitted Ratings

- **Upcoming Events:**

Displays upcoming cultural events with images, brief descriptions, and RSVP options—with reminder notifications included.

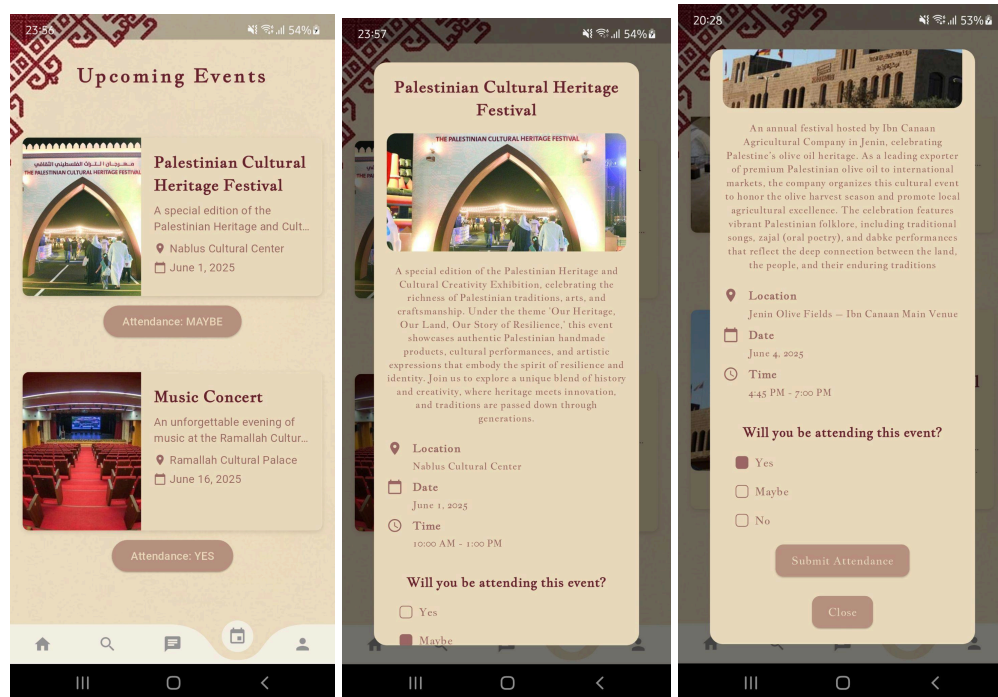
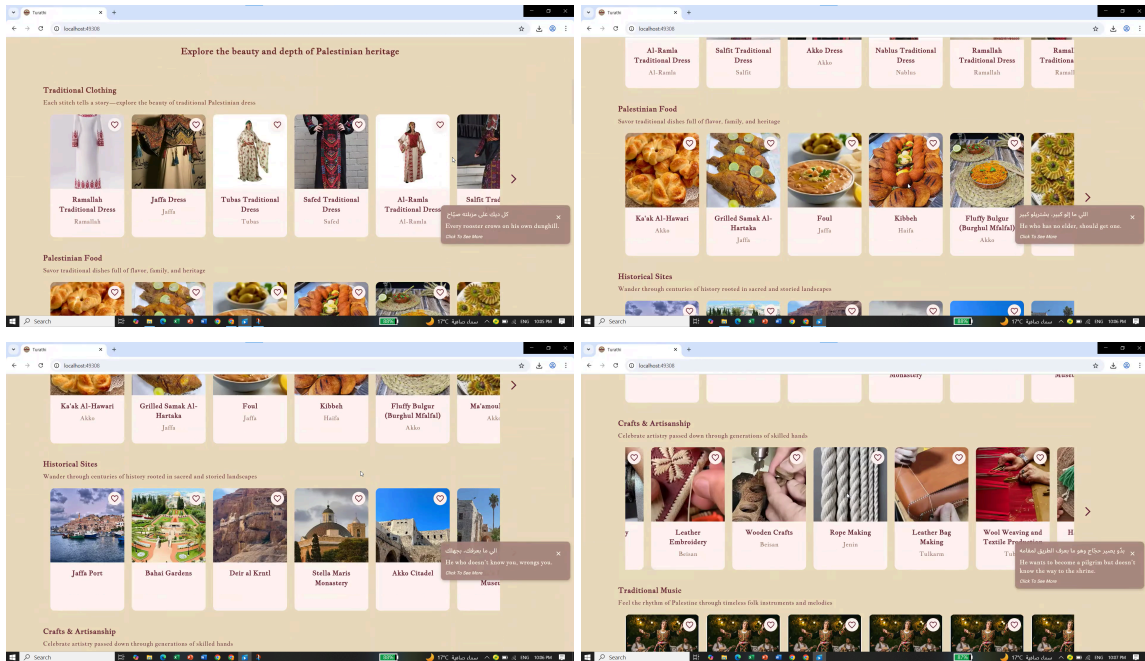
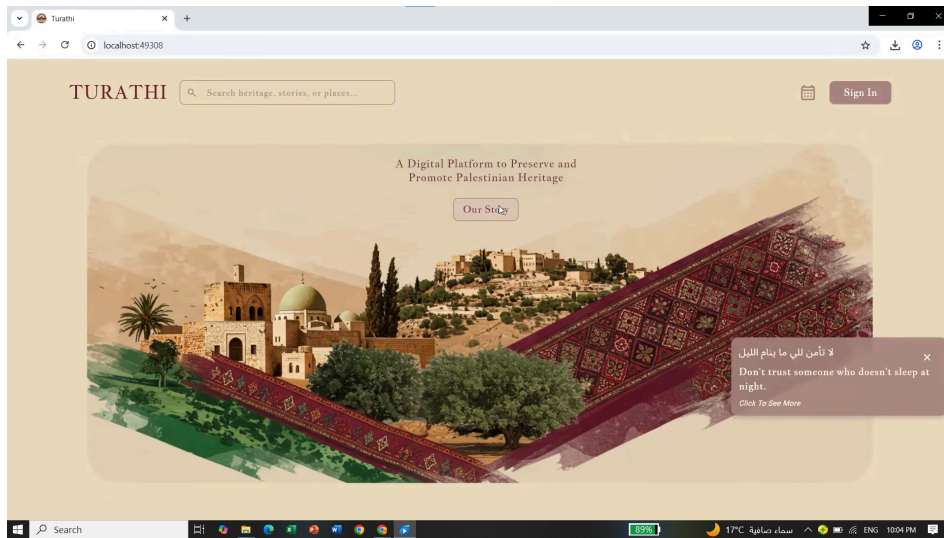


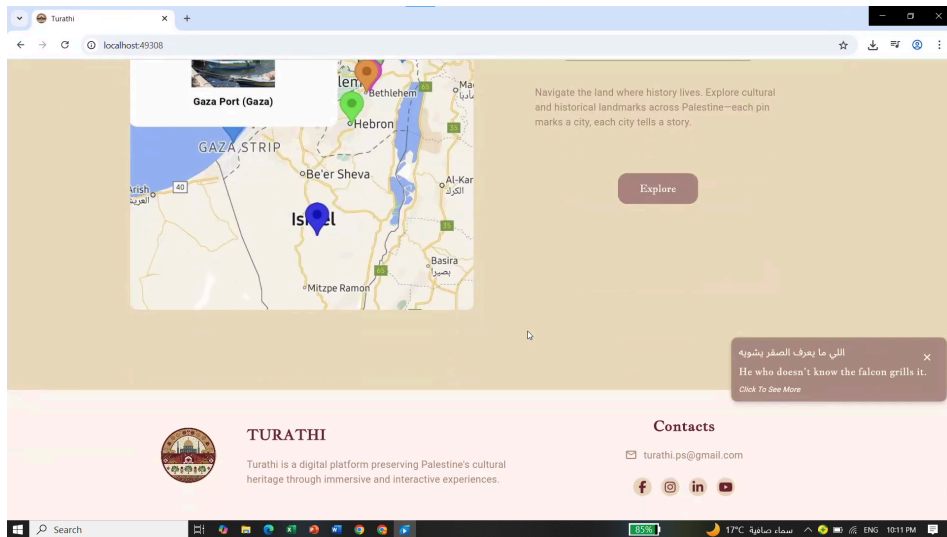
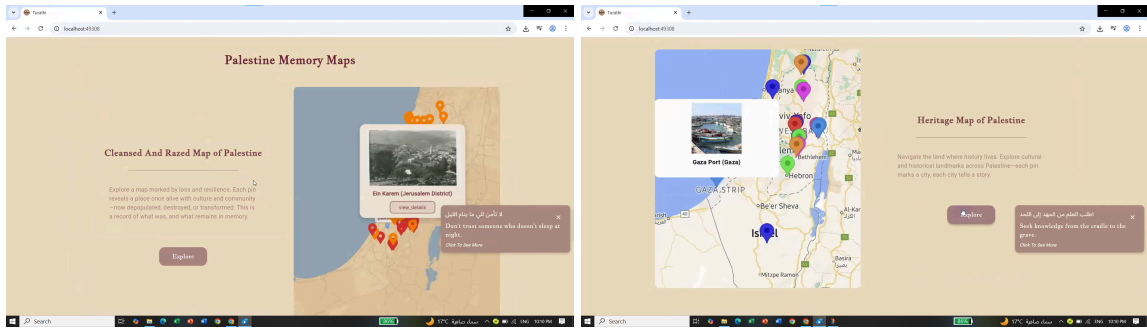
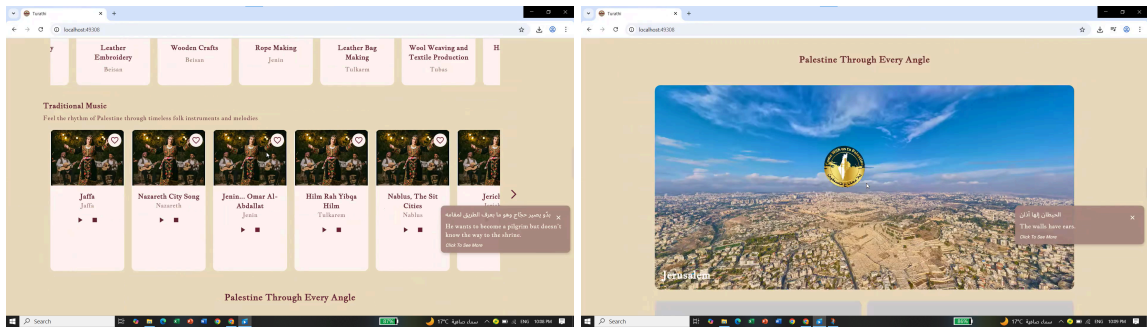
Figure 86: Upcoming Events Screen    Figure 87: Event Details    Figure 88: RSVP and Attendance Confirmation

## Web Version:

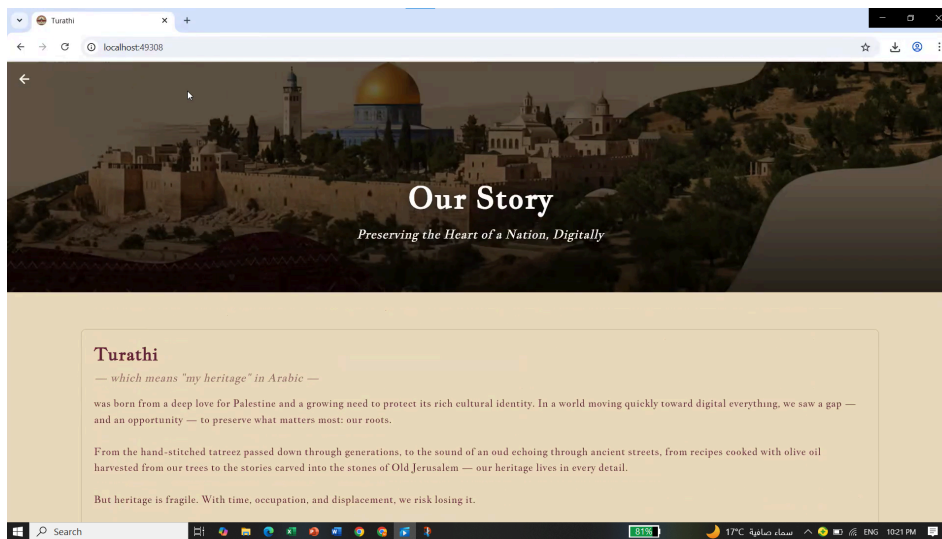
All application screens are also available as fully responsive web pages, providing users with seamless access across both mobile and desktop platforms.

### Home Page View

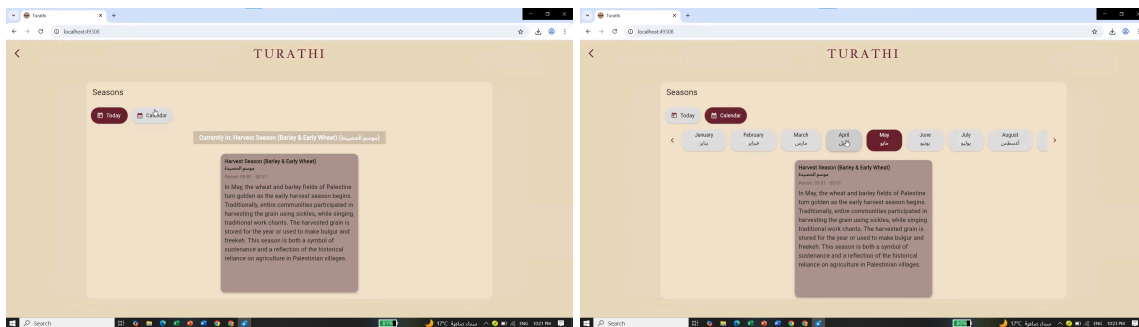




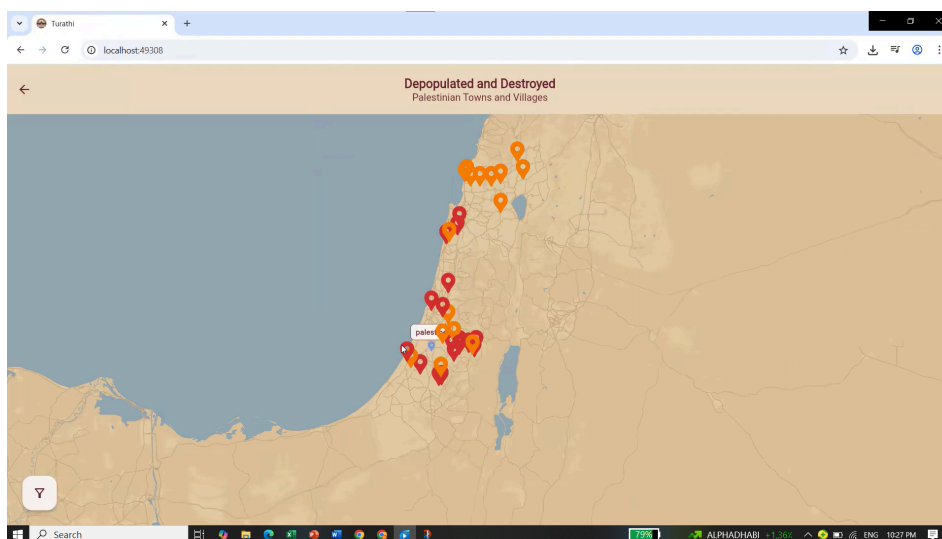
## Our Story Page - About Us

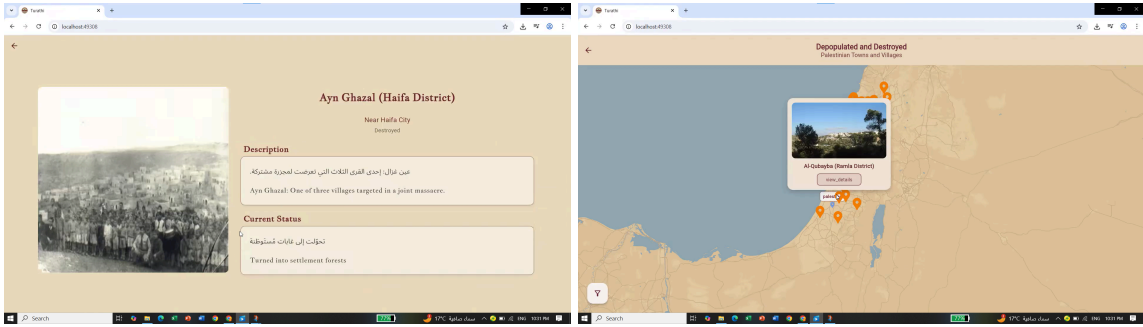
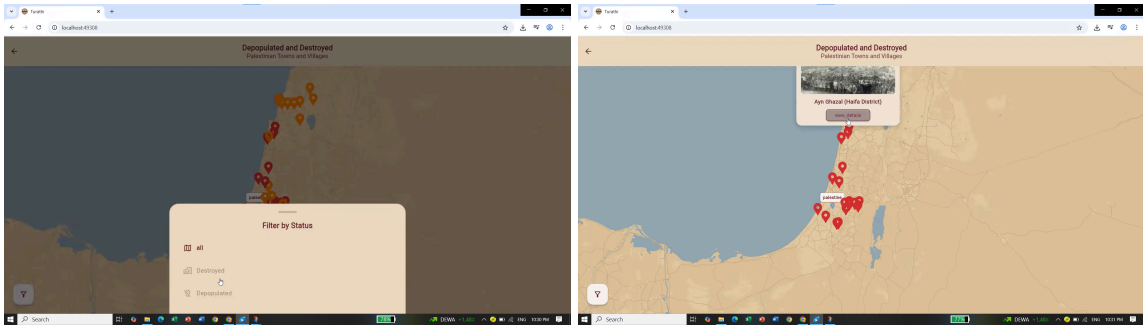


