COMP2011

My Website

My website is an e-commerce platform designed to sell sarees. It allows users to browse different categories, view saree details, add items to their cart or wishlist, and complete the checkout process. Users can sign up, log in, or proceed as guests for purchasing.

User Path

This is the homepage of the website, where users can explore different product categories such as Sarees, Lehengas, Women, and Men. From here, users can navigate to their desired category to view the available products.

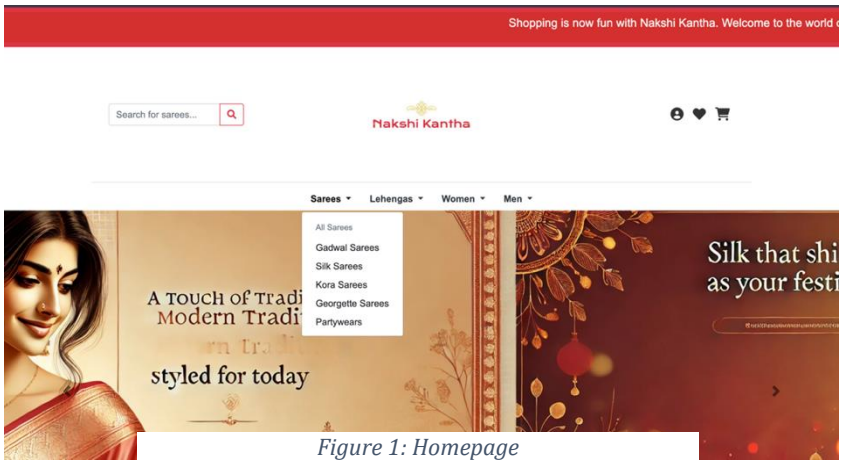


Figure 1: Homepage

1. Sign-Up and Login Process:

This video demonstrates how a user signs up and logs in. This straightforward process ensures that users can create an account to access more features, such as viewing order history and wishlist. **Please click the link here to see it: https://youtu.be/Z_tLWHrP1hU (Fig 2).** There is also an alternative path which is the guest user path and click the link here to see it: https://youtu.be/zk2YSHD65ZU **(Fig 28)**

2. Browsing Products:

If the user selects the Sarees category and then chooses a sub-category like Gadwal Sarees, they are redirected to the corresponding category page. To enhance usability, breadcrumb navigation is implemented on the website. Breadcrumbs help users understand the hierarchy of pages and allow them to easily navigate back to previous pages. This improves accessibility and provides a seamless user experience.

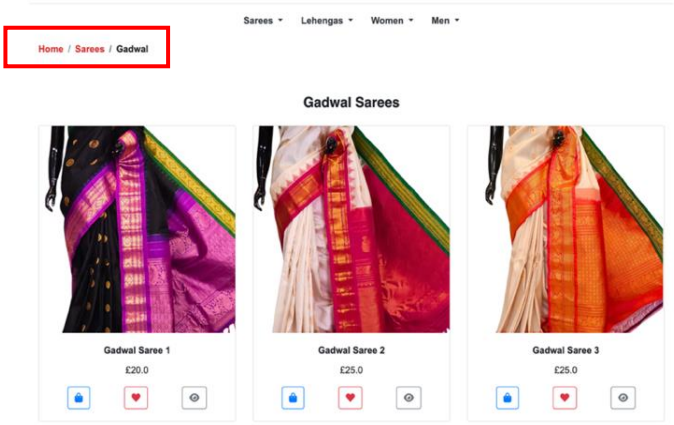


Figure 2: Breadcrumb navigation

Product Details Page:
When the user clicks on a specific product, such as "Gadwal Saree 1," they are redirected to a detailed product page. While the current implementation includes basic information such as price and stock availability, additional details like material type could be added for a real website to enhance the shopping experience.

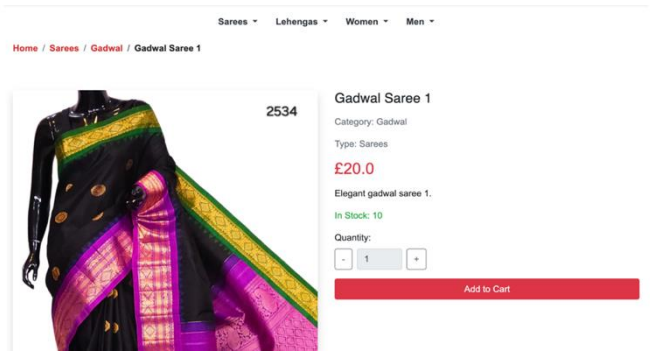


Figure 3: Product details page

Adding Products to the Cart:
Users can add products to their cart either directly from the category page or from the product detail page. This flexibility allows users to quickly add items while browsing or after reviewing product details.

