

Assignment 3.

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Part 1. Traditional Way: SRS

1. System Features

1.1 F2.Messages and reminders

1.1.1 Description and Priority

This feature shall display messages and reminders to the user based on their location and their previous interactions with the system.

Priority: High

1.1.3 Functional Requirements

Req ID	Description	Priority
F2	Messages and reminders	High
F2.1	Display the information about current sales, if the user is near the corresponding store	High
F2.1.1	When a user is detected by beacon near a store with sale, the system shall display a notification with details about the sale.	High
F2.1.2	The system shall update the sales information display whenever the beacon broadcasts a new signal, ensuring the most recent sales are shown	High

F2.1.3	If the system fails to receive updated sales information due to a lack of internet connectivity, it shall display the last known sales information along with the timestamp of when it was last updated.	High
F2.2	Welcome messages when the user approaches Mega Mall.	High
F2.2.1	When a customer approaches the entrance of Mega, the system shall trigger a personalized welcome message if the customer has the mall's app installed.	High
F2.2.2	If the customer has visited Mega frequently, the welcome message shall include a "thank you for your loyalty" note.	High
F2.2.3	If a customer entered Mega Mall and does not have the mall's app installed, the system shall display a generic welcome message on nearby beacons, encouraging the customer to download the app for personalized experiences and benefits.	High
F2.3	reminders to use discounts/loyalty programs, when the user is in the corresponding store.	High
F2.3.1	While the customer is within a participating store, the system shall send reminders about applicable discounts or loyalty program benefits based on the store's current promotions.	High
F2.3.2	While a customer is checking out at a store, the system shall display a reminder about any unused discounts or loyalty rewards that can be applied to the current purchase.	High
F2.3.3	If a customer is detected entering a store without a history of loyalty program usage, then the system shall send information about how to join the loyalty program and the benefits of doing so.	High
F2.4	reminders to pick up online orders.	High
F2.4.1	When a customer with an online order enters the beacon's transmission range, and if the order is ready for pickup, then the system shall send a reminder to the customer's smartphone to pick up their order.	High
F2.4.2	If the customer has multiple orders ready for pickup, then the system shall aggregate the reminders into a single notification, listing all the orders ready for collection.	High
F2.4.3	If the customer does not pick up the order within a store predefined period after receiving the reminder, then the	High

	system shall send a follow-up reminder.	
F2.5	reminders based on the previous consumption patterns.	High
F2.5.1	If a customer is detected in an area of the store relevant to their past purchases, then the system shall suggest items or promotions related to their previous buying patterns.	High
F2.5.2	While the system identifies a repeat purchase cycle, the system shall send a reminder when the customer is near the store around the time they would typically repurchase.	High
F2.5.3	If a customer does not have a purchase history, then the system shall not send personalized reminders, but may send general information about current store promotions or popular items.	High

1.2 F3.Store location

1.2.1 Description and Priority

This feature shall display store location based on user information.

Priority: High

1.2.3 Functional Requirements

Req ID	Description	Priority
F3	Store location	
F3.1	Searching a store location	High
F3.1.1	When a user enters or selects a geographic area (e.g., city, neighborhood) in the search field and clicks the "Search Stores" button, the system shall display a map and display a list of stores within the selected area.	High
F3.1.2	If the user enters incorrect information (e.g., city, neighborhood) the system shall prompt the user to "Please enter a valid location."	High
F3.1.3	When a weak or no Internet connection is detected affecting search or map loading, the system shall prompt "Internet connection is weak or unavailable. Please check your connection and try again."	High
F3.1.4	The system shall present an interactive map pinpointing store location, allowing users to zoom in/out and click on pins for store details, such as opening hours, available offers, and contact information.	High
F3.1.5	If a user searches for a store in an area where none exist or the criteria do not match any stores, the system shall display "No stores found. Try another location or criteria."	High
F3.1.6	For each store, the system shall indicate real-time information such as current crowd levels, wait times, assisting in planning visits efficiently.	High

1.3 F5. User Behavior

1.3.1 Description and Priority

This feature shall send interest-based messages to users, ensuring relevant and timely communication