## Palestinian Seasons Page

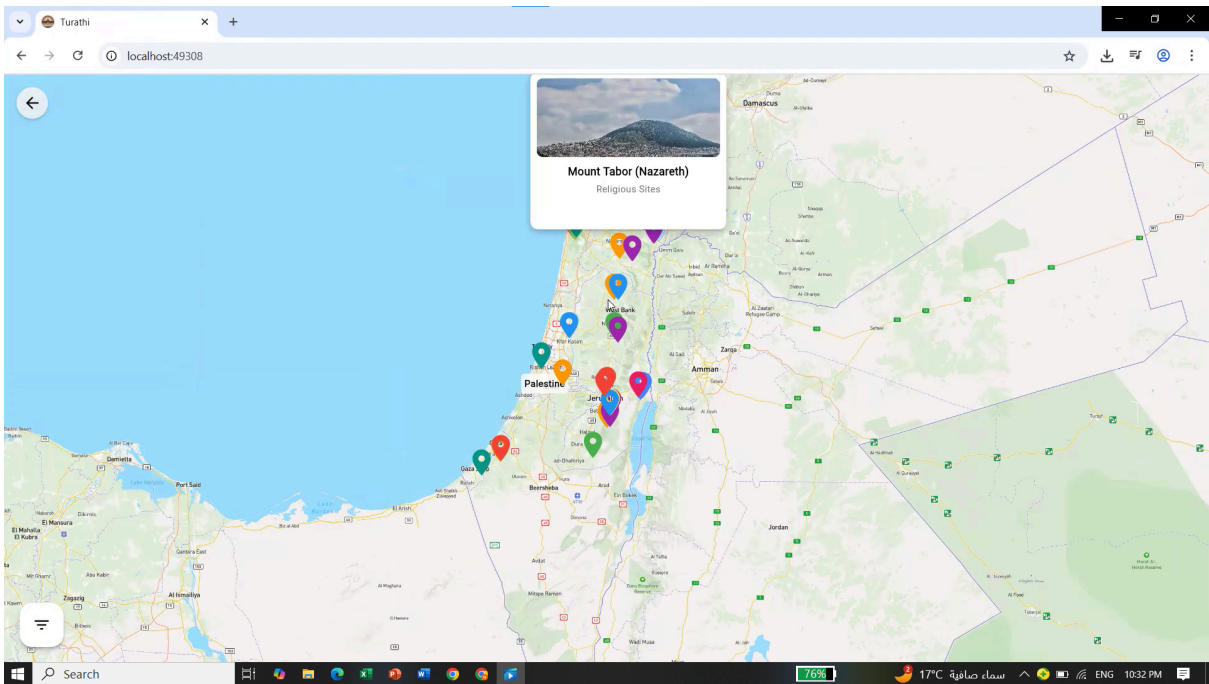


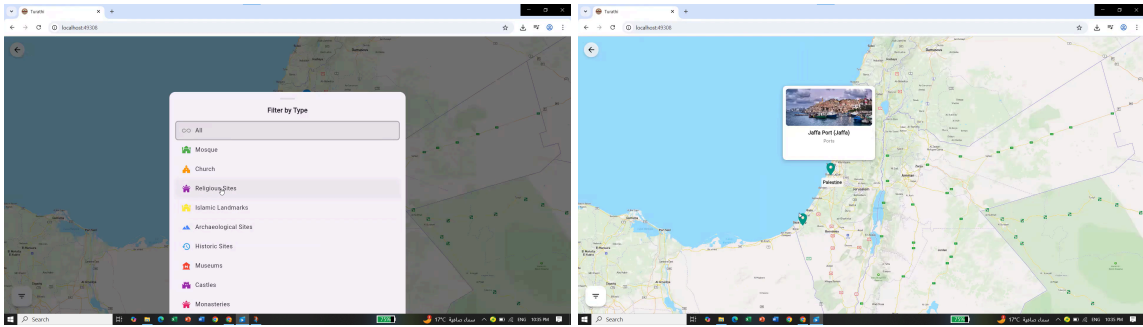
## Interactive Map of Destroyed and Depopulated Villages and Towns:



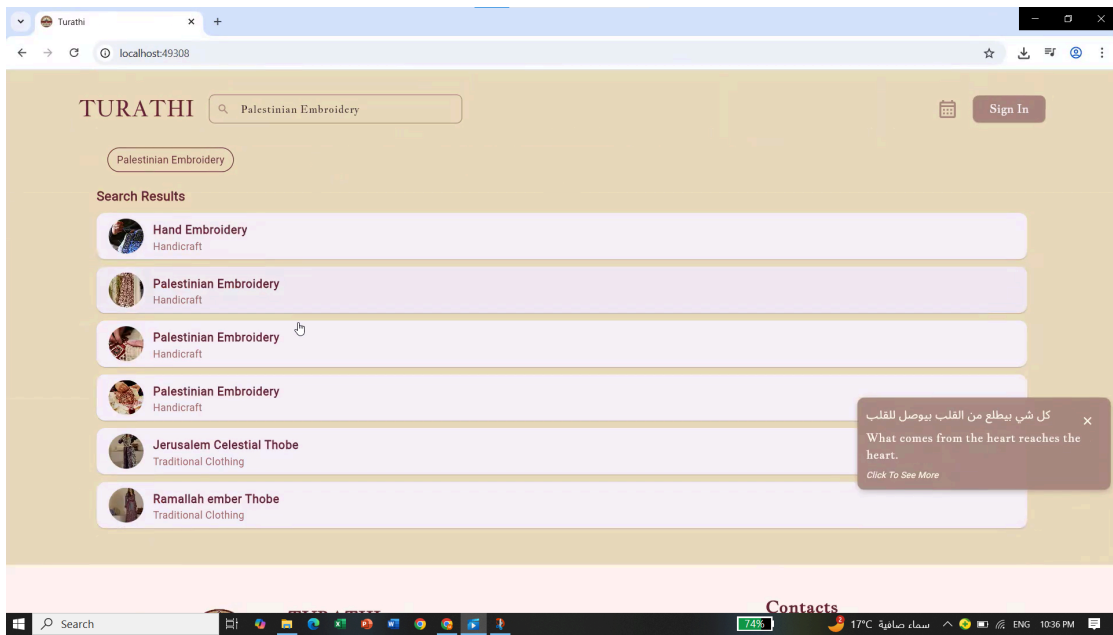


## Interactive Map for Exploring Key Palestinian Sites

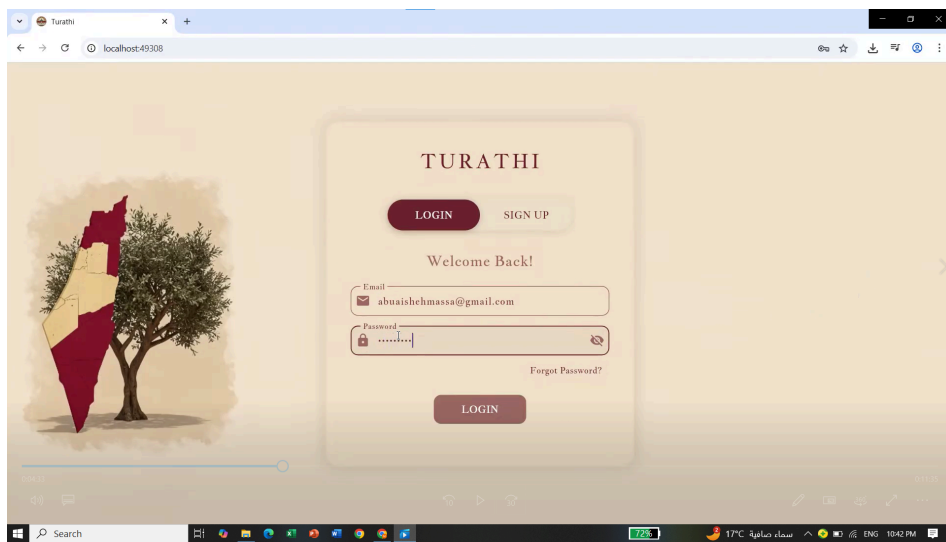




## Search Across Palestinian Heritage Content

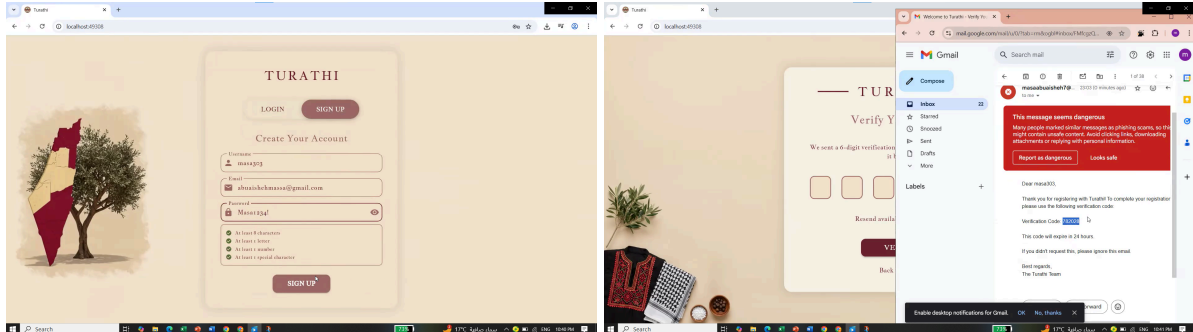


## Login Page

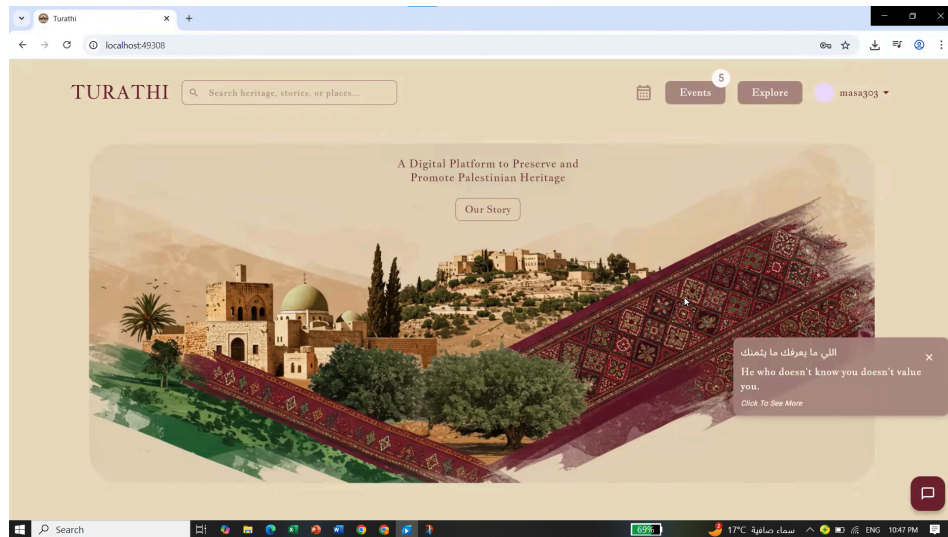


## Sign Up Page – Email Verification via OTP

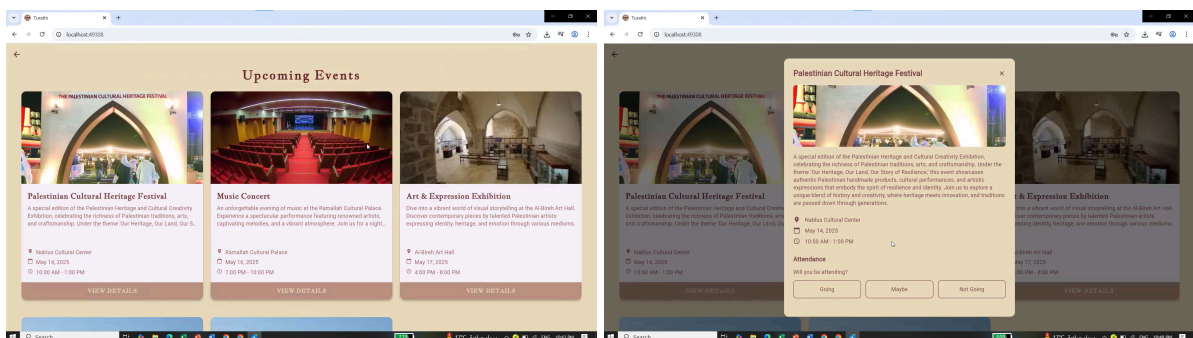
Once logged in, users gain access to additional features and personalized content not visible before signing in.