The user can also increment or decrease the quantity of an item before adding it to the cart. For instance, if the amount is updated to 2 and the product is added to the cart, a flash message confirms that the item has been successfully added.

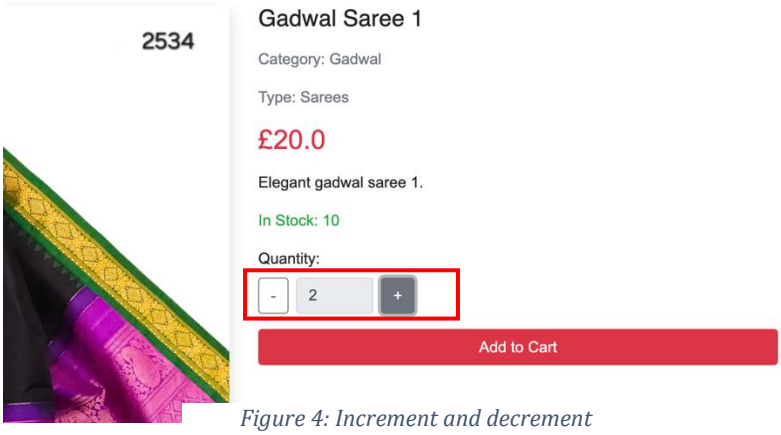


Figure 4: Increment and decrement

Using Modals for Cart Overview:
Instead of redirecting the user to a separate cart page, the website displays the cart in a modal. This design choice keeps the shopping experience seamless and reduces the disruption caused by navigation. Users can quickly view their cart contents and proceed with their browsing without leaving the current page.

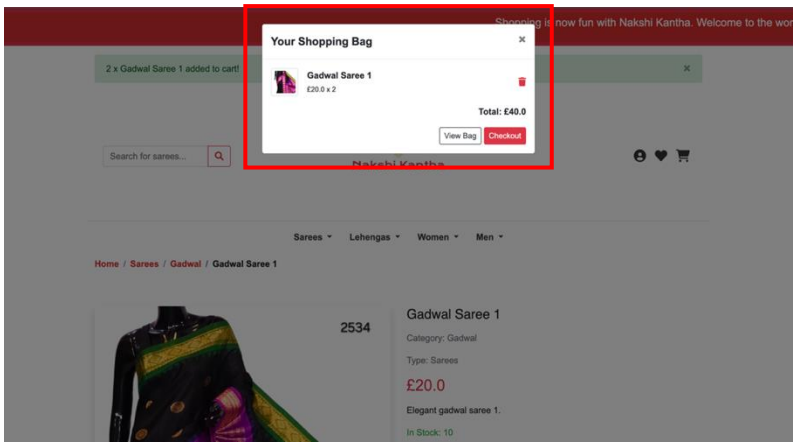


Figure 5: Modal for cart

Viewing and Managing the Cart:
If the user wants to make changes, such as updating the quantity or removing an item, they can do so either from the "View Cart" page or from the modal, as shown in Fig 6 and 7.

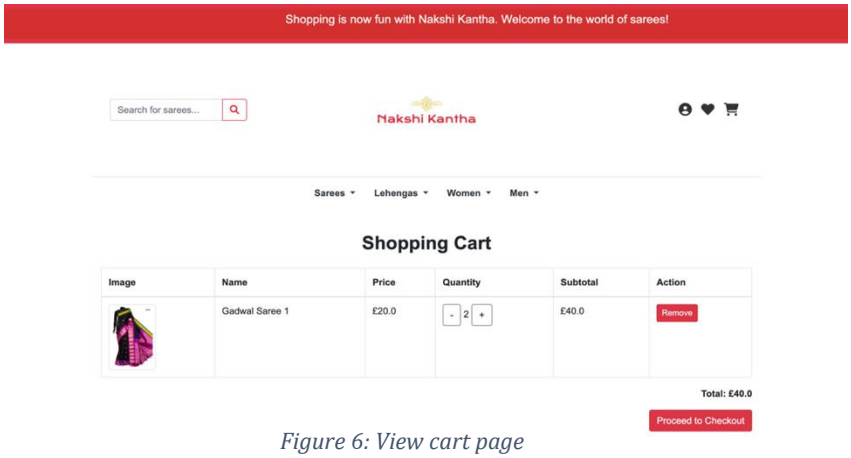


Figure 6: View cart page

For example, here, the user can increment the quantity of "Gadwal Saree 1" to 5, and the subtotal, total, and modal update dynamically to reflect the changes.

