Einstein’s Bros Bagel Mobile App

Software Design Document

IS321: System Analysis and Design - Project Group 8
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Introduction

Our Software Design Document (SDD) serves as a map for our Einstein's Bros Bagel mobile application. This document constitutes the user manual and presents details on the architecture, layout, and functioning of the system. Basically, it is the blueprint that translates into real digital experience our conceptions.

The creation of the SDD makes us to align all involved players such as developers, designers and stakeholders to one level. This is a vital document that paves the way for implementation stage and directs us on the complexities of converting our dream to reality.

This document provides specifics on how our system is designed. For instance, it discusses the class diagram for component relationship, the storyboard and wireframe for user experience. Also, we have managed to get around with Data Flow Diagram (DFD) to clearly comprehend on how data flows in the system. The progress and challenges associated with the project in a dynamic manner through the Kanban boards, milestones, and issues section will keep us organized and focused. Lastly, we offer a demonstration of our developed Einstein's Bros bagel mobile app prototype that shows its interface.

To put it simply, this SDD is like our road map that ensures smooth sailing in the challenging terrain of analyzing and designing a system that provides ultimate satisfaction for end users.

Purpose

Our Einstein's Bros Bagel mobile app will seek to solve the problems faced and make the experience enjoyable for the customers and the bagel shop in general. Our goal is to simplify the procedure associated with ordering of customized bagels, which will ultimately become a less complicated experience for the guests.

To begin with, for the customers' sake, we will endeavor to provide convenience, tailor-made service, and time saving when ordering through the app.

- Make the ordering simpler than that as they will use the app to view the menu, tailor-make their orders, and pay.
- Allow users to customize their bagel choices such that they receive what they ultimately want.
- Eliminate waiting for many customers by using electronic order placing beforehand to avoid queues at the store.

Finally, regarding the Einstein's Bros Bagel itself, this mobile application will be perfect to improve operational efficiency and engage customers.

- Improve the order management through automated system thus reducing errors and enhance operational efficiency in the bagel shop.
- The mobile app can also be used to intensify communication with customers, collect feedback and provide offers for promotions that stimulate customer loyalty.

We have created an app whose potential users are the bagel lovers, people on the move who would wish to make orders in the simplest of ways, as well as the ones looking for bagels at their fingertips This will help us improve the general delight among our customers as well as Einstein's Bros Bagel.

Scope

Certain bounds have been set within the scope of our Einstein's Bros Bagel mobile app to keep it focused and easily manageable. These restraints are laid down for pragmatic reasons considering resources, timeframe, plus the objectives of the project at hand. To begin with, our initial release specifies a particular set of features which deal with important operational capabilities including menu navigation, item specification, and cash flow. In subsequent stages, other features can be considered.

Then, the first stage focuses on creating the mobile application strictly for a certain system, like iOS or Android. Such decisions are dependent on issues such as the audience intended a product for, and the resources that were in place for its development.

The app will enhance customer experience but won't necessarily connect with all aspects of Einstein's Bros bagel. Take for instance, an initial rollout could emphasize on order management with no involvement of highly detailed inventory systems.

The application can also be custom-made for some areas or places initially. It will be expanded in later phases. Adopting this strategy enables us to customize the app for the unique requirements of the selected market.

The limits which are set by these standards enable the company to determine what can be achieved considering the other available parameters. With this in mind, it is possible to develop an effective mobile app that caters to urgent customer needs as well as that of the bagel shop to provide the best groundwork for future upgrades and expansion.

Reference Material

Alshammari, A., Alshammari, M., & Alshammari, S. (2019). A systematic literature review on the use of virtualization technologies in higher education: A case study of King Saud University. *International Journal of Advanced Computer Science and Applications, 18(2), 1-10.*

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Definition and Acronyms

Full Term	Acronym/Abbrev.	Definition
Agile	N/A	A project management methodology which uses cycles of planning, building, deploying, and evaluating to build software or systems in an iterative and incremental fashion. Most used for software development but also used for other types of projects.

Data Flow Diagram	DFD	An illustration of movement of data in a system showing activities involved, the stores, flows, and the external entities.
Epics	N/A	In agile project management, epics refer to large user stories that constitute epic narratives helping to deconstruct complex undertakings into smaller achievable activities.
Kanban	N/A	A visual project management system for managing work and workflow with an emphasis on continuous delivery rather than overburdening the developmental team.
Milestone	N/A	Checkpoints are used as a means of measuring project-related activities, with a view to ensuring that the relevant stakeholders are properly equipped to make wise choices about the direction in which the project should be heading. It serves as a physical method for determining and communicating successes, ensuring teams remain focused about the objectives of the project.
Prototype	N/A	An initial representation or mockup of a product, system, or capability to illustrate and assess its design and performance. Prototypes can be low fidelity such as sketches or high fidelity such as interactive models.
SCRUM	N/A	A framework for managing and organizing work, focusing on collaboration, accountability, and incremental progress. Usually applied for use in software development projects.
Software Design Document	SDD, SWDD, SDS	A design document used to describe the high-level (and some low-level) architecture and design goals & planning of a software project.
Software Development Lifecycle	SDLC	Umbrella term for methodologies used to make a structured process for producing software systems and applications.
Use-Case	N/A	An accountable representation of how a particular system or product is going to achieve a specific target point, through communication with one or more users/other systems. The use cases explain how the user interacts with the system which gives an overall picture of the systems' behavior.
User Interface	User Interface	A part where a user contacts or interacts with an application that comprises all the features designed into a device through which a user can interface it.
User Experience	User Experience	Comprises everything about the end-user's interface with the company, its products, and its services aiming at improving client satisfaction.