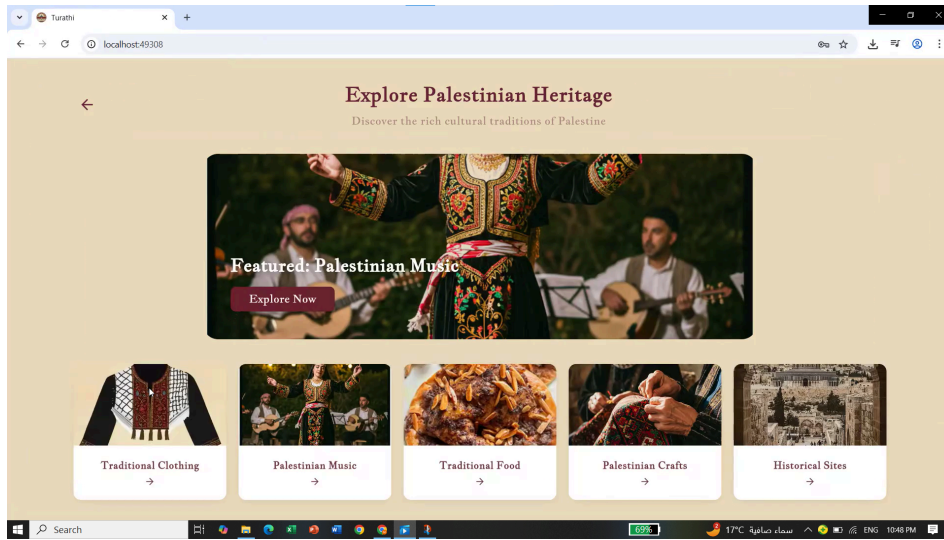
## Post-Login Features Screen



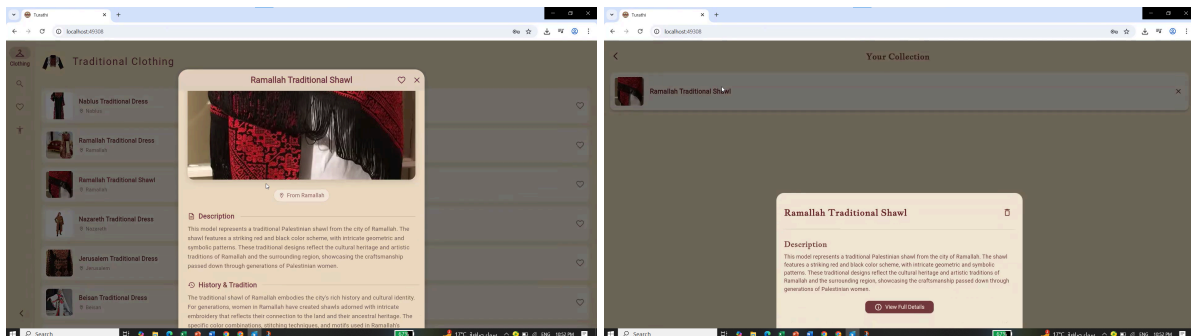
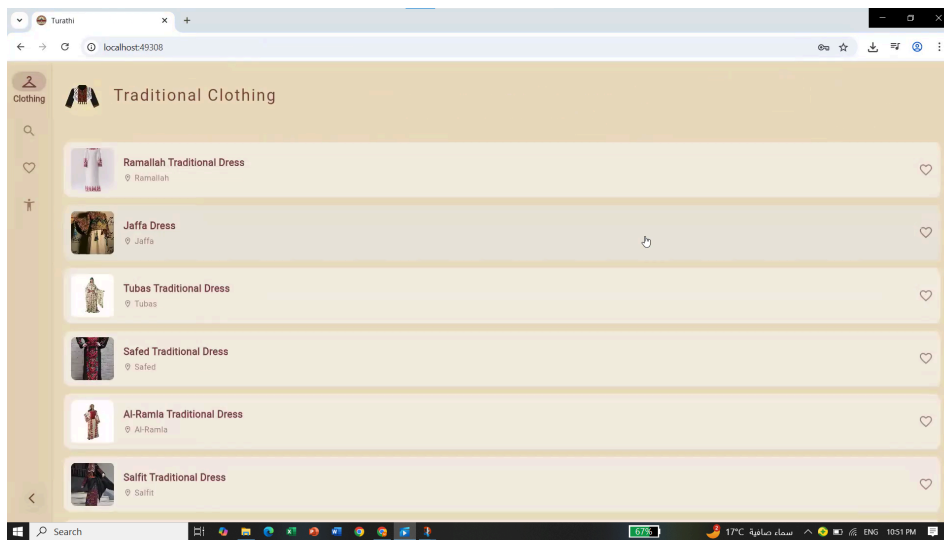
## Upcoming Events

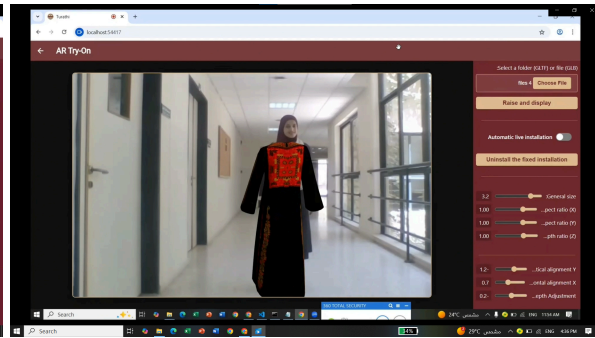
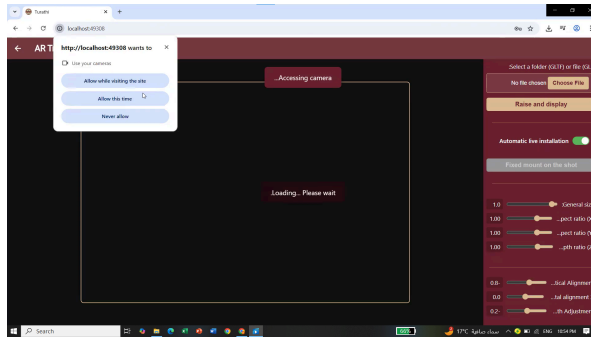
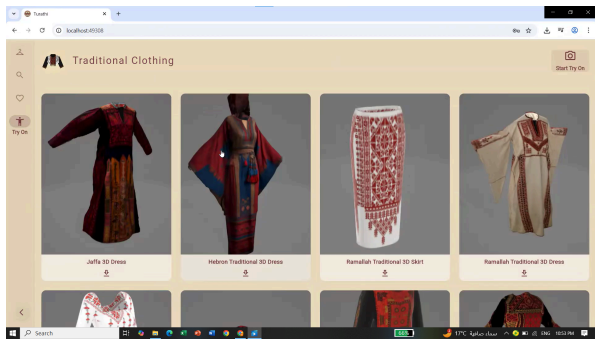
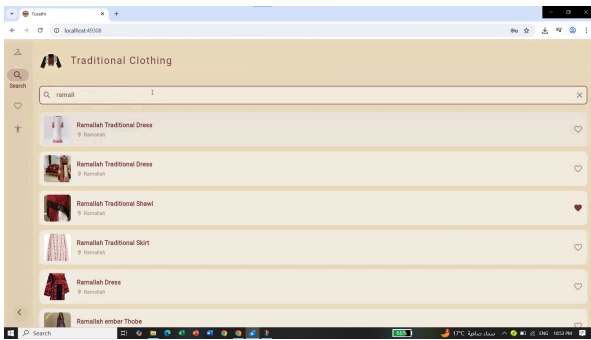


# Main Experience

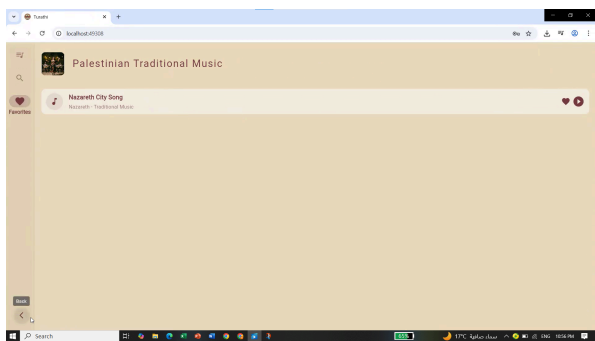
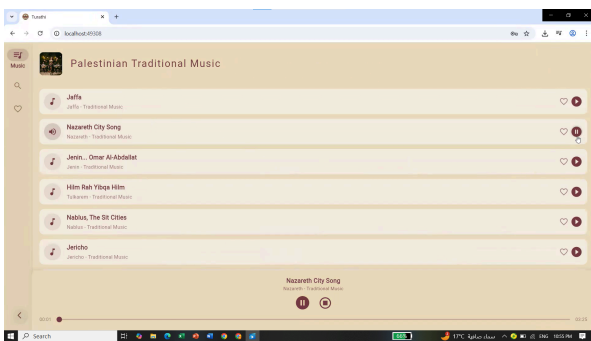


# Traditional Clothing Section

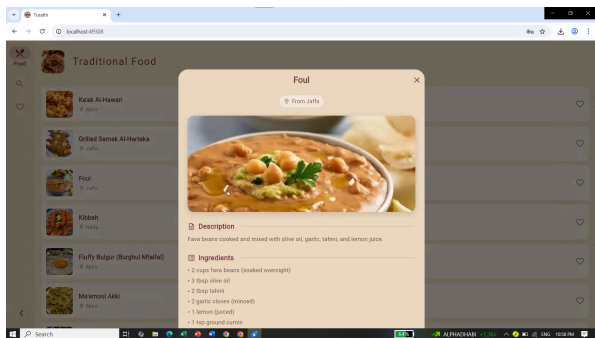




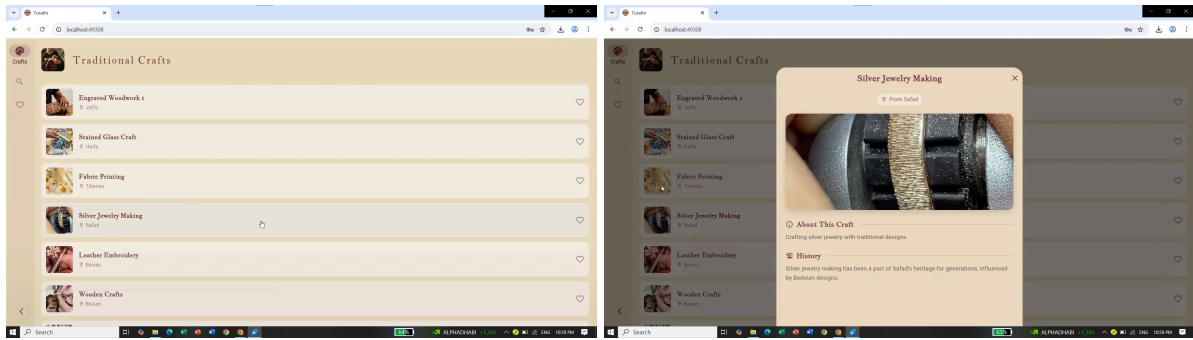
## Palestinian Music Section



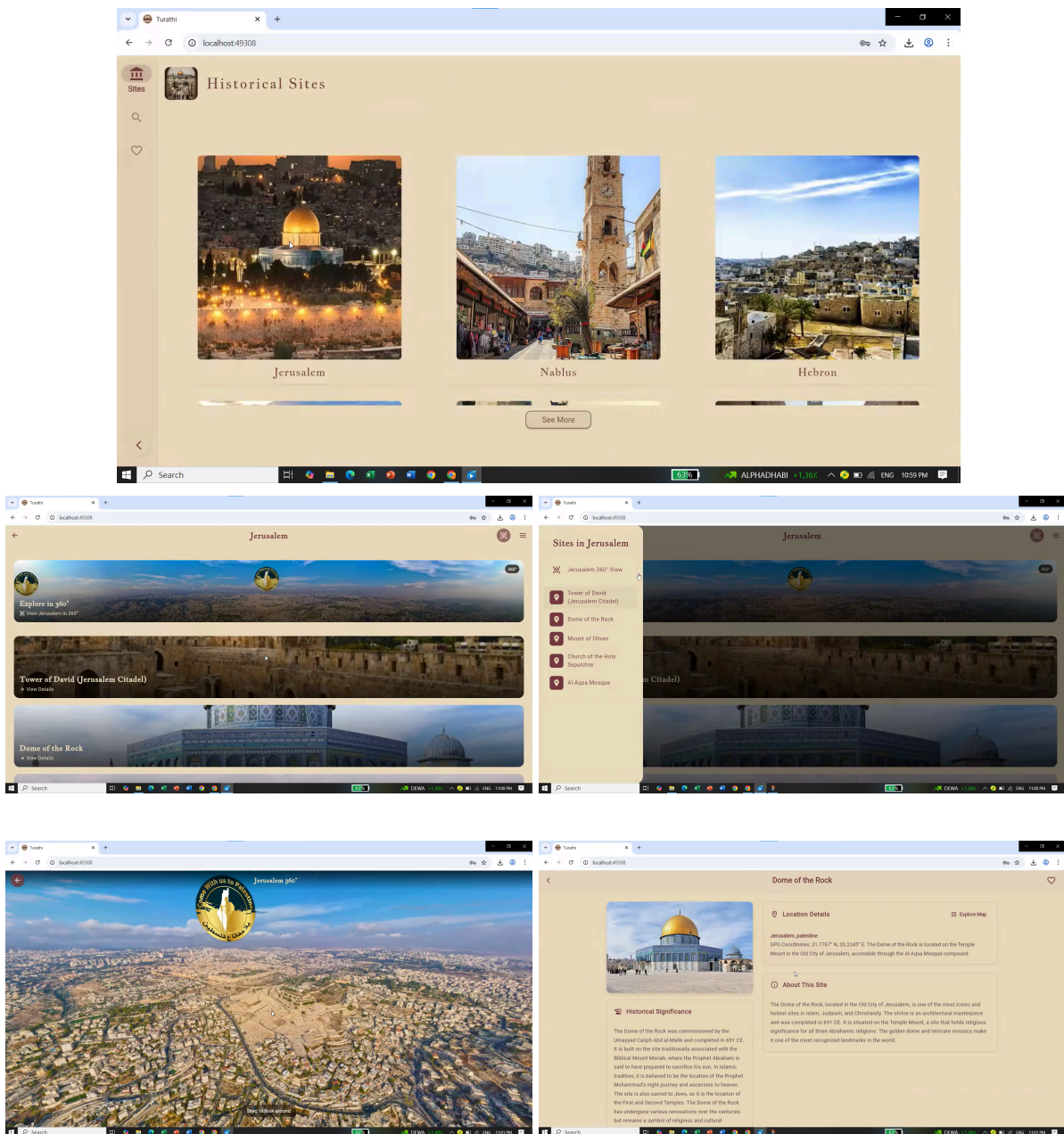
## Traditional Food Section

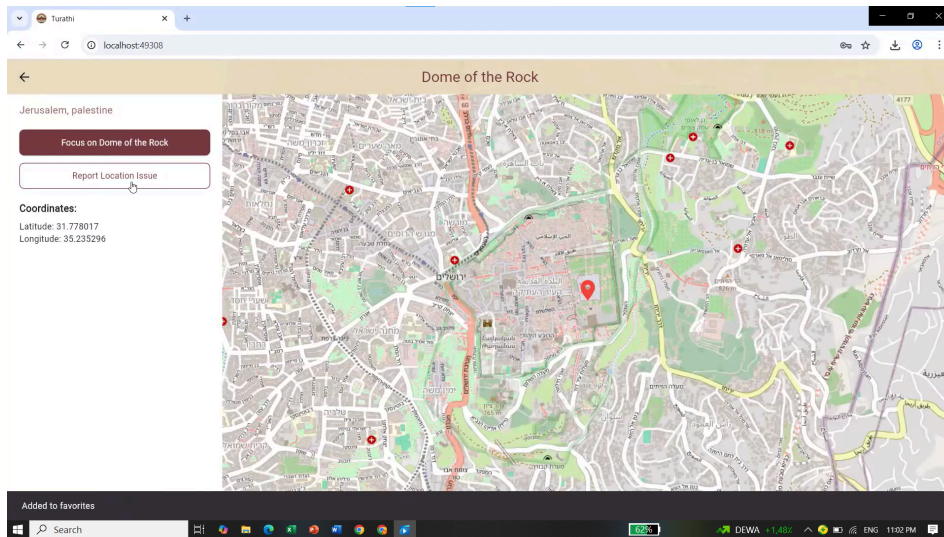


## Palestinian Crafts Section

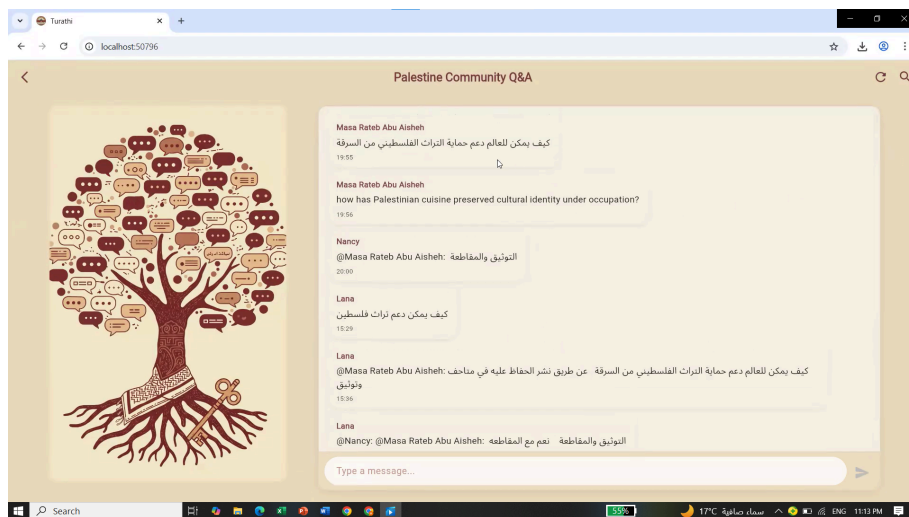
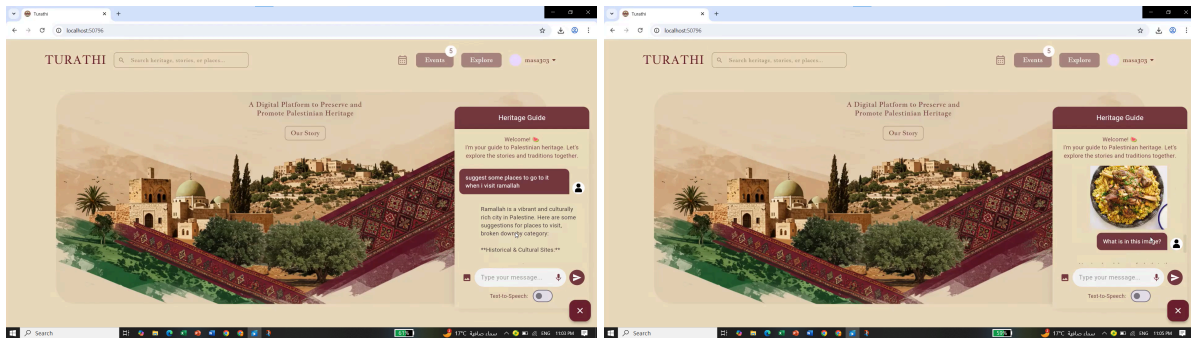