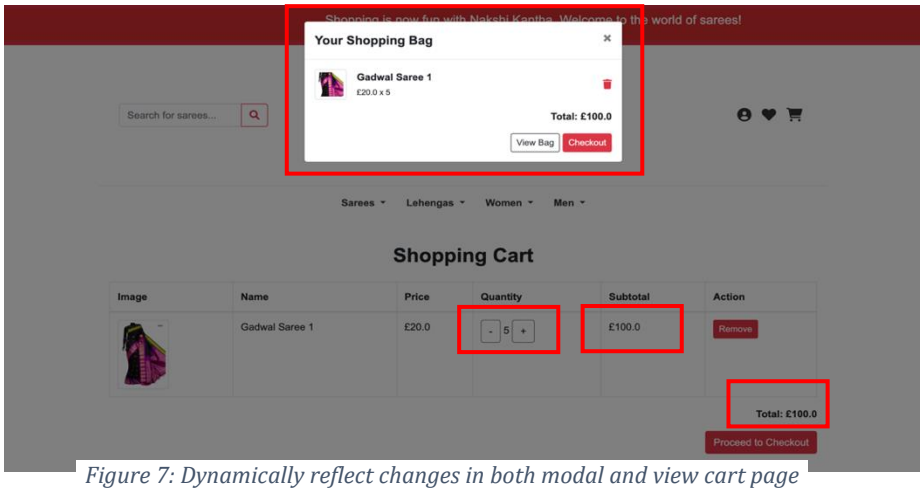


Figure 7: Dynamically reflect changes in both modal and view cart page

Checkout Process:
When the user proceeds to checkout, they are redirected to the shipping address page. Here, the user is prompted to enter their shipping address, which is then saved in the User table. The implementation is kept simple for now, but in the future, a separate model for managing multiple saved addresses could be added for better scalability.

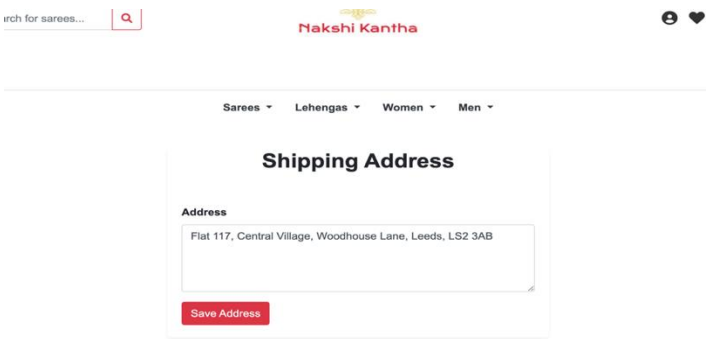


Figure 8: Checkout process

Payment Page:
After entering the shipping address, the user is redirected to the payments page. While the website is fully functional, integrating a payments API would enable real transactions, making the website ready for deployment. Once the user submits payment, the order is stored in the Order table.

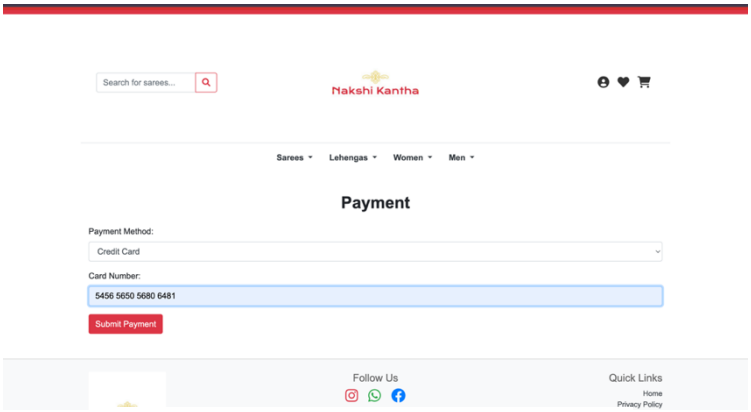


Figure 9: Payment page

Order History:

Users can view their past orders in their account section. This feature ensures a complete shopping experience, allowing users to track their purchases conveniently.