Priority: High

1.3.3 Functional Requirements

Req ID	Description	Priority
F5	User Behavior	High
F5.1	send interest-based messages to users	High
F5.1.1	Whenever a new offer that matches the user's preferences is added to the system, the system shall notify the user through the app or email. The user must have opted in for notifications.	High
F5.1.2	The system shall adjust offers notifications displays in real-time based on immediate user actions, ensuring the most relevant ad experience.	High
F5.1.3	In case of failure to adjust offers notifications in real-time (e.g., due to latency issues), the system shall revert to displaying general offers notifications and log the issue for review	High
F5.2	Monitor User In- Advertisements Behavior	High
F5.2.1	When a user spends many times on a specific advertisement or category, the system shall mark this as high interest and adjust future ad presentations accordingly.	High
F5.2.2	If engagement metrics are incorrect due to non-user actions (e.g., bot interactions), the system shall filter out these to maintain accurate user profiles.	High
F5.2.3	Each time a user dislikes or hides an advertisement, the system shall refine its understanding of user preferences to decrease similar future advertisements.	High

1.4 F8. Account management and wish list

1.4.1 Description and Priority

This feature shall includes user registration, login, profile management. Additionally, users can create, modify, and manage wish lists to keep track of desired items.

Priority: High

1.4.3 Functional Requirements

Req ID	Description	Priority
F8	Account management and wish list	
F8.1	Account management	High
F8.1.1	The system shall allow customers to add/edit personal information to their profile when they access the account settings	High
F8.1.2	Customers shall be able to set and edit their preferences for receiving notifications.	High
F8.2	Wish List management	High
F8.2.1	When a customer with items on their wish list enters a store, the system shall remind them of these items.	High
F8.2.2	While browsing the online shop, customers shall have the option to add items to their wish list by selecting an 'Add to Wish List' button.	High
F8.2.3	If a customer with a wish list enters a store of an item on their list, then the system shall send a notification reminder about the item.	High
F8.2.4	Customers shall be able to remove items from their wish list by selecting a 'Remove from Wish List' option.	High

1.5 F11. Advertisements Update

1.5.1 Description and Priority

The feature shall present advertisements to users based on their location and interaction history.

Priority: High

1.5.3 Functional Requirements

Req ID	Description	Priority
F11	Advertisements Update	
F11.1	present advertisements to users	High
F11.1.1	When an advertiser submits an advertisement update form, the system shall validate that all required fields are filled in the correct format (e.g., text, numeric values).	High
F11.1.2	If an incorrect format is detected (e.g., numeric value in a text-only field), the system shall highlight the field in red and prompt "Please enter the correct format."	High
F11.1.3	Before an advertisement is published, the system shall perform an automated check for inappropriate or violations content or banned keywords.	High
F11.1.4	When network issues prevent advertisement submission or update, the system shall alert "Network issue detected. Please try your submission again later."	High
F11.1.5	Upon successful submission, the system shall review advertisements in real-time and approve them for posting, notifying the advertiser with "Advertisement approved and now live."	High
F11.1.6	When an advertiser sets a schedule for the advertisement to go live, the system shall confirm the date and time.	High
F11.1.7	If a selected schedule date is in the past, the system shall prompt "Please select a future date and time for your advertisement."	High

2. Nonfunctional Requirements

2.1 Rationale of quality attributes

Qualities	Rational
Internal	
Reusability	<i>Low priority. The System is designed for Mega Mall's , not designed for reuse in other solutions</i>
Maintainability	<i>High priority. It is very important for timely updates of offers and the system to be effective</i>
Modifiability	<i>High priority. The system shall adapt to changing store layouts, offers, and mall events.</i>
Scalability	<i>Medium priority. Expected to focus on handling all the users inside the mall.</i>
Verifiability	<i>High priority. Ensuring the system functions correctly in all scenarios is crucial for user trust</i>
Efficiency	<i>Medium priority. The system shall be optimized for minimum impact on device battery life while using Bluetooth Low Energy (BLE).</i>
Portability	<i>High priority. The system shall work across various device types and operating systems.</i>
External	
Availability	<i>High priority. Especially important during peak hours, which we expect to have from 5pm to 11pm during weekends</i>
Performance	<i>High priority. Fast and responsive, facilitating a smooth user experience.</i>
Reliability	<i>High priority. System failures shall lead to bad user experience and potential loss of business for stores</i>
Robustness	<i>High priority. Should handle erroneous inputs or unexpected user behavior gracefully.</i>
Safety	<i>Low priority. Not directly safety-critical</i>
Security	<i>High priority. Protects user data.</i>
Usability	<i>High priority. shall be user-friendly to encourage adoption by a wide range of mall visitors.</i>
Interoperability	<i>Medium priority. The system shall integration with other loyalty programs.</i>
Installability	<i>Medium priority. As a primarily web-based platform, ease of installation is less relevant.</i>
Integrity	<i>Medium priority. Important for maintaining accurate information and user trust, especially if personalized content is provided</i>

2.2 prioritization of quality attributes

[illegible]

2.3 Quality requirements specification

2.3.1 Maintainability

MAIN-1: The system shall log all advertisement update attempts and outcomes to facilitate debugging and maintenance, with a maximum log retention period of 6 months for operational review.