## Historical Sites Section

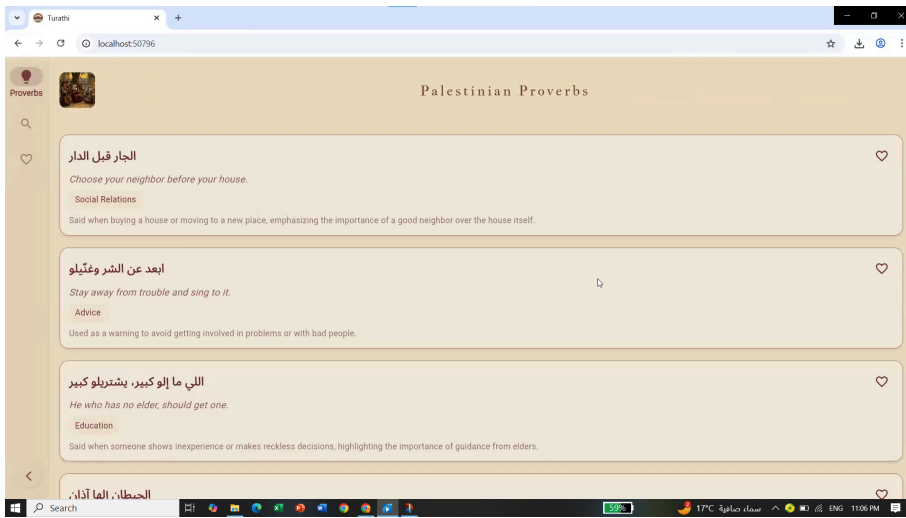




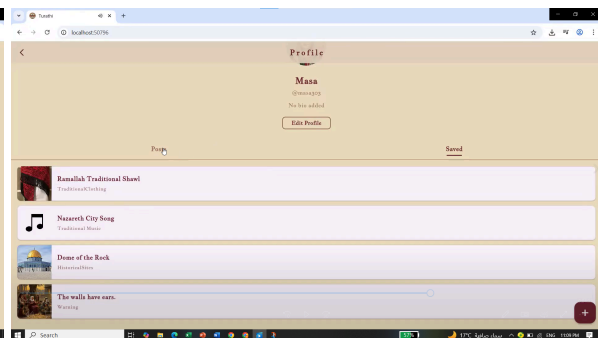
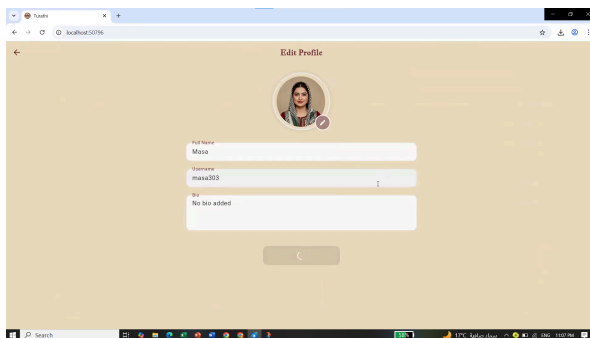
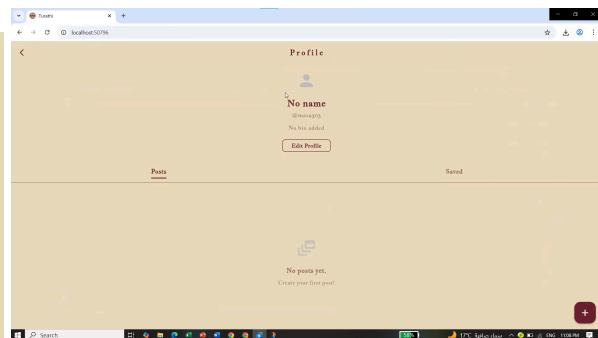
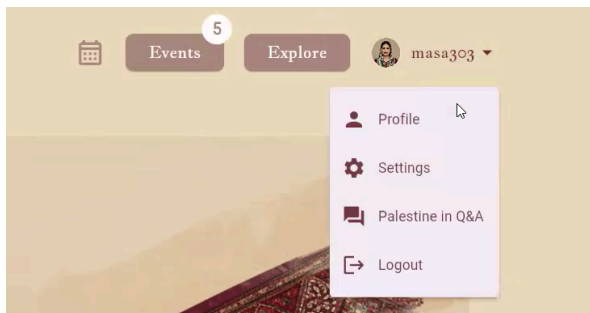
## Chat Experience: AI & Palestine in Q&A

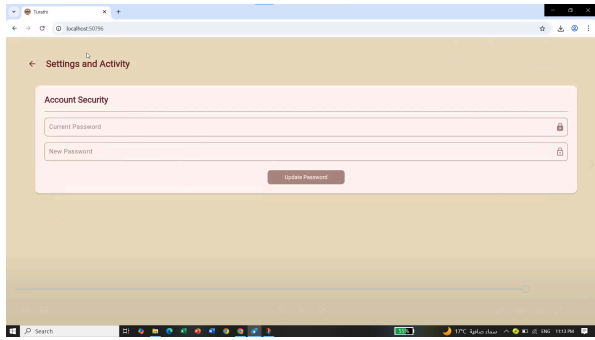
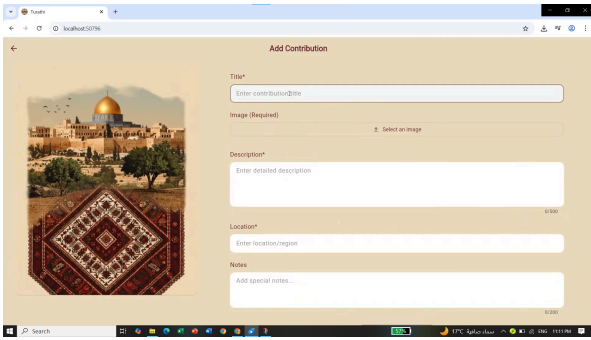
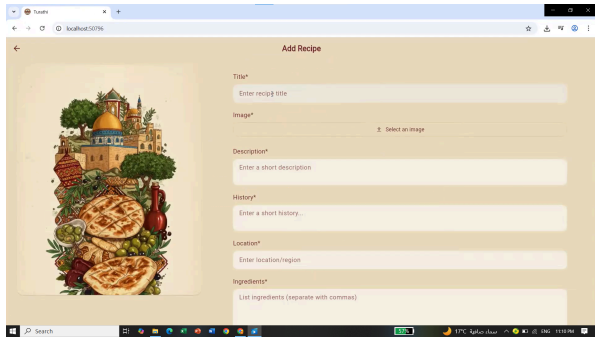
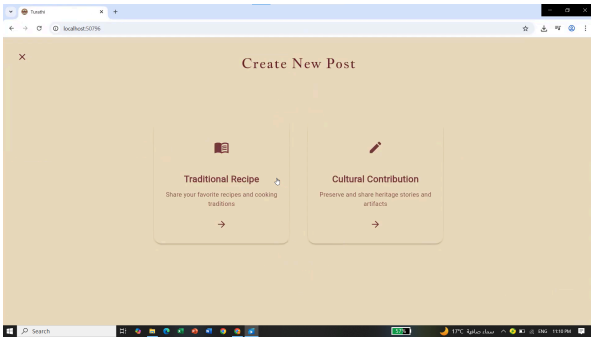


# Palestinian Proverbs



# Profile





# Admin Control – Turathi App

## 1. Welcome Screen

1. Upon opening the app, admins are greeted with a symbolic visual and to Turathi's mission.
2. A glowing "Admin Dashboard" button leads to the secure login screen for administrative access.

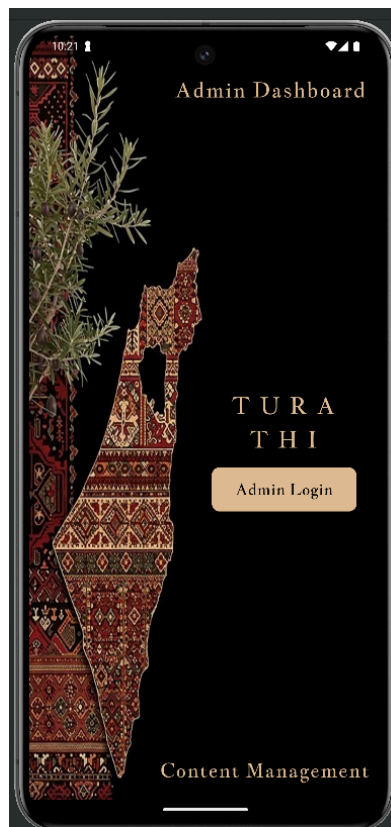


Figure 1: Administrator Welcome Screen

## 2. Login Screen

When Admin Login:

Admin logs in using username and password via a secure login screen. If the admin forgets the password, the "Forgot Password" option allows resetting via email and username verification.

The system displays clear error messages—"Invalid email" or "Incorrect password"—when login credentials are incorrect.

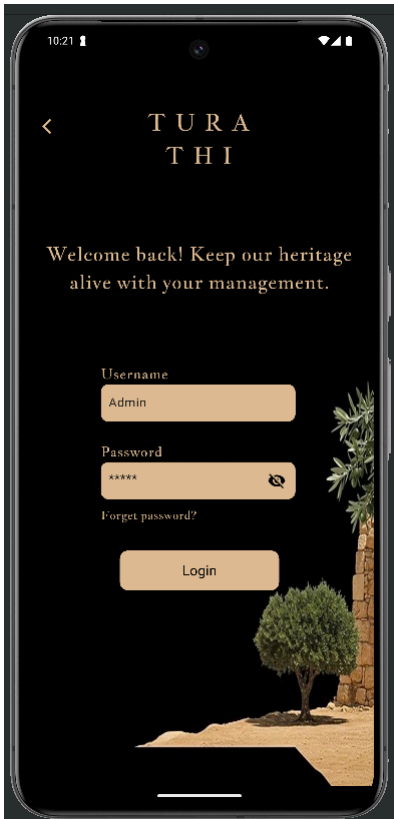


Figure 2:Login screen

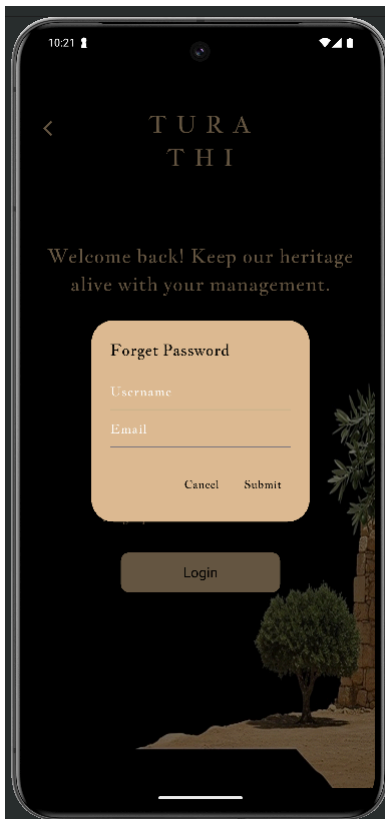


Figure 3:Forget password screen

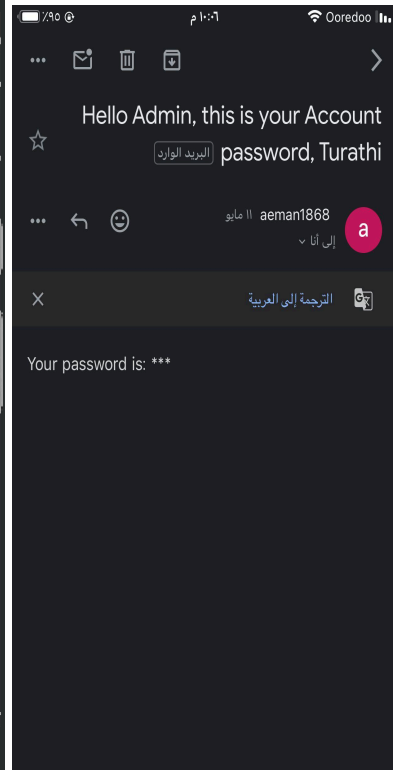


Figure 4:Reset password message

### 3. Home Page Screen

After successful login, the admin is directed to the main dashboard—an all-in-one interface that provides access to every feature in the app. From this centralized hub, the admin can manage, edit, delete, approve, and monitor all content and user activities, ensuring complete control over system operations and user-generated submissions.

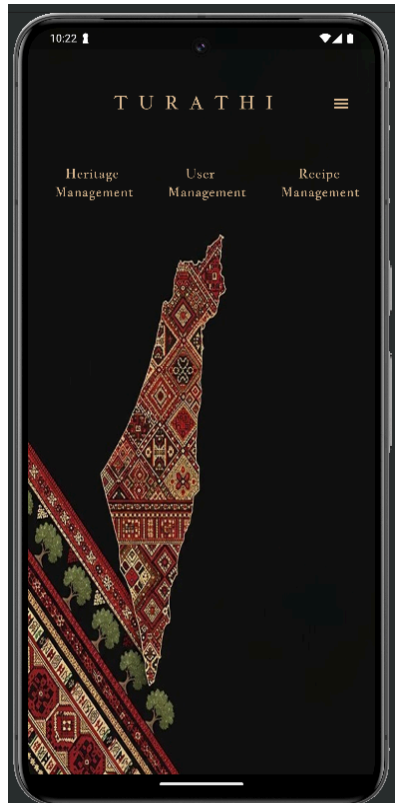


Figure5:Homepage screen

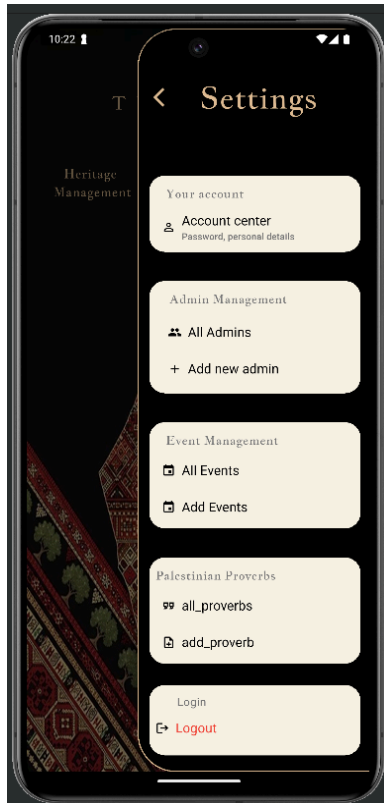


Figure6:Settings screen

#### 4. Account Center Screen

The **Account Center** screen allows the admin to independently update their name and username, with a dedicated "Save" button to confirm changes. Additionally, a separate section is provided for password updates, enabling the admin to change their password without affecting other account details—offering full control with flexibility and ease.