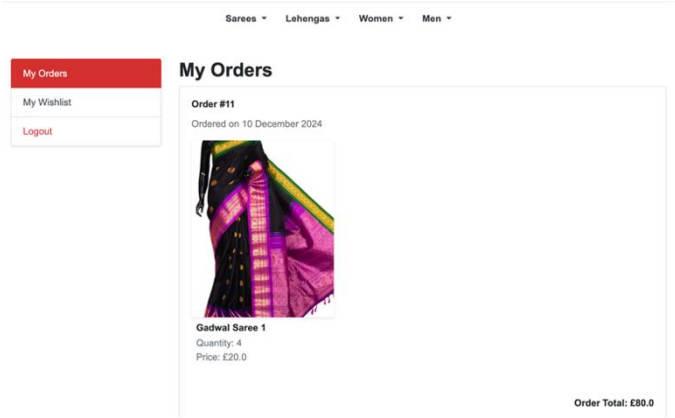


Figure 10: My profile page

Design

The design of the website was carefully chosen to align with the traditional elegance of sarees while maintaining a modern e-commerce feel. The colour scheme prominently features **Bootstrap's danger red (#dc3545)**, which adds a bold and vibrant look to key elements like buttons and navigation highlights. This shade of red is often associated with attention-grabbing elements, making it an ideal choice for call-to-action buttons, such as "Add to Cart" and "Checkout." The white background ensures clarity and readability, while the red elements draw focus to the interactive parts of the site. The typography is clean and minimal, making the website user-friendly and accessible to all demographics. The layout emphasises simplicity and functionality. Key features, such as the navigation menu, search bar, and product categories, are prominently displayed at the top of the page. Product listings are organised in a grid format to make browsing intuitive.

Interesting bits of design on my website:

1. Carousel for Visual Appeal: One of the standout design elements of my website is the carousel on the homepage, which serves as an eye-catching way to showcase banners, promotions, and the overall branding of the website. This carousel helps to immediately draw the user's attention and provides a visually appealing introduction to the site. **Please click the link here to see it:** https://youtu.be/3eaRUL_FKLg **(Fig 12)**.

2. Dropdown navigation menus: I have created organised dropdowns under "Sarees," "Lehengas," "Women," and "Men", which allow users to explore categories efficiently and help keep the interface clean and prevent information overload while offering quick access to subcategories. I implemented it using

Bootstrap dropdowns with CSS styling to maintain consistency with the website's colour scheme. **Please click the link here to see it: https://youtu.be/KeZS_WAHi3o (Fig 13)**

Challenges I faced and how I overcame them:

1. **Ensuring Responsiveness:**
   Managing saree images of varying sizes and ensuring a seamless layout across devices was challenging. However, Bootstrap's grid system and responsive utilities simplified mobile navigation and responsiveness, eliminating the need for custom media queries.

   Unlike some approaches that rely on media queries fully, using Bootstrap properly made it easier to handle responsiveness. Classes like col-md-4 for grids and img-fluid for images ensured proper scaling and alignment across all devices. This streamlined design provided a consistent user experience, especially for mobile users.

```
/* Card Layout for products */
.card img {
    width: 100%;
    max-height: 400px;
    object-fit: cover; /* to display proportionally*/
}

.card-title {
    font-size: 1rem;
    font-weight: bold;
}
```

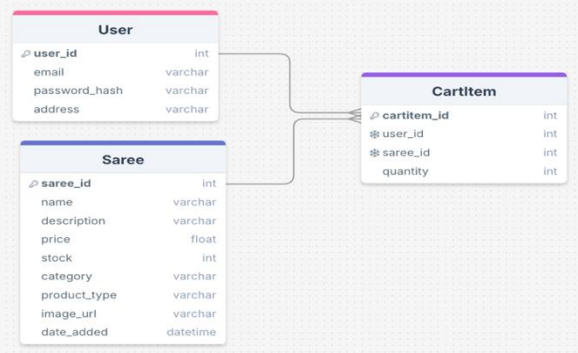
Figure 14: Bootstrap CSS code

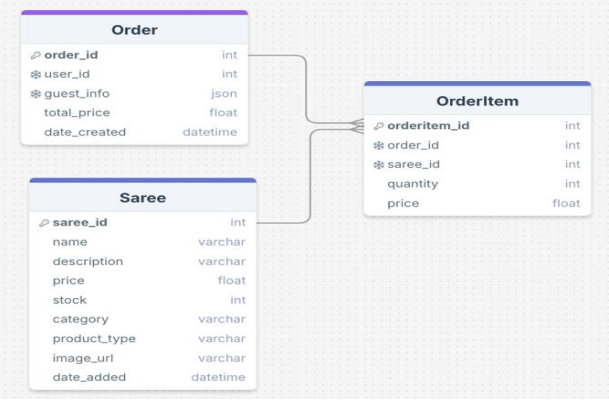
2. **Modal Integration:**
   Designing and implementing a modal for the shopping cart that dynamically updates in real time posed a challenge. This required integrating JavaScript and Flask templates to ensure changes, such as adding, incrementing, decrementing or removing items, were reflected instantly without page reloads. Users can view their cart and make small updates without leaving the current page.

```
$.ajax({
    url: '/update-quantity', // Endpoint for updating quantity
    type: 'POST',
    data: JSON.stringify({ item_id: item_id, action: action }), // Send item ID and action
    contentType: "application/json; charset=utf-8",
    dataType: "json",
    success: function (response) {
        if (response.status === 
            // Format the number (parameter) response: any
            const newSubtotal = response.new_subtotal.toFixed(1);
            const newTotal = response.new_total.toFixed(1);

            // Update the quantity and total dynamically in the shopping cart page
            $("#quantity-" + item_id).text(response.new_quantity);
            $("#subtotal-" + item_id).text("£" + newSubtotal);
            $("#cart-total").text("Total: £" + newTotal);

             // Update in cart modal if applicable
            $("#modal-quantity-" + item_id).text(response.new_quantity);
            $("#modal-cart-total").text("Total: £" + newTotal);
```