Human Interface Design

Main Functionality of the System

User Registration and Authentication:

- Sign-up Page: Enable users to sign up by inputting details such as name, email, and password.
- Sign-in Page: For the existing users, provide a safe login platform to their accounts.

Menu Display:

- Food Menu: List all sorts of bagels, sandwich variety, salads and other edibles in Einstein Bros Bagels. Specify good images, detailed description and pricing.
- Drink Menu: Provide a list of drinks such as coffee, tea, and specially made drinks with description and price.

Search and Filters:

- Provide a search option that enables them to access certain products at ease.
- Categorization of products, dietary preferences and price tag can be used as filters to create smaller pools of data for users.

Customization Options:

- Enable customers to select own preferred topping, spread or extras.
- Offer bagel variants, assortment of fillings, and quantity.

Order Cart:

- Let users put some things into a cart.
- Provide an overview of the order's contents with item information, corresponding quantities, and pricing.
- Enable users to easily edit or remove items from the cart.

Notifications:

- Send confirmation notifications for successful orders.
- Provide real-time order status updates, including order preparation and delivery notifications.

Overall User Feedback

Questions Choice

This elicitation form aims to get a comprehensive view concerning the user's experience with the Einstein Bros Bagels order mobile app. All questions were designed to touch upon many facets of users' experience such as their frequency, preferences, problems encountered and what can be done better. This survey form is meant to identify consumers' opinions about the app, the order process, and how promotions and loyalty discounts factor into the decision-making process. This

makes for varied types of questions that allow an overall sense of how a person interacts with the app.

Theme Design Choice

These questions were specifically selected with respect to the major components of user journey including frequency of use of apps, particular food choices, as well as difficulties that occurred during the process. Design decisions for supporting open-ended inputs so that users can convey their ideas without any restrictions. Regarding some questions such as whether one would recommend the app rating scale is used, to capture sentiments and make it easy to analyze. They chose a neutral background because the color should be as clean and professional as possible in order not to distract the respondents.

Summary of Result

People usually discover that the menu section is easy enough for them while the order history tracking feature is not. General ordering experience average is 9.5. We also need to improve our link with loyalty programs, quicker order processing, and the use of in-play advertisement and discounts. In essence, most of the customers will recommend the app to their friends/colleagues at our rating of 8.0.

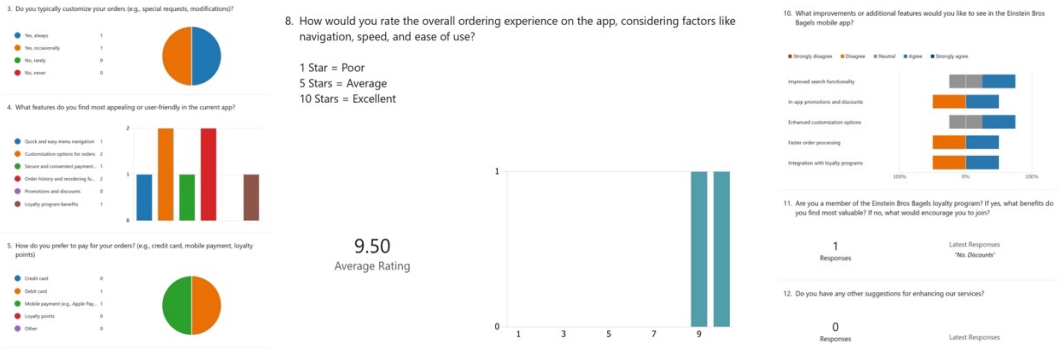


Figure 1. User Experience Feedback

UI Design Images

Wireframe

Stripped off from detail design elements like colors and pictures, our wireframe puts us in a position where we outline the positioning of central features, encompassing buttons, menus, and content regions. On this note, wireframes are deliberately basic allowing us to focus on refining the functionality of the application and interactions with users. Wireframes work as a foundation that ensures a logical and friendly-to-use interface while speeding up the design iteration process.