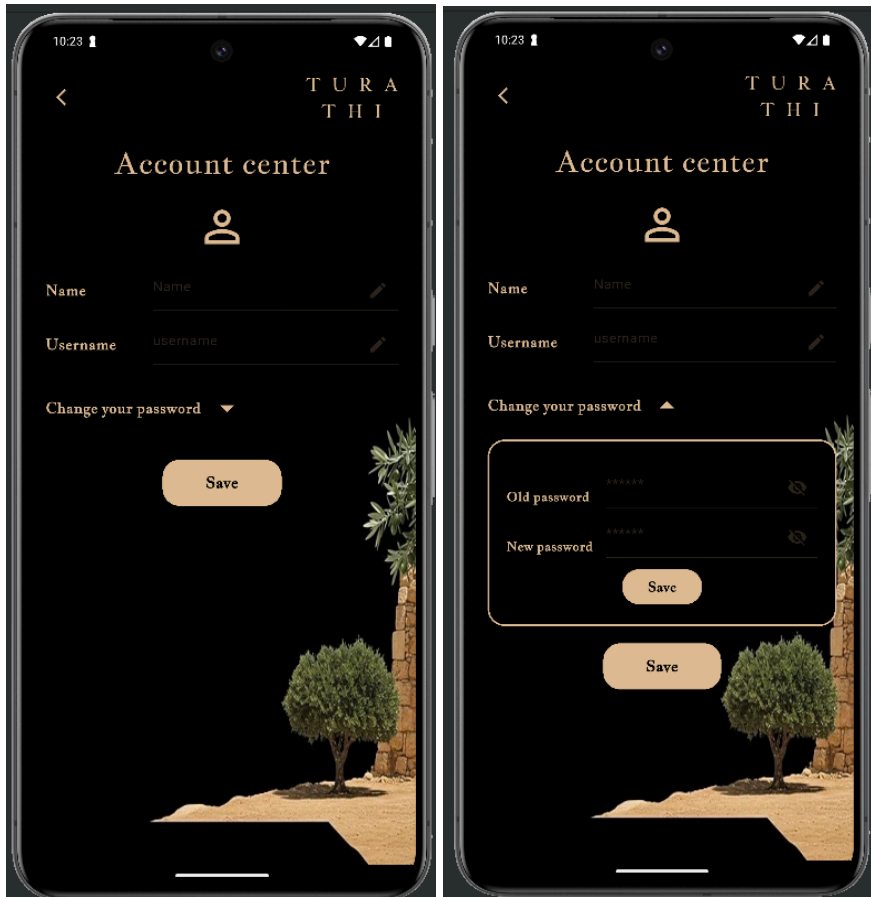


Figure 7:Account center page

## 5. Event Management Section

1. The **View All Events** page automatically removes any past events and allows the admin to manually delete current ones. A button on this page also navigates directly to the event creation screen.
2. The **Add Event** page lets the admin input complete event details, with real-time validation that highlights any missing or incorrect information for correction before submission.

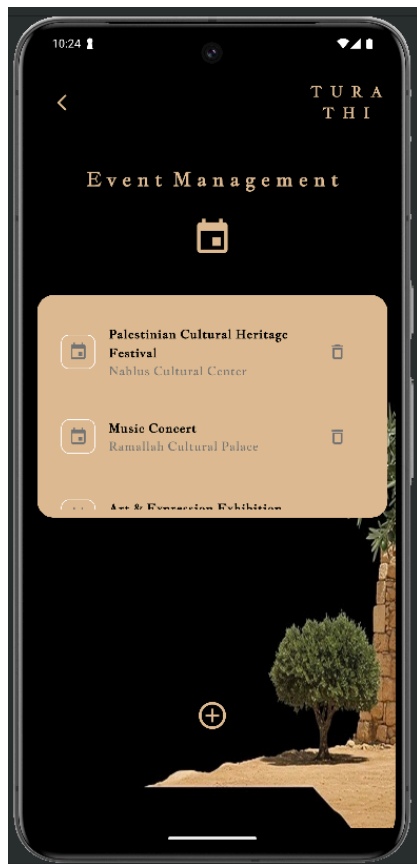


Figure 8:View All Event Page



Figure 9: Add Event Page

## 6. Admin Management Section

1. The **View All Admins** page allows the admin to review all registered admin accounts and manually delete any if necessary. A button on this page also navigates to the admin creation screen.
2. The **Add Admin** page enables the current admin to input complete details for a new admin, with real-time validation to highlight any missing or incorrect information before submission.

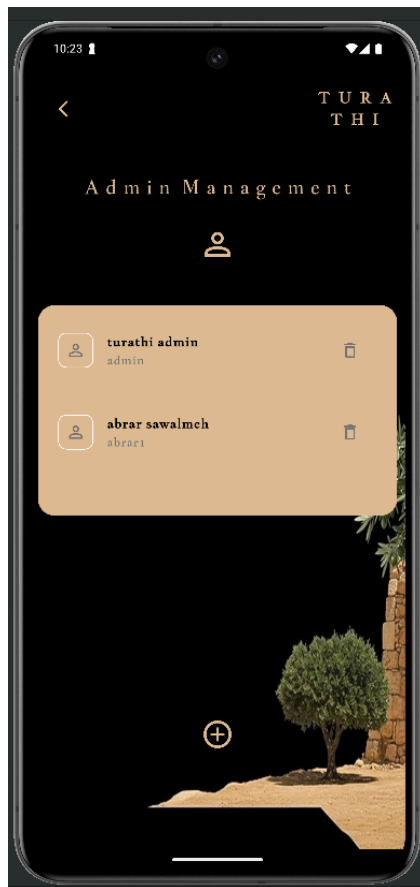


Figure 10:View All Admin Page

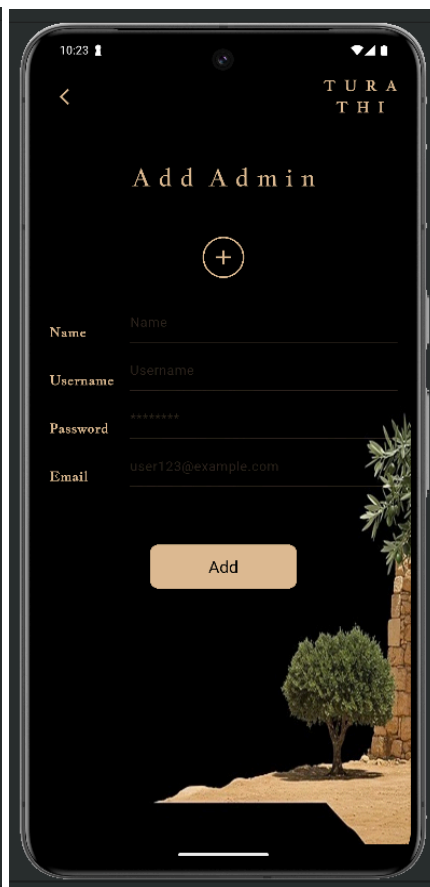


Figure 11: AddAdmin Page

## 7. Proverbs Management Section

1. The **View All Proverbs** page lists all entries, each with a delete icon for quick removal.
2. Selecting a proverb opens the **View Proverb** screen for editing or deletion.
3. The **Add Proverb** page allows entry of new proverbs, with validation for missing fields.



Figure 12:View All Proverbs Page

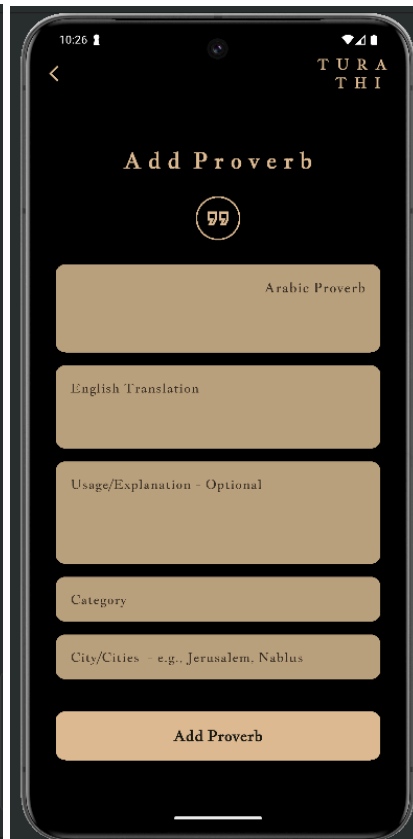


Figure 13: Add Proverb Page



Figure 14:show Proverb details page

## 8. Recipe Management Section

1. When entering the **Recipe Management** section, AI filtering (via Groq SDK) scans and rejects inauthentic or incorrect recipes, with instant user notifications.
2. Clicking a valid recipe opens its details and submitter info, allowing the admin to **Approve** or **Reject**, triggering a status update to the user.

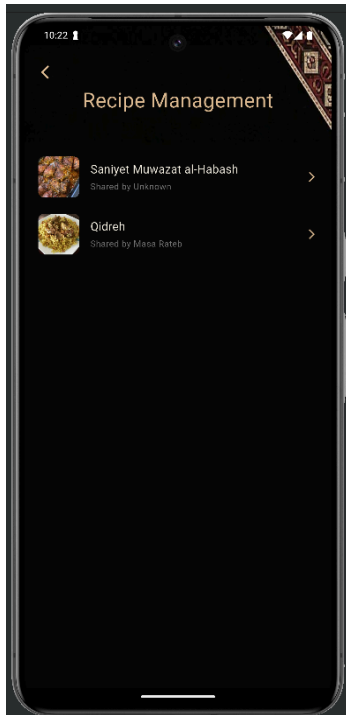


Figure 15:View All Recipe Page

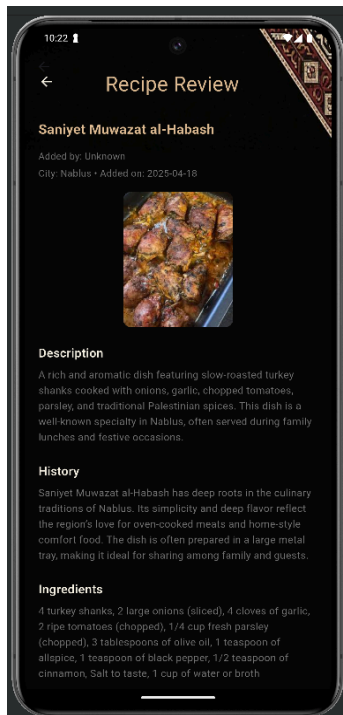
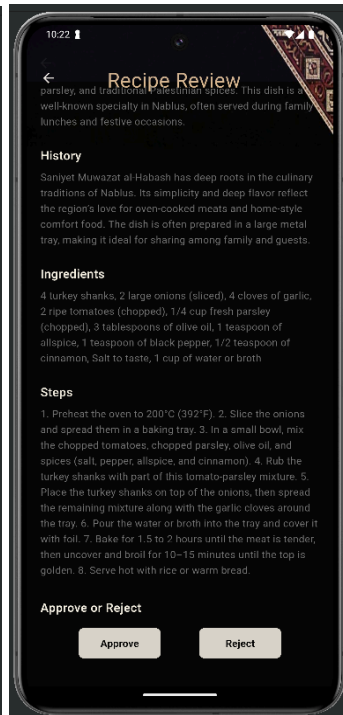


Figure 16:show Recipe details page



## 9. User Management Section

1. The **View All Users** page displays all registered users with a filterable dropdown to sort by recent, oldest, or time-based registrations, along with a search bar for quick lookup.
2. Clicking a user opens a detailed profile showing their activity and info, with an option to permanently delete the user from the app.

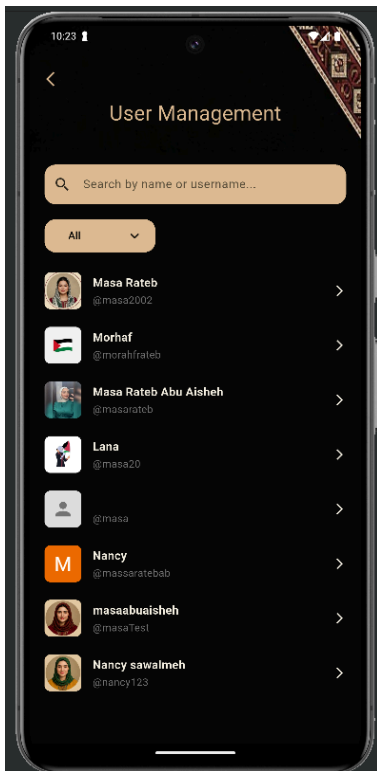


Figure 17:View All user with a filterable dropdown Page

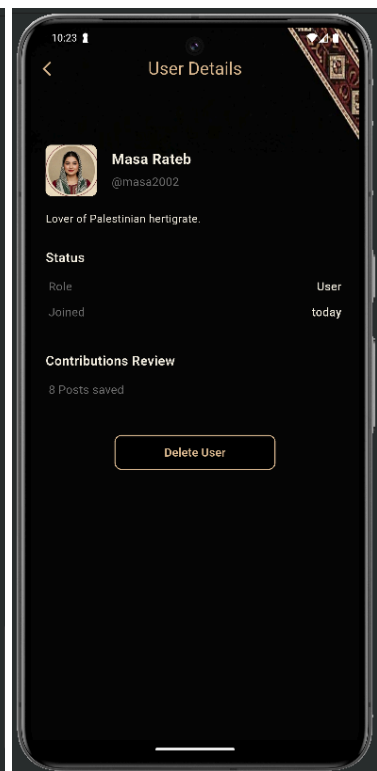
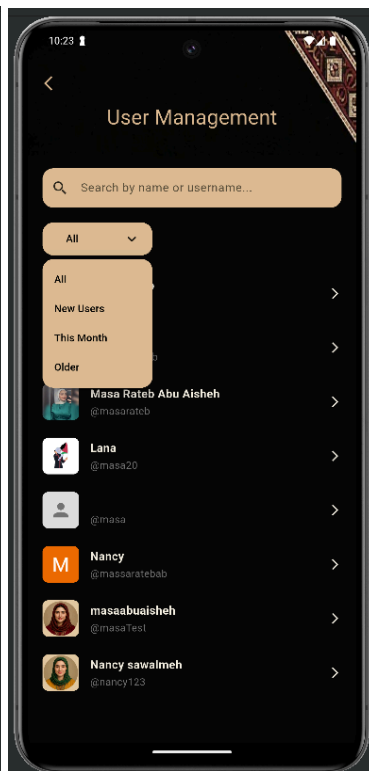


Figure 18:show User details page

## 10. Heritage Management Section

The **Heritage Management** page displays all heritage items with a search bar and filtering by type, recency, and status.

Each item opens a detailed view with edit and delete options, consistent across all heritage types.

The **Drafts** filter shows unpublished items only, with actions to edit, delete, or publish and notify users.

A button on the main page allows admins to quickly navigate to the **Add Heritage Item** screen.