Figure 15: Modal integration JS

Database





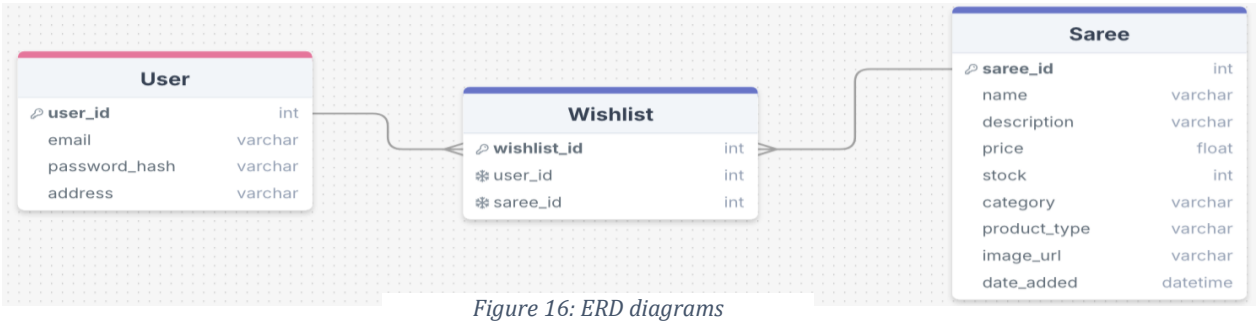


Figure 16: ERD diagrams

The database for my e-commerce website is designed to efficiently manage sarees, users, carts, wishlists, and orders, focusing on scalability and data integrity. The Saree model forms the core by storing product details such as name, price, category, stock, and images, interacting with other models like CartItem, WishlistItem, and OrderItem to handle shopping and order processes seamlessly.

The User model stores essential user data, including email addresses, hashed passwords, and shipping addresses. It connects to CartItem, WishlistItem, and Order models, enabling personalised features such as persistent cart management, wishlists, and order histories. For example, logged-in users can save items to their cart or wishlist and revisit them later, enhancing convenience.

The CartItem model links users and sarees in shopping carts with attributes like quantity and supports dynamic cart management, improving user control. Wishlist functionality is implemented through the WishlistItem model, representing a Many-to-Many relationship where users can save items for future consideration.

The Order and OrderItem models manage purchases, linking sarees to specific orders and storing quantities and prices. They provide users with a detailed purchase history while maintaining system scalability. The database design uses normalisation, foreign key constraints, and indexed fields like user_id and saree_id to ensure performance and integrity, supporting future expansions like multi-address support or promotional discounts.

Accessibility

I evaluated the accessibility of my website using the WAVE Accessibility Tool, which is widely recognised for identifying potential accessibility issues. The tool flagged only three contrast errors, demonstrating that the overall design maintains a high level of visual accessibility for most users. These errors are minimal and can be attributed to specific design elements, such as text placed on coloured backgrounds where contrast may not meet the recommended standards.

Other ways I have done accessibility on my website are:

1. ARIA Attributes: Where necessary, ARIA attributes such as aria-label, aria-expanded, and role have been added to interactive elements to provide additional context for screen readers. This is particularly useful for modal windows and navigation dropdowns.

2. Breadcrumb Navigation: Breadcrumbs are implemented to provide context and improve navigation. It allows users to understand the relationship between parent pages and secondary pages, making navigation more intuitive. For users relying on assistive technology like a screen reader, breadcrumbs help convey the site's structure, ensuring the correct aria current attribute is used for the current page. (Fig 3)

3. Tooltips for Enhanced Usability: I implemented tooltips for key interactive elements like, for example, the profile icon. These tooltips appear on hover or focus, providing additional context to the user. For

example, hovering over the profile icon displays "View Profile," clarifying its purpose. (Fig 16)