MAIN-2: The Mall Beacon System shall allow for seamless updates to beacon firmware and content without service interruption, ensuring that updates are completed within a maximum of 30 minutes during off-peak hours.

2.3.2 Verifiability

VER-1: Each beacon's message delivery functionality shall be verifiable through automated tests that simulate customer interactions, ensuring a 95% pass rate before any new version deployment.

VER-2: The system shall include a simulation environment where advertisers can preview how their advertisements will appear before submission, ensuring accuracy and correctness.

2.3.3 Portability

POR-1: The Mall Beacon System's customer-facing app shall be operable across different mobile operating systems, including iOS and Android, supporting versions up to three years old to maximize user reach.

2.3.4 Performance

PERF-1: The system shall handle simultaneous beacon messages to at least 1,000 users within the mall premises without delays exceeding 2 seconds from the point of triggering the message.

2.3.5 Robustness

ROB-1: The system shall implement robust validation on all user input fields related to offer search criteria, ensuring inputs are within acceptable ranges or formats to prevent errors and improve the user experience.

ROB-B2: The beacon system shall include real-time monitoring to detect and report any malfunctioning units within 1 hour, enabling proactive maintenance.

2.3.6 Usability

USE-1: An inexperienced user shall be able to discover personalized shopping offers within an average of 2 minutes, and in a maximum of 4 minutes, from their initial interaction with the system.

USE-2: A first-time user shall be able to register and set up their profile, including preferences for offer notifications, in an average of 2 minutes, and in a maximum of 5 minutes.

Part 2. Agile approach: User Stories

ID F2.1	Name: Display Information About Current Sales	Priority: High
<p>As a customer,</p> <p>I want to receive notifications about current sales when I am near the corresponding store,</p> <p>So that I can take advantage of sales promotions while shopping.</p>		
Acceptance Criteria:		
<p>AC2.1.1: The system sends a notification about current sales when a customer with the app is detected by the store's beacon.</p> <p>AC2.1.2: Sales notifications must be updated in real-time with the beacon's signal to ensure the latest information is displayed.</p> <p>AC2.1.3: In the absence of an internet connection, the system displays the last updated sales information with a timestamp.</p>		

ID F2.2	Name: Welcome Messages When the User Approaches Mega Mall	Priority: High
<p>As a customer,</p> <p>I want to receive notifications about current sales when I am near the corresponding store,</p> <p>So that I can take advantage of sales promotions while shopping.</p>		
Acceptance Criteria:		
<p>AC2.1.1: The system sends a notification about current sales when a customer with the app is detected by the store's beacon.</p> <p>AC2.1.2: Sales notifications must be updated in real-time with the beacon's signal to ensure the latest information is displayed.</p> <p>AC2.1.3: In the absence of an internet connection, the system displays the last updated sales information with a timestamp.</p>		

ID F2.3	Name: Reminders to Use Discounts/Loyalty Programs	Priority: High
<p>As a customer,</p> <p>I want to be reminded to use discounts or loyalty program benefits when I am in the store,</p> <p>So that I can save money or earn rewards on my purchases.</p>		
Acceptance Criteria:		
<p>AC2.3.1: Reminders about discounts and loyalty benefits are sent to customers while they are within a participating store.</p> <p>AC2.3.2: Reminders to apply unused discounts or rewards are displayed during checkout.</p> <p>AC2.3.3: Information on how to join the loyalty program is sent to customers who do not have a history of loyalty program usage when they enter the store.</p>		

ID F2.4	Name: Reminders to Pick Up Online Orders	Priority: High
<p>As a customer,</p> <p>I want to be reminded to pick up my online orders when I am near the pickup area,</p> <p>So that I do not forget to collect my purchases.</p>		
Acceptance Criteria:		
<p>AC2.4.1: Customers with ready online orders receive a pickup reminder upon entering the beacon's range.</p> <p>AC2.4.2: A single notification containing all ready orders is sent to customers with multiple pickups.</p> <p>AC2.4.3: Follow-up reminders are sent if the order is not picked up within the store's predefined period.</p>		