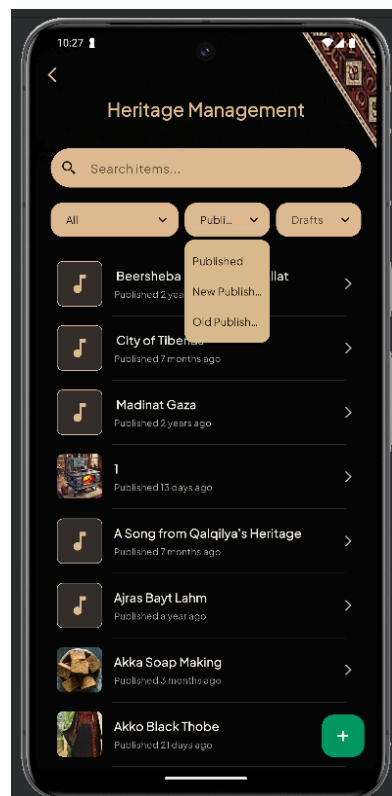
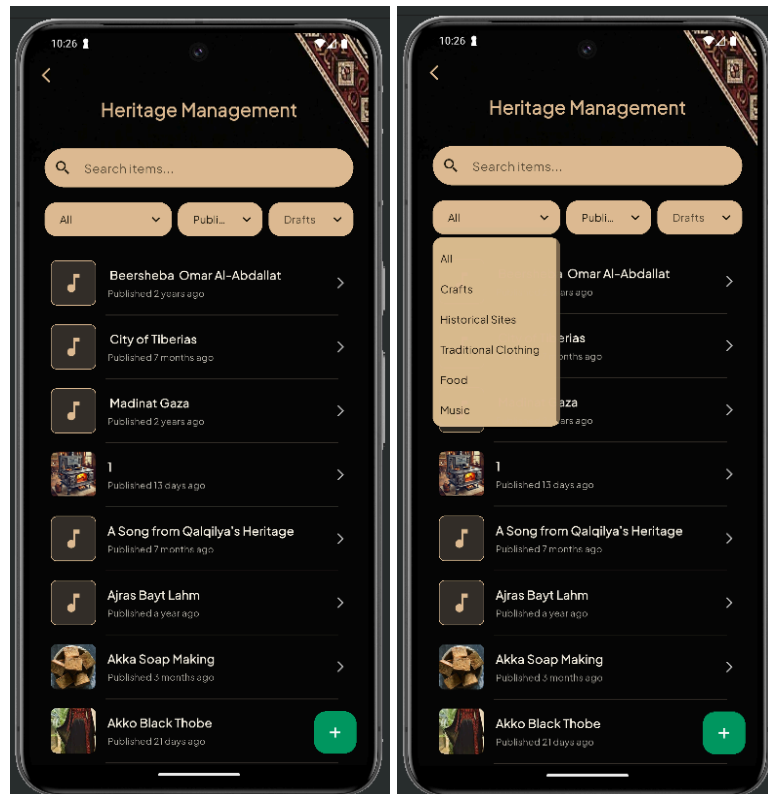


Figure 19: View All Heritage with a search bar and filtering by type, recency, and status Page

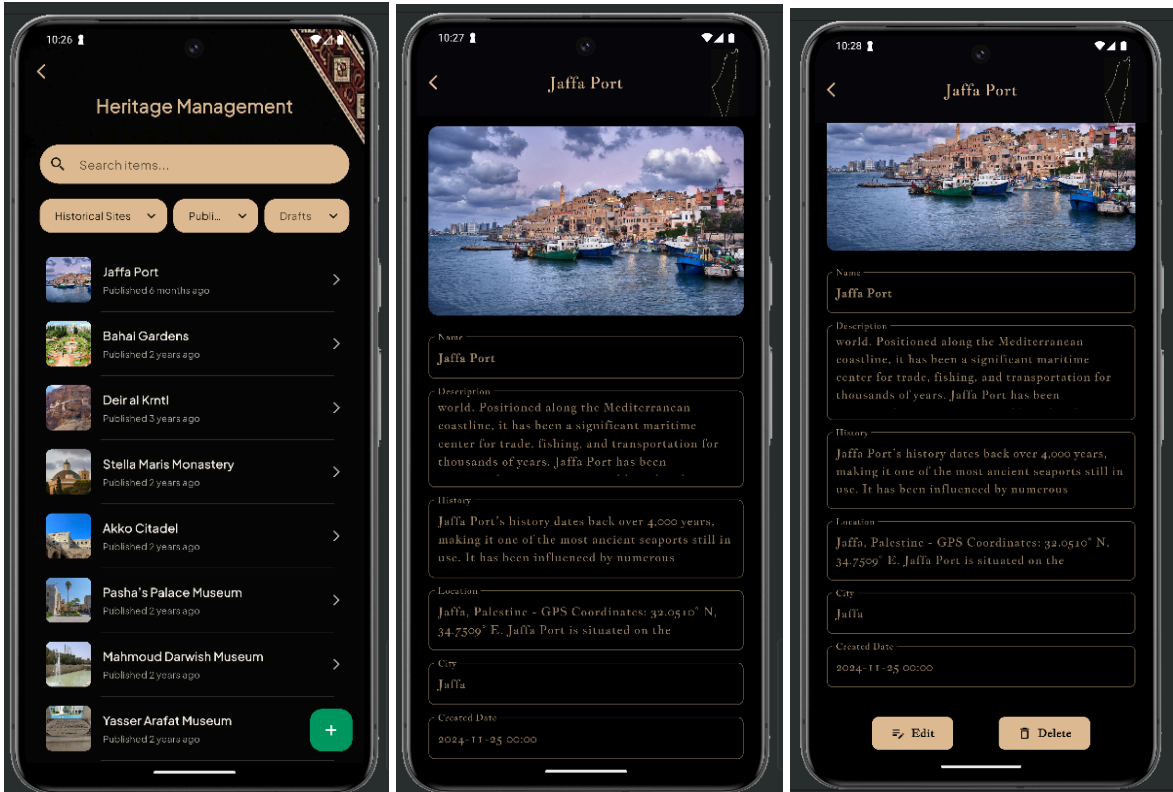


Figure 20: Viewing all heritage sites by filtering and displaying all details for a specific site

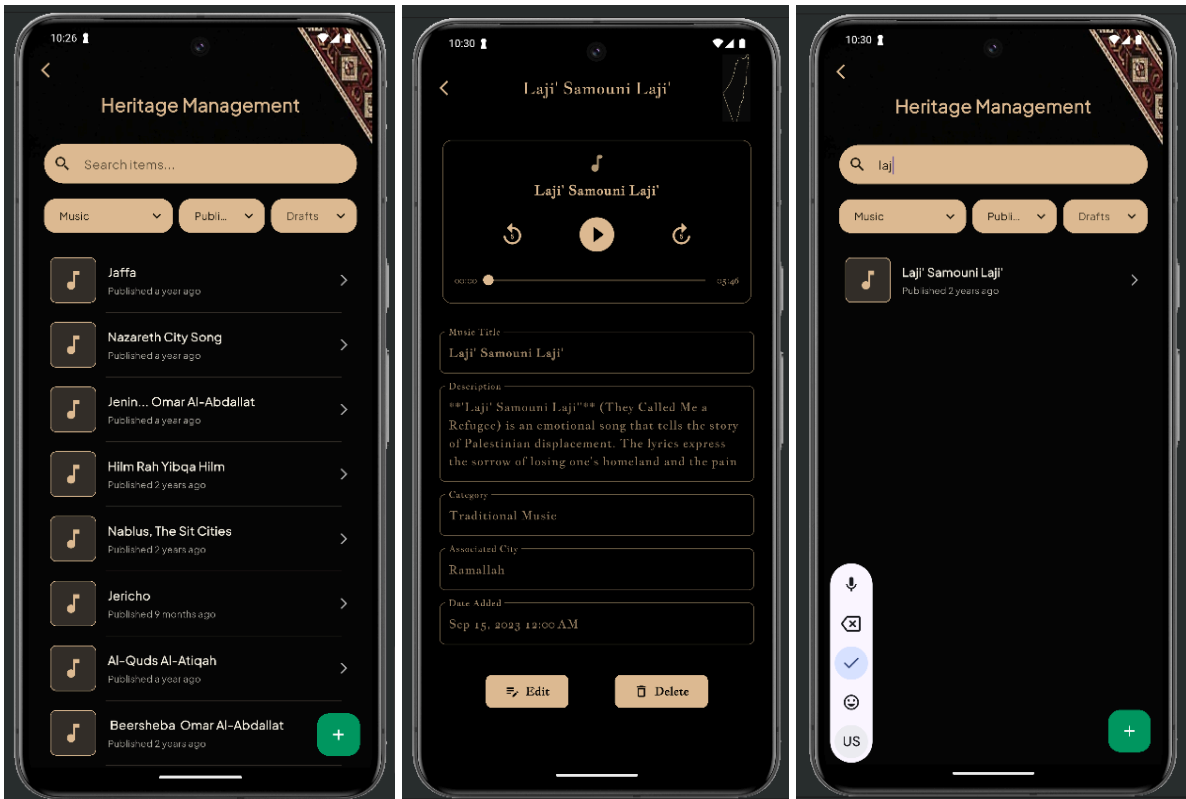


Figure 21: Viewing all heritage music by filtering and displaying all details for a specific searched site.



Figure 22: Displaying all traditional dishes by filtering and displaying all details for a specific dish

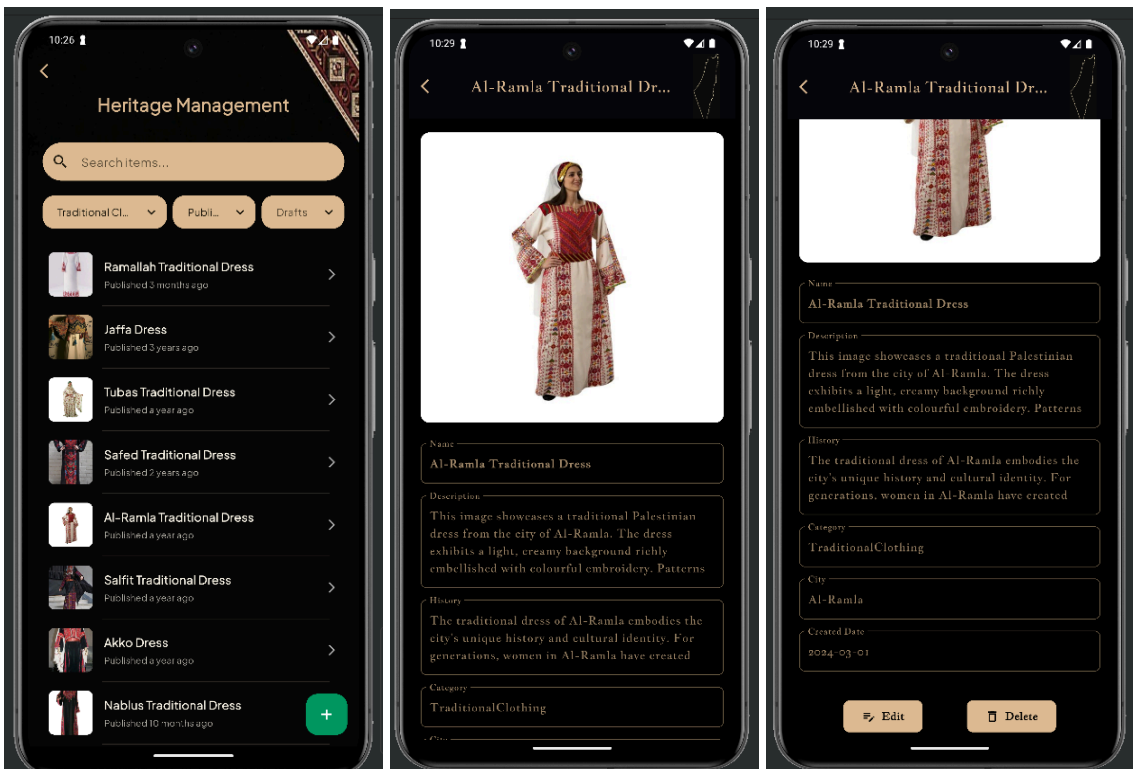


Figure 23: Displaying all traditional clothing by filtering and displaying all details for a specific clothing



Figure 24: Displaying all heritage items saved as drafts and viewing a specific traditional craft saved as drafts.

## 11. Add Heritage Items Section

This section includes a main page with a navigation bar listing all heritage categories. When selecting a specific category, the admin is directed to a form to add complete item details. Submissions can be saved as either published or draft. If any required field is missing, an error message appears.