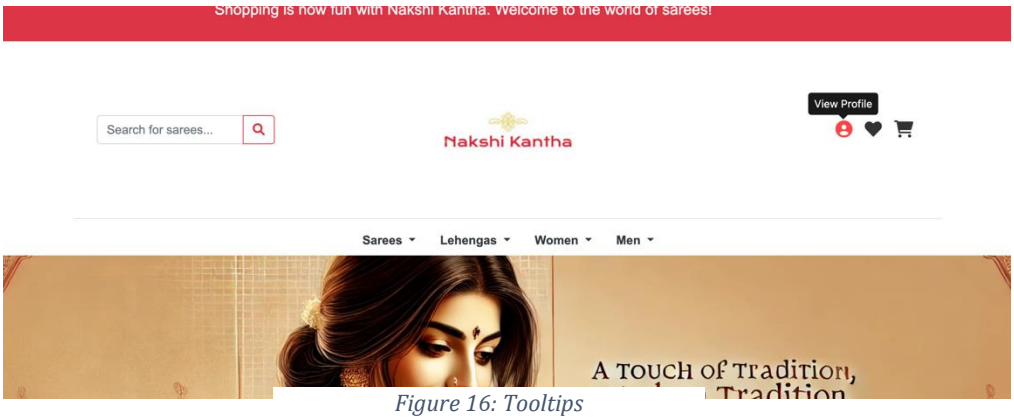


Figure 16: Tooltips

Advanced Features

1. Dynamic Cart Management with Increment/Decrement Buttons: Users can dynamically adjust the number of items in their cart using increment and decrement buttons without needing to press the add to cart button repeatedly. The updated total is displayed in real-time in the modal when the user clicks the cart icon. It improves the website by making shopping seamless and interactive. Real-time feedback eliminates the need for page reloads, enhancing usability. You can see the feature in **(Fig 5 and 8**).

2. Search Functionality: The search bar enables users to find products by typing keywords. The results dynamically update to match the user's query. This feature simplifies navigation for users with specific needs, helping them locate products quickly without manually browsing through categories. **Please click the link here to see it: https://youtu.be/vzD7LSBygbM (Fig 17)**

3. Cookies: I implemented cookies to enhance the user experience by managing guest checkouts and cart persistence for users not logged in, ensuring their selections remain intact across sessions. Additionally, cookies securely handle session data for logged-in users, providing a seamless and personalised shopping experience.

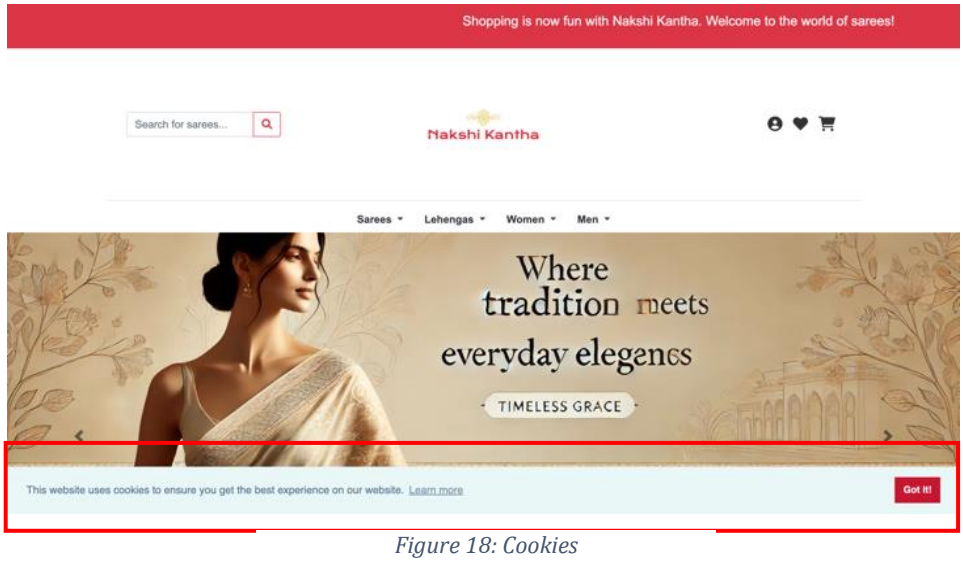


Figure 18: Cookies

4. Wishlist Integration: Users can save their favourite sarees to a wishlist, which is stored in the database. Items can be added to the cart directly from the wishlist. The wishlist feature enhances personalisation and engagement, allowing users to select their preferences and revisit them later. **(Fig 23)**

4. Forgot Password and Reset Password: This feature allows users to reset their account password if they forget it. Users can request a password reset link by typing their registered email, which is then sent. Upon clicking the link, they are redirected to a secure form to set a new password. This feature adds a crucial layer of functionality and user convenience by ensuring account recovery is possible without admin intervention. It boosts user trust by handling sensitive operations securely with unique tokens and hash-based validation.