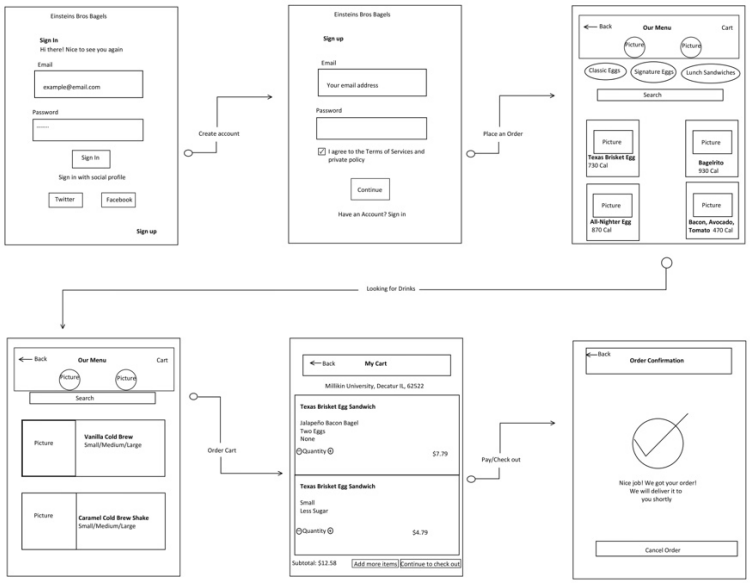


Figure 2. Initial Draft of Wireframe

Storyboard

This is a storyboard that creates scenarios for interactivity, presenting the logical sequence of screens and showing what users do on these screens. Every frame on the storyboard builds a very good image of a distinct stage of the user's interaction, yielding useful information related to the whole user experience. However, storyboard is effective in visualizing mobile flows, such as user pathways, feedback prompts, and screen switches. We use storyboards to convey the expected user experience and finalize the user's journey through the lenses of the Einstein's Bros Bagel mobile app.

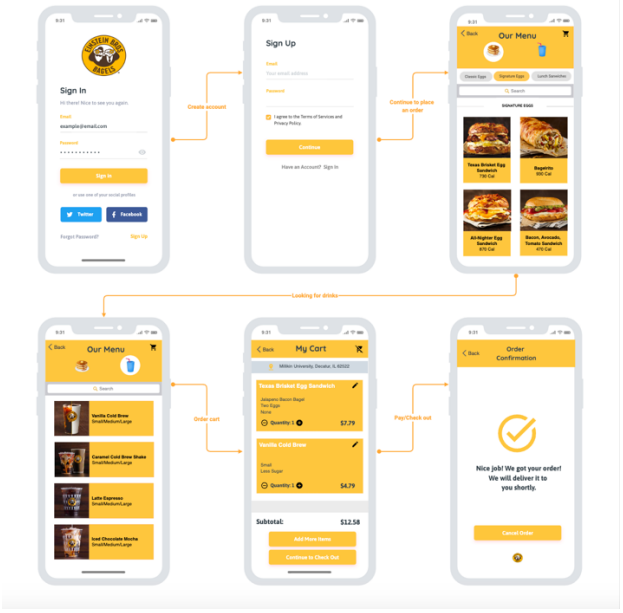


Figure 3. Storyboard

Changes Made to Convert Functions

Sign-In Page: Change the layout to be consistent with small screen and maintain usability, one column layout for mobile, big input fields and buttons for touch operation, hamburger menu or bottom navigation will help user reach anywhere in the app, ensure that keyboard does not cover user input fields when pressed.

Sign-Up Page: As for layout of sign-up form it should be similar to that used while logging in and ask for only necessary data because small screen does not allow users to type much.

Food Menu and Drink Menu: Use tabs or a dropdown menu for categories to preserve screen space, let users swipe left or right among menu categories or items, include expandable sections of details, ingredients, and customization in order not to crowd, optimize phone images for fast loading, prices should still be visible.

Order Cart: Add a persisting cart icon that is accessible at every page, include swiping or flick options to delete items, make the overall price clear, incorporate +/- buttons for quantity adjustment, or enable tapping into the cart to change numbers manually.

Confirmation Notification: Make sure you send short but useful messages, use push notifications when the customer allows it for updated orders and promotional messages.

Pages with Items Added or Removed

Sign-In Page:

- Bigger, touch-friendly input fields and buttons.
- Keyboard management to avoid obscuration of input boxes.
- If appropriate, social media log-in buttons.
- Use single column layout without any side bars or multiple columns on a website.
- Text and information can be condensed to avoid overload.

Sign-Up Page:

- Validation and mobile-optimized error messages.
- Discard long explanations and needless material.

Food and Drink Menu:

- Categories could be arranged in tabs or a dropdown menu to occupy less space on the screen.
- Navigating between categories and items using simple swipe gestures.
- Expandable section on items' names, components, and customized options.
- Mobile optimized high-resolution photos.
- Responsive pricing display.
- Tackle cluttered designs not suitable for small screens.

Order Cart:

- An ever-present floating cart icon with access from anywhere.
- Items removed by swiping.
- Total cost visibility in clear and strong format.
- Quantity adjustment using plus and minus buttons as well as direct editing.
- Eliminate intricate or non-obvious cart engagement.

Confirmation Notification:

- Clear and concise notification messages.
- Delete those unhelpful notifications that never need action by the user.

Demo Prototype

Our demo prototype for Einstein's Bros Bagel was developed on Figma. The app's envisioned user experience has come to life thanks to Figma, enabling collaborative design with instant feedback. This is a demonstration of essential features of the app in terms of item perusal as well as personalized ordering and safe online payments as also it can track the orders real time. Our team has been able to modify various aspects of the design including visual appeal of the user interface, thanks to Figma simple interface. Demo-prototype is both