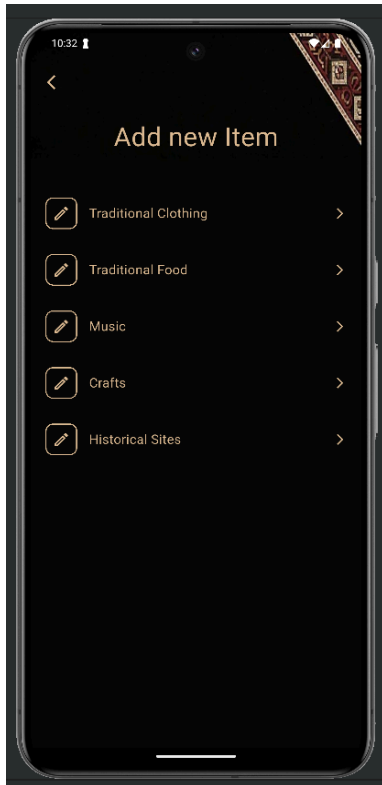


Figure 25:View Add Items Page

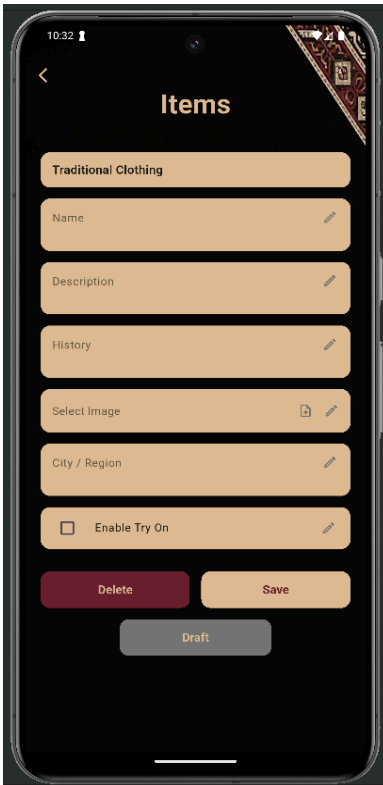


Figure 26:View Add traditional clothing

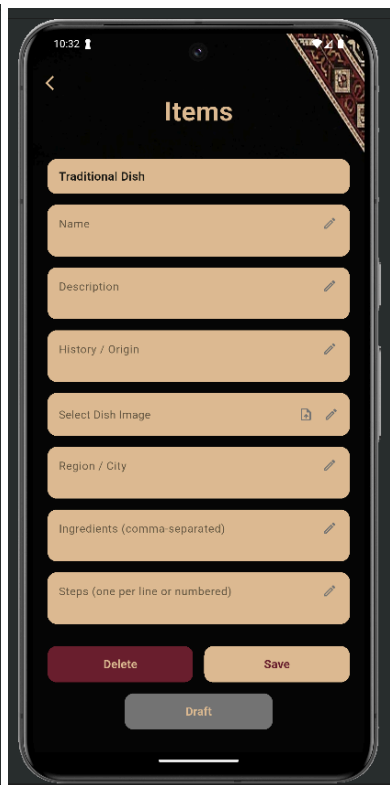


Figure 27:View Add traditional dish

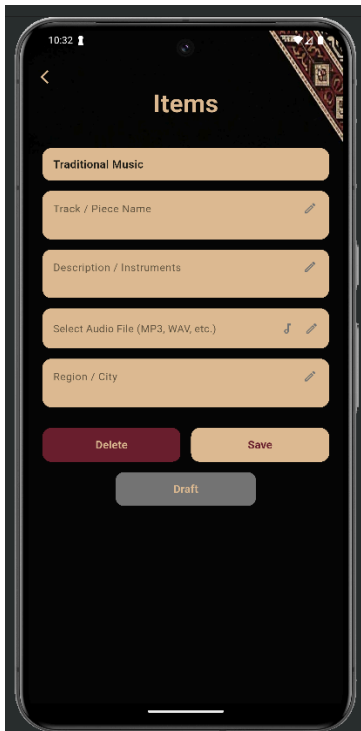


Figure 28:View Add traditional Music

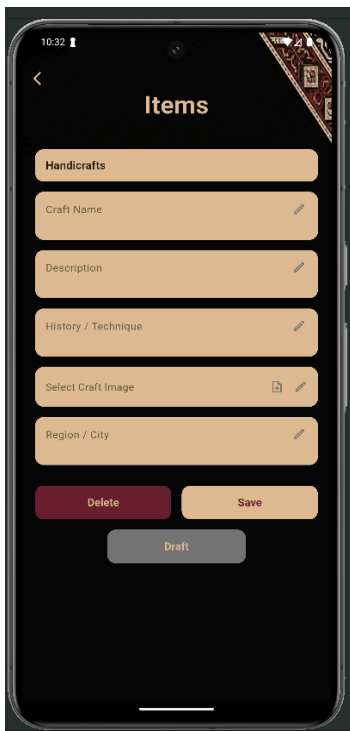


Figure 29:View Add traditional Craft Site

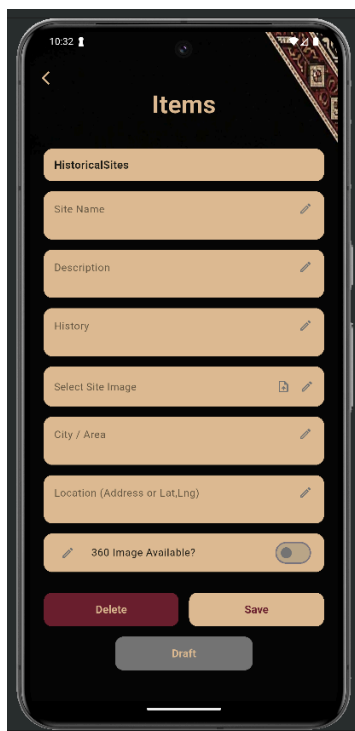
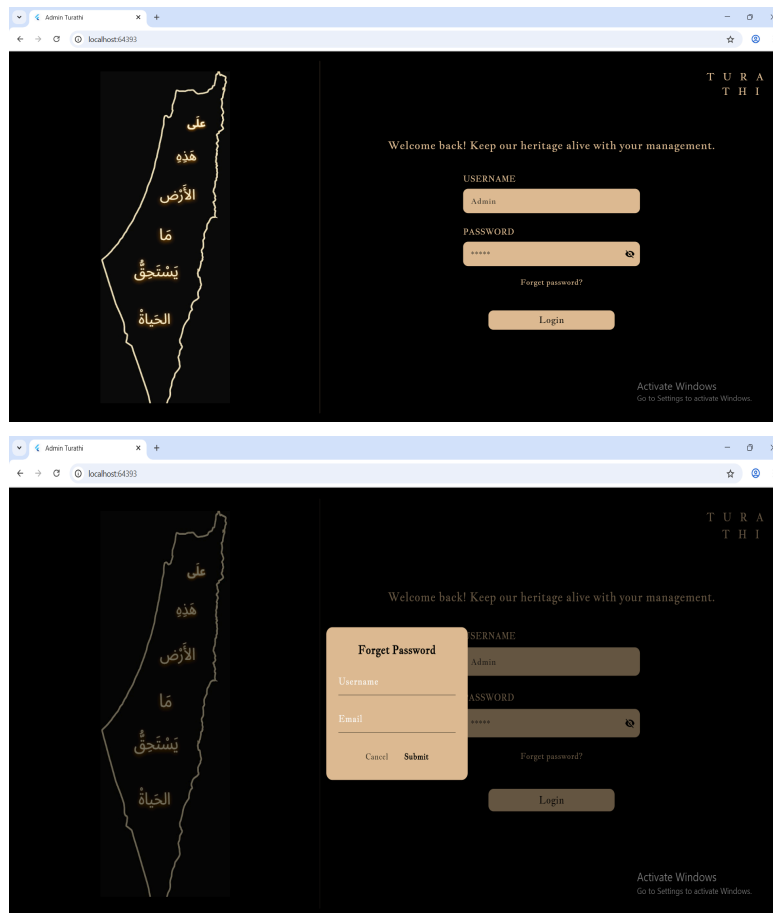


Figure 30:View Add traditional Site

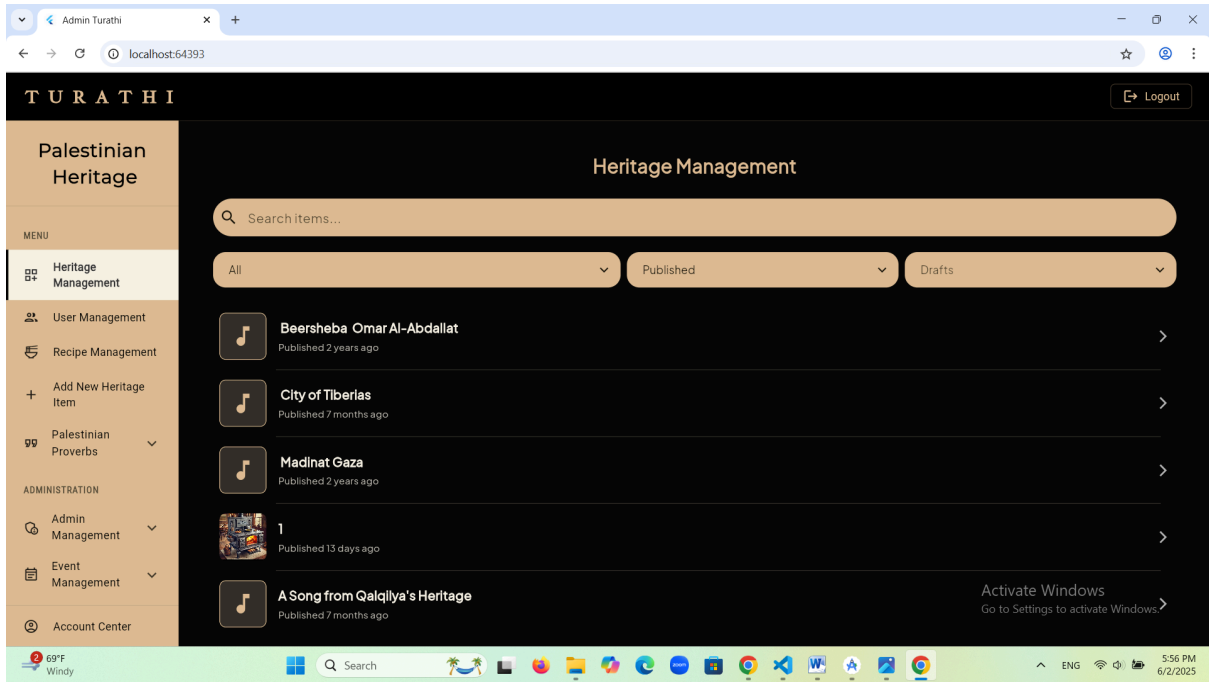
## Web Version:

All admin screens are also fully responsive on the web, ensuring smooth access and management across both desktop and mobile devices.

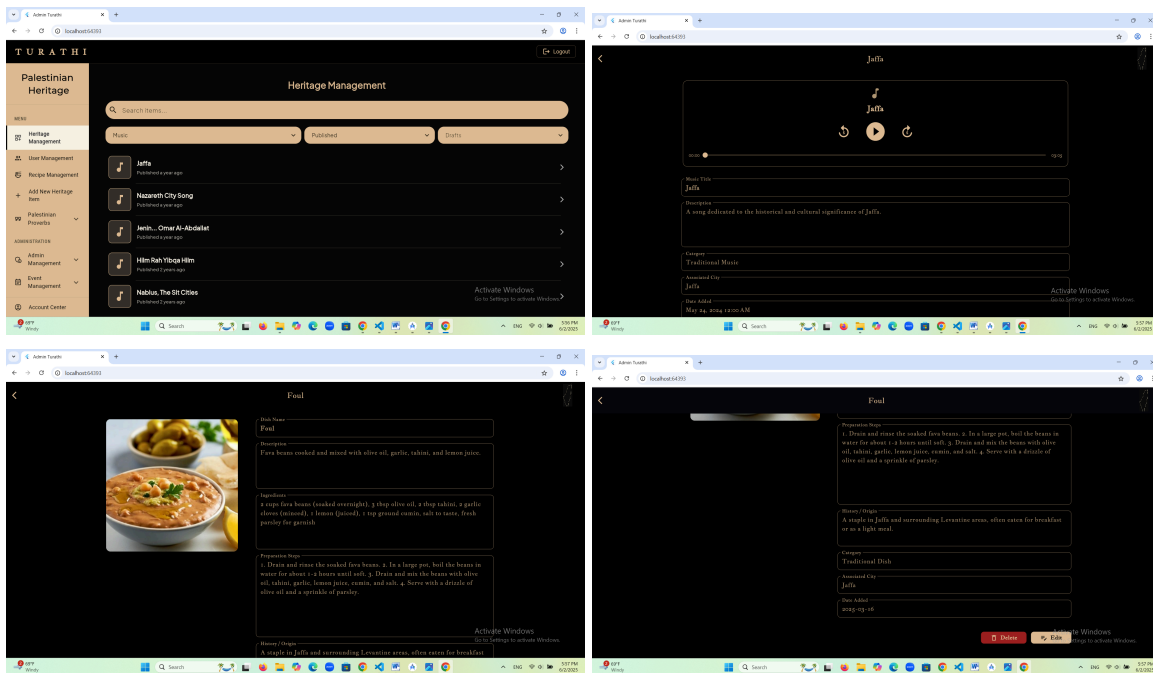
## Welcome Screen And Login




# Home Page Screen



# Heritage Management Screen



**Jaffa Dress**



**Name:** Jaffa Dress

**Description:** A traditional Palestinian dress from the city of Jaffa, known for its luxurious fabric, intricate embroidery, and vibrant colors. It often features gold and silver threadwork, along with floral and geometric patterns.

**Notes:** Jaffa, an historic coastal city and trade hub, influenced its traditional dress with elegant designs and rich embroidery. Palestinian women in Jaffa crafted their dresses using high-quality fabrics.


**Category:** TraditionalClothing

**City:** Jaffa

**Created On:** 2024-06-04

Buttons: Edit, Publish, Share

**Bahai Gardens**



**Name:** Bahai Gardens

**Description:** The Bahai Gardens, located in Haifa, Palestine, are a stunning series of terraced gardens surrounding the Shrine of the Báb on Mount Carmel. These meticulously landscaped gardens are a UNESCO World Heritage Site and serve as a major pilgrimage site for members of the Bahá'í Faith. The gardens offer breathtaking views of the city and the Mediterranean Sea.

**Notes:** The Bahai Gardens were designed as a tribute to the Bahá'í Faith's spiritual and historical roots. The construction of the gardens began in the 1920s and was completed in 1953. The construction of the gardens, the Shrine of the Báb, honors the remains of the Bahá'í Faith's prophet Báb.

**Category:** Landmarks


**City:** Haifa, Palestine

**GPS Coordinates:** 32.814° N, 34.981° E

**Created On:** 2024-06-04

Buttons: Edit, Publish, Share

**Safed Traditional Dress**



**Name:** Safed Traditional Dress

**Description:** This dress represents a traditional Palestinian dress characteristic of the city of Safed and the Galilee region. The dress is distinguished by its dark headscarf (black or indigo) and its vibrant, rich embroidery. The chest panel (Qabbal) and side panels (Dhaghr) are adorned with intricate embroidery in earthy tones and deep blues.

**Notes:** The history of this style of dress dates back to the traditions of the Upper Galilee region, where Safed was an important center. Women would donate fabric to the church or later deal in dark colors. The embroidery, especially cross-stitch (Tarran), is a key feature.

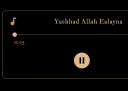
**Category:** TraditionalClothing

**City:** Safed

**Created On:** 2024-06-04

Buttons: Edit, Publish, Share

**Yashad Allah Dalayna**



**Name:** Yashad Allah Dalayna

**Description:** A powerful traditional song that originates from "Nabatie", known for its emotional lyrics and passionate tone. The song expresses pride, unity, and resilience among Palestinians, with a special reference to the cultural and revolutionary spirit of Nabatie. Its lyrics often reflect the struggle, the love for the homeland, and the yearning for freedom.