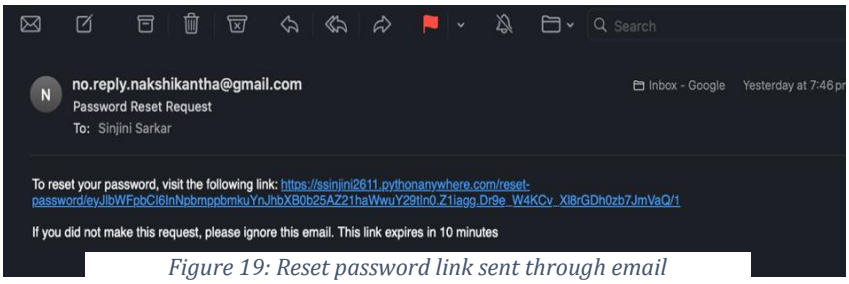


Figure 19: Reset password link sent through email

Testing & Critical Analysis

Testing

Functionality

I conducted comprehensive manual testing to ensure the website's functionalities worked seamlessly. For the sign-up and log-in features, I attempted to log in with an unregistered email and verified the system displayed an appropriate flash message. After signing up with the same email, I successfully created an account and logged in, confirming smooth account access. **Please click the link here to see it:** https://youtu.be/ZKJKD1cEMco **(Fig 20).** The profile page was tested to ensure an accurate order display, showing a "No Orders" message when applicable (Fig). Cart functionality was verified by adding items and ensuring dynamic updates to the item count and subtotal during increment/decrement actions. I also checked item removal from both the modal and the view cart page for logged-in and guest users (Fig 8).

The checkout process was tested to ensure smooth functionality for both logged-in and guest users, verifying correct checkout options and successful payment completion **(Figs 9 and 10).** Stock management was validated by ensuring the stock decreased with purchases and items displayed "Out of Stock" when unavailable **Please click the link here to see it:** https://youtu.be/8VqCgVUlqEY **(Fig 21)** . I observed that the "Add to Cart" button on the categories page was still visible for out-of-stock items. To address this, I updated the code to ensure that the "Out of Stock" message is displayed consistently both on the product details page and the categories page. (Fig 22)

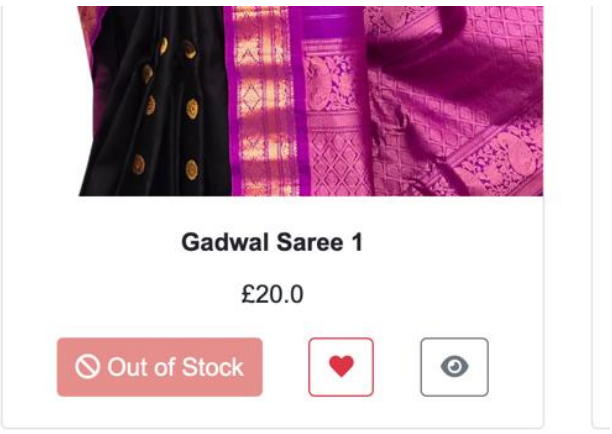


Figure 22: out of stock button in categories page

Wishlist functionality was verified to ensure only signed-up or logged-in users could access the page, and

saved items were displayed correctly **(Fig 23 and 24).** The search feature was tested to confirm that relevant items were displayed based on name and description **(Fig 17).**

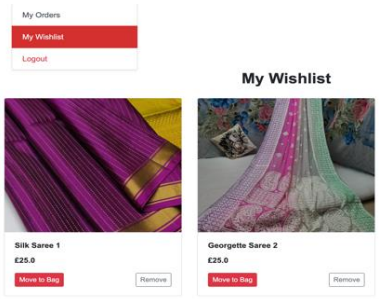


Figure 23: Wishlist

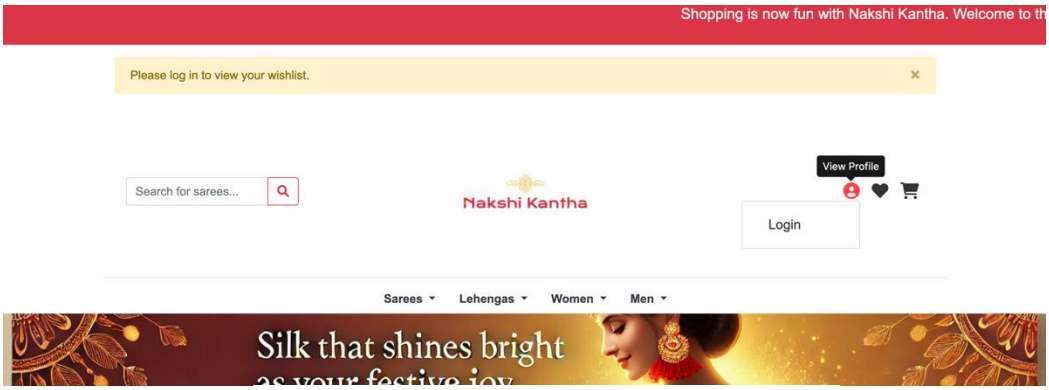


Figure 24: Flash message showing only logged in users can view wishlist

Finally, for the forgot and reset password functionality, I verified that reset emails were sent correctly **Please click the link here to see it:** https://youtu.be/XqC4FhrTDnM **(Fig 26)** and tested token expiration after 10 minutes **(Fig 25)**. Flash messages for expired tokens and successful password updates were validated. Attempts to log in with old and new passwords confirmed the functionality worked as expected. I also ensured an appropriate flash message was displayed for non-registered emails **Please click the link here to see it:** https://youtu.be/g4eywipZ0VM **(Fig 27)**