ID F2.5	Name: Reminders Based on Previous Consumption Patterns	Priority: High
<p>As a customer,</p> <p>I want to receive reminders and suggestions based on my past shopping activity,</p> <p>So that I can be alerted about items I am likely to need or be interested in</p>		
Acceptance Criteria:		
<p>AC2.5.1: Suggestions for items or promotions related to past purchases are provided when customers are detected in relevant store areas.</p> <p>AC2.5.2: Reminders are sent about typical repurchase times based on identified repeat purchase cycles.</p> <p>AC2.5.3: General store promotions or popular items are sent to customers without a purchase history.</p>		

ID F3.1	Name: Searching a Store Location	Priority: High
<p>As a customer,</p> <p>I want to be able to enter or select a geographic area in the search field and search for stores,</p> <p>So that I can find the nearest store location quickly and efficiently.</p>		
Acceptance Criteria:		
<p>AC3.1.1: When I enter a city or neighborhood and press the "Search Stores" button, the system displays a map and a list of stores in that area.</p> <p>AC3.1.2: If I enter incorrect location information, the system prompts me with "Please enter a valid location."</p> <p>AC3.1.3: If the search or map loading is affected by a weak or no Internet connection, the system prompts me with "Internet connection is weak or unavailable. Please check your connection and try again."</p> <p>AC3.1.4: The interactive map allows me to zoom in/out and click on pins to view store details like opening hours, available offers, and contact information.</p> <p>AC3.1.5: If no stores are found in the search area, the system displays "No stores found. Try another location or criteria."</p> <p>AC3.1.6: Each store pin on the map shows real-time information such as current crowd levels and wait times.</p>		

ID F5.1	Name: Send Interest-Based Messages to Users	Priority: High
As a customer, I want to receive notifications on offers that match my interests, So that I can take advantage of deals that are relevant to me.		
Acceptance Criteria:		
AC5.1.1: System notifies the user when a new offer matching their preferences is added, assuming the user has opted in for notifications. AC5.1.2: System updates offer notifications in real-time based on user actions. AC5.1.3: In case of real-time adjustment failure, the system defaults to general offers and logs the incident.		

ID F5.2	Name: Monitor User In-Advertisements Behavior	Priority: High
As a marketing analyst, I want the system to track user engagement with advertisements, So that the ad targeting can be refined for future presentations.		
Acceptance Criteria:		
AC5.2.1: System marks a user's interest as high if they spend a lot of time on a specific advertisement or category. AC5.2.2: System filters out non-user actions to maintain accurate user engagement metrics. AC5.2.3: System refines future advertisement preferences each time a user dislikes or hides an ad.		

ID F11.1	Name: Monitor User In-Advertisements Behavior	Priority: High
<p>As an advertiser,</p> <p>I want to submit and update advertisements with validation checks,</p> <p>So that my ads are correctly formatted and approved for posting without delay.</p>		
Acceptance Criteria:		
<p>AC11.1.1: System validates all required fields in the advertisement submission form for correct format.</p> <p>AC11.1.2: System highlights incorrect formats in submission fields and prompts the advertiser to correct them.</p> <p>AC11.1.3: System checks advertisements for inappropriate content or banned keywords before publishing.</p> <p>AC11.1.4: System provides feedback on network issues affecting advertisement submission.</p> <p>AC11.1.5: System reviews and approves submitted advertisements in real-time, notifying advertisers of approval status.</p> <p>AC11.1.6: System confirms the schedule set by advertisers for ads to go live and ensures it is in the future.</p> <p>AC11.1.7: System prompts for a future date and time if an advertiser selects a schedule date in the past.</p>		

ID F8.1	Name: Account management	Priority: High
<p>As a registered user,</p> <p>I want to add and edit my personal information and notification preferences in my account settings,</p> <p>So that I can personalize my experience and control the communications I receive.</p>		
Acceptance Criteria:		
<p>AC8.1.1: I can access the account settings and successfully update my personal information such as name, address, and contact details.</p> <p>AC8.1.2: I am able to set my preferences for receiving different types of notifications and update them anytime.</p>		

ID F8.2	Name: Wish List management	Priority: High
<p>As a customer,</p> <p>I want to manage my wish list by adding and removing items easily, and receive reminders about my wish list items when I enter a store,</p> <p>So that I can keep track of my desired purchases and take advantage of any store visit to fulfill them.</p>		
Acceptance Criteria:		
<p>AC8.2.1: When I enter a store, the system checks my wish list and reminds me of any items I have wished for that are available in the store.</p> <p>AC8.2.2: While browsing online, I can add items to my wish list using an 'Add to Wish List' button.</p> <p>AC8.2.3: If an item on my wish list is available in the store I enter, I receive a notification about it.</p> <p>AC8.2.4: I can remove items from my wish list at any time by selecting a 'Remove from Wish List' option.</p>		