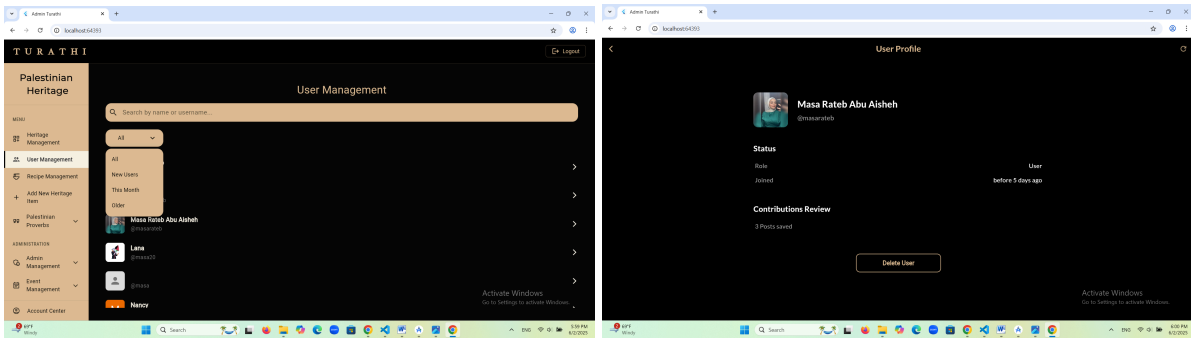
**Category:** Traditional Music

**City:** Nabatie

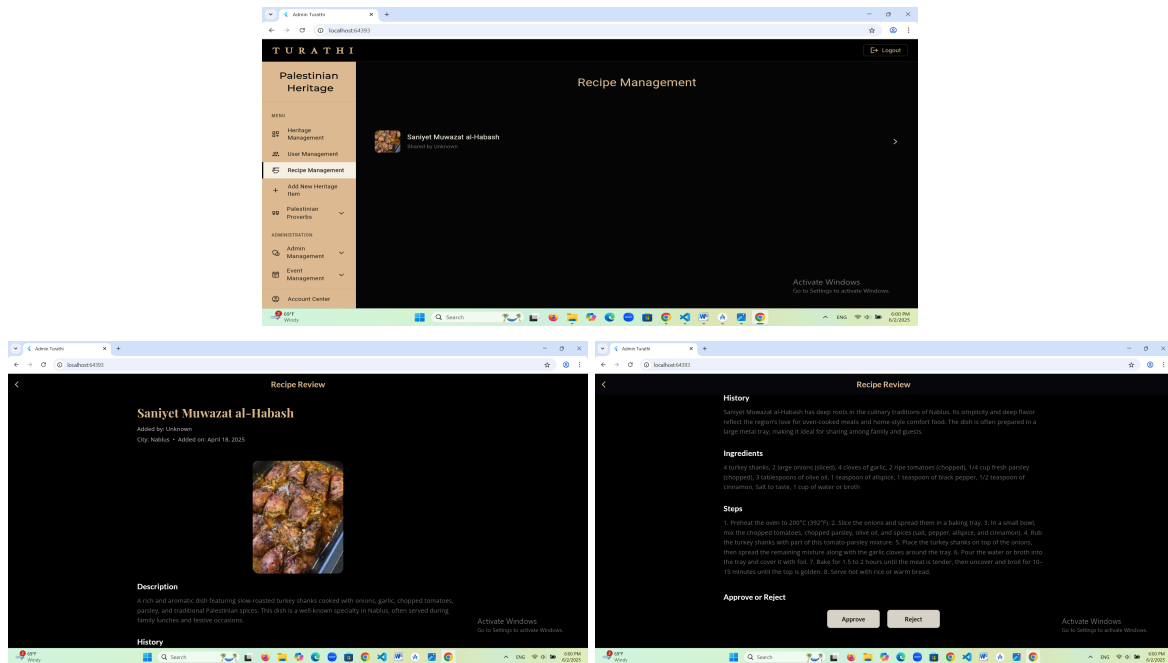
**Created On:** 2024-06-04

Buttons: Edit, Publish, Share

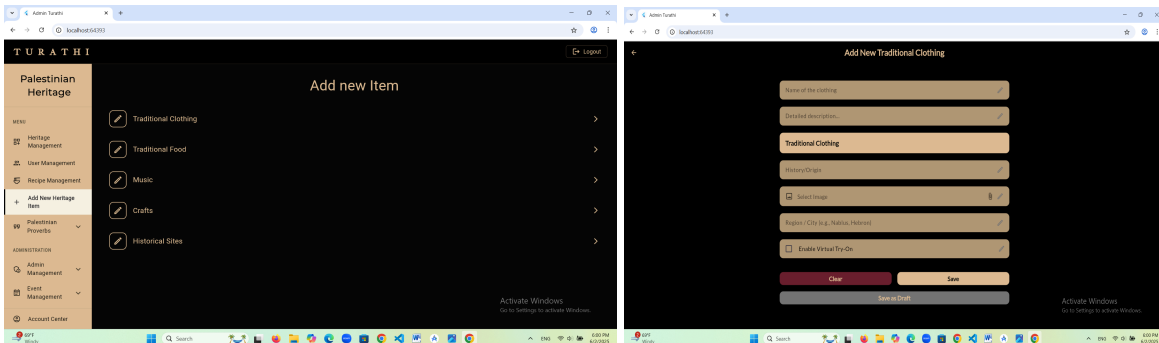
# User Management Screen

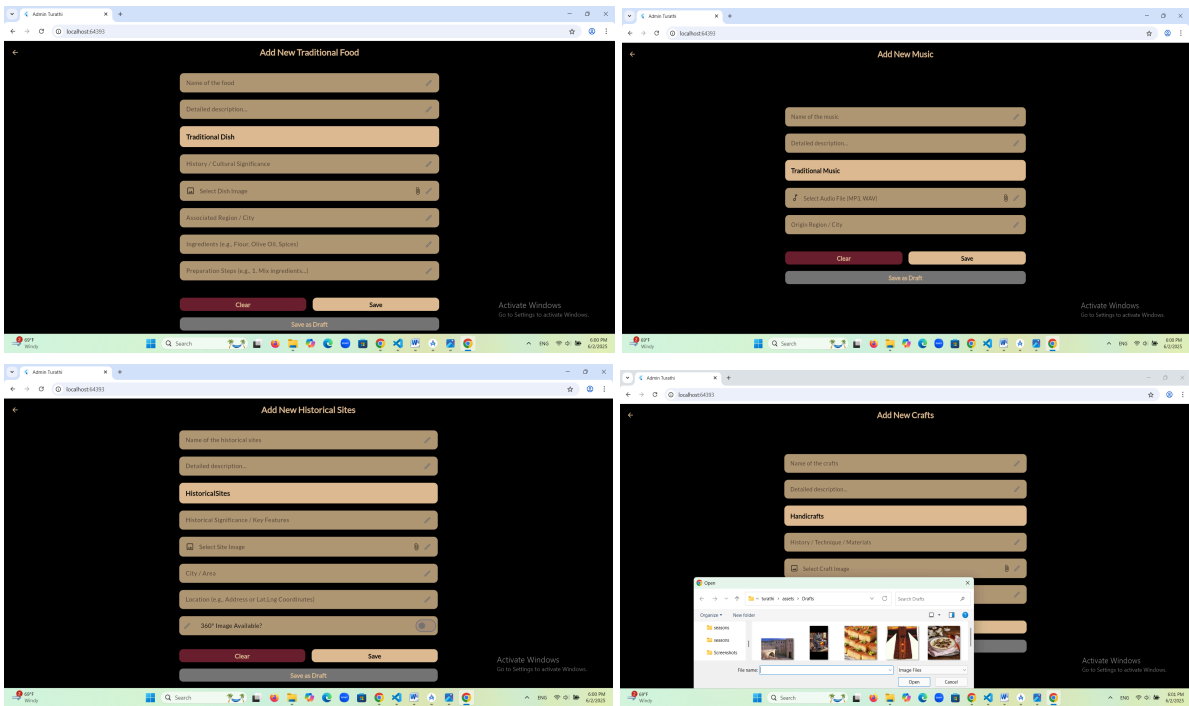


# Recipe Management Screen

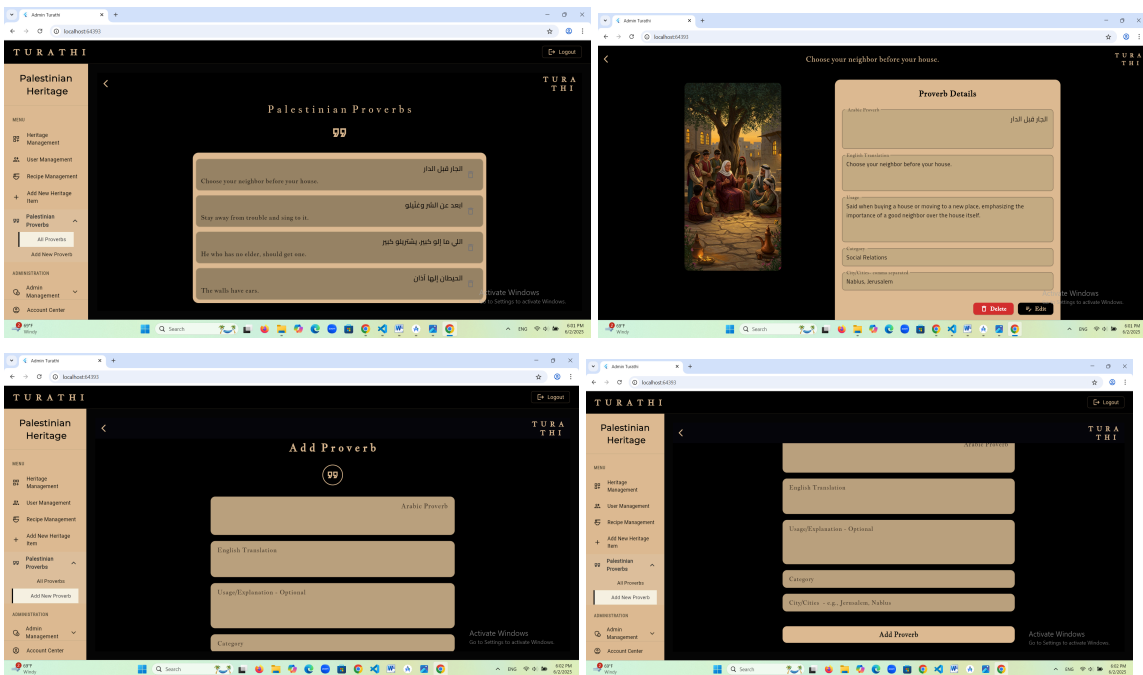


# Add Heritage Items Screen

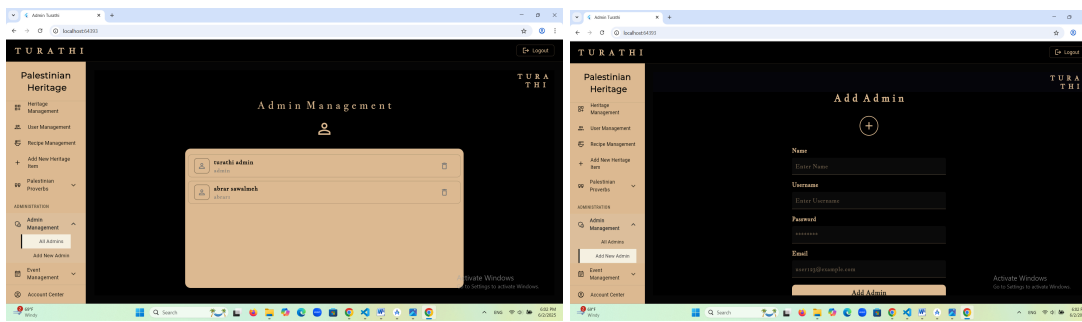




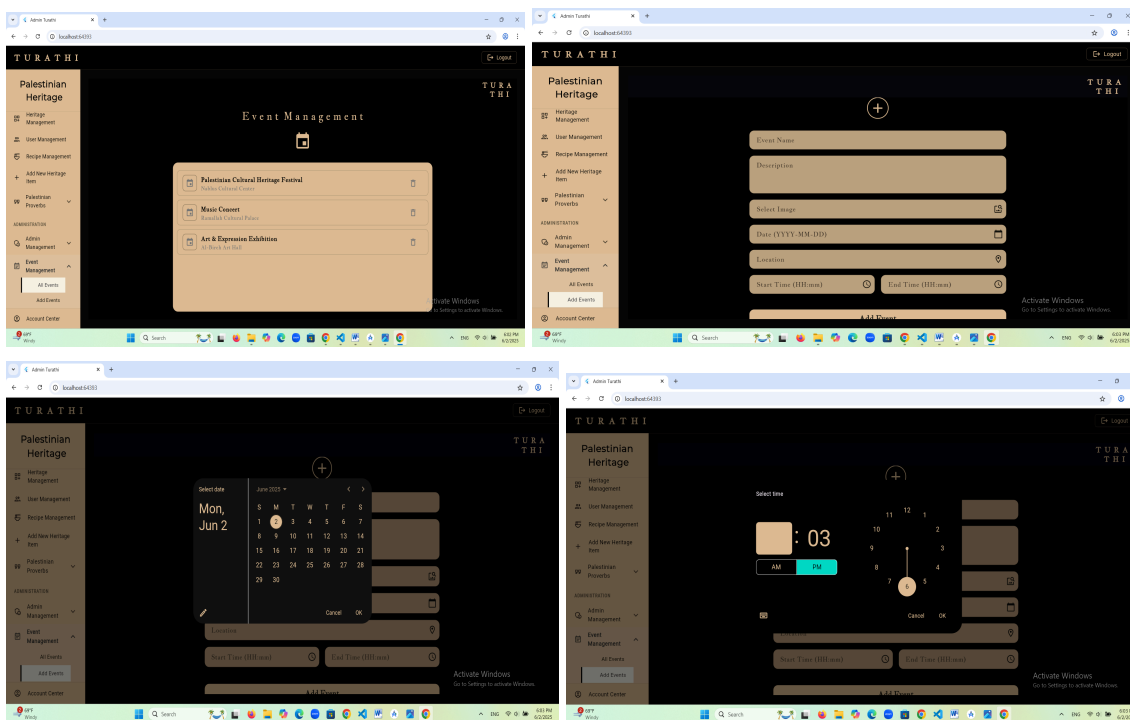
## Proverbs Management Section



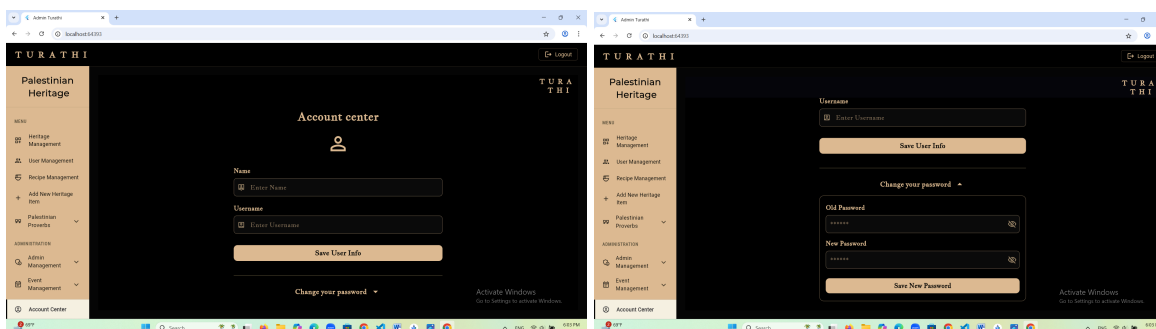
## Admin Management Section



## Event Management Section



## Account Center Screen



# Result & Discussion

## Resolving the Problem

Turathi addresses the challenge of digital cultural preservation and dissemination via a scalable, inclusive, and interactive framework. Some highlights are as follows:

- **Cultural Accessibility:** The notion of cultural accessibility is based on the multi-linguistic capability of the platform with dispersed points of knowledge; the system bridges all the gaps in cultural education when contextually confronting the dispersal of Palestinian heritage (e.g., the proverbs used to frame significant smart objects, AR clothing, numerous heritage sites, etc.).
- **Security & Moderation:** JWT for authentication, Firebase Authentication for privacy, and filtering unacceptable content (blocking politically sensitive terms) provides security and moderation for respectful culturally interactive meanings.
- **User Engagement:** Users can engage with the site through AR try-ons, AI-generated Q & A, and engagement from social input (e.g. submitting recipes) that the administrators can use to validate (scale and functionality).

Accordingly, there were some limitations to the project such as financial limitations (e.g., free tier based maps), limited or best effort data (e.g. verifying the historical accuracy) so more functionality was possible in a socially impactful way (interactivity of the map).

## Contributions to the Field

Turathi pushes cultural conservation technology forward by:

1. **Cross-Platform AR Integration:** The hybrid AR format (live camera + freeze-frame) establishes a pathway for mobile and web cultural experiences with low latency.
2. **Ethical AI Moderation:** The Groq SDK is used to filter out inauthentic content (e.g., recipes) plus the chat Q&A obligates cultural sensitivity—a model for heritage platforms in contested areas.
3. **Community-Curated Content:** Users provide submissions (e.g., recipes, posts) which will have administrator approval, balancing inclusiveness to authenticity, an approach useful for other heritage initiatives.

## Limitations

- **Data Gaps:** Some historical sites were not photographed with 360° imagery or were not able to be hyper-linked to their provenance for political reasons.
- **AR Performance:** Device fragmentation made our try-on experience inconsistent on older devices.

## Future Directions

- **Collaborative Data Sourcing:** Work with cultural institutions to grow the verified heritage datasets.
- **Monetization for Sustainability:** Allow users to pay for premium features (e.g. ad-free tiers) to allow for upgrades on the API tier..
- **Offline Mode:** Cache important content for lack of connectivity (e.g. maps).

# Conclusions and Recommendations

Turathi is, by all accounts, a cutting-edge digital resource that merges both tradition and innovation. Leveraging a combination of AI, AR, geolocation, and community engagement, the digital platform engages both local and diaspora audiences in the rise of Palestinian heritage. The approach demonstrates that technology can be a vital tool in maintaining identity, educating future generations, and affirming cultural pride.

## Recommendations

- **Expand AR Capabilities:** Use Unity to create more stable AR clothing try-ons across devices.
- **Community Incentives:** Consider offering verified user contributions badges as a reward for making high quality contributions.

## Future Work

- **Cultural Marketplace:** Create a Store within the app that will allow local artisans and home-based food makers to show off and sell traditional crafts and foods by selling them directly on the app.
- **Enhanced AR Experience:** Improve AR clothing try-ons to permit better accuracy and allow users to try many traditional dresses in one user session and create an option for users to take and save a picture of themselves wearing the virtual outfit for their use or social media (it will contribute to both cultural experience but also marketing).
- **Community Interaction:** Create a social layer where users can follow, like, and comment on each other's postings, thereby enabling group identity through a shared sense of identity and allowing for a more active cultural exchange.
- **Event Management Section:** The current solution serves as a middleman by showing upcoming events and advising users of an RSVP, yet we envision a more high-tech solution. Future improvements would include the ability for users to reserve actual seats and receive QR-based digital tickets and potentially offer priority access for tickets based on some engagement record. The upgrade would change this component from simply passive viewing experiences into a more interactive culture portal.
- **Historical Timeline Expansion:** The preservation of history is critical. Add an interactive archive of important events in Palestinian history that together tells the story of what has happened, including battles, Nakba events, martyrs' events, or important national leaders, to add more educational weight to the timeline.

## References

1. **Flutter:** A UI toolkit built by Google for creating natively compiled mobile, web, and desktop apps on any platform with the same codebase using the Dart programming language.
  - [Flutter Official Docs](#)
2. **Node.js + Express.js:** Node.js is a runtime that enables you to run JavaScript server-side. Express.js is a minimal web framework for Node.js that enables you to test the waters when building web applications (e.g., APIs).
  - [Node.js Docs](#)
3. **MongoDB + Mongoose:** MongoDB is a NoSQL database and data is stored in flexible, JSON-like documents. Mongoose is designed to manage relationships and schemas with MongoDB as an ODM (Object Data Modeling) library for Node.js.
  - [MongoDB Official Docs](#)
4. **TensorFlow:** An open-source machine learning software library developed by Google. It is used to build and train machine learning models in areas such as image recognition, natural language processing, etc.
  - [TensorFlow Official Docs](#)
5. **Mapbox:** A location platform that offers custom maps, geolocation tools and navigation for web and mobile applications.
  - [Mapbox Docs](#)