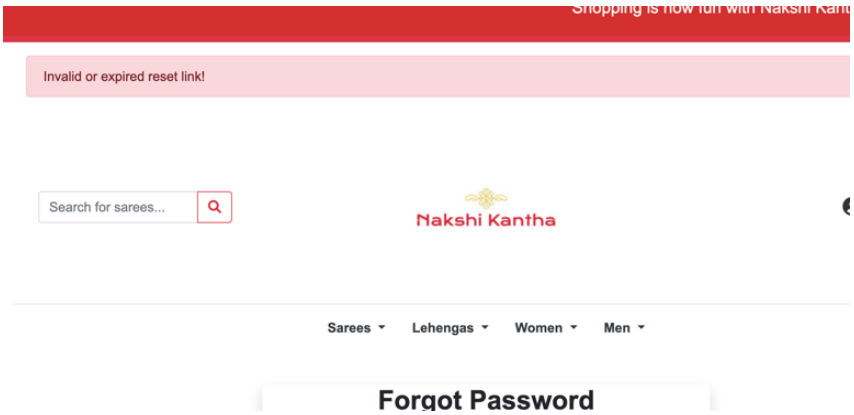


Figure25: Flash message showing expired link

Database Testing: Manually checked entries in the database to ensure proper data relationships and integrity. **(an example is shown in Fig 26)**

Figure 26: Entries in the saree database

Layout & responsiveness

To ensure the website is responsive and works seamlessly across different devices, I utilised Bootstrap's responsive grid system and utility classes. All of the pages were tested to ensure they adapt fluidly to varying screen sizes. The layout was evaluated on devices with resolutions for desktop (1920x1080), tablet (768x1024), and mobile (360x640) using both physical devices and browser developer tools for simulation. Additionally, cross-browser compatibility was tested on Chrome, Safari, and Firefox to confirm consistent rendering across platforms. Due to limited space screenshots/videos are not attached. **Please click the link here to see it https://youtu.be/xM_L4QEmNI8 (Fig 27)**

Accessibility

To ensure accessibility, I implemented semantic HTML for logical content structure, including proper headings, landmarks, and ARIA attributes to support screen readers. Interactive elements like buttons and links have descriptive labels or tooltips for easy navigation by assistive technologies. I prioritised colour contrast using WAVE to meet WCAG guidelines and included meaningful alt attributes for images. Keyboard navigability was integrated, ensuring logical tab order and seamless navigation without a mouse. Bootstrap components, such as models and dropdowns, were utilised for built-in accessibility features. Finally, I tested the site across devices and browsers to ensure responsiveness and consistent user experiences, making the site inclusive and user-friendly. **(Fig 27)**

Analysis

What Went Well

The project successfully delivered a functional e-commerce platform with features like product filtering, a dynamic cart, and a wishlist system. The breadcrumbs feature enhanced navigation and accessibility, while the modal for the cart allowed users to review items seamlessly without leaving the page. The website's responsiveness across devices was another major success, validated through thorough testing. Additionally, features like password reset worked flawlessly, reflecting a secure and user-focused implementation. I have also implemented guest checkout so that if a user doesn't want to register but still wants to order, they have an option.

What Went Badly

Managing stock quantities during checkout was challenging, requiring extensive debugging to handle both logged-in and guest user scenarios effectively. Ensuring accessibility for tooltips and keyboard navigation demanded time and attention. Testing many-to-many database relationships, such as the wishlist, involved meticulous checks to manage edge cases. Implementing the forgot and reset password functionality required creating a dedicated email account and configuring Gmail settings, including enabling less secure app access and fine-tuning SMTP configurations to resolve authentication and spam issues. Guest checkout, reliant on session handling, also required significant effort to implement seamlessly.

Improvements

Future enhancements could include animations and transitions for a more visually engaging experience, such as smooth carousel transitions. Expanding user profiles to include account details and saved addresses would improve personalisation. Adding a functional payment API would make the platform more practical, and introducing advanced filtering options, like price range and material type, would further enhance usability.

I conducted more extensive testing, but due to space constraints, I was unable to showcase all the test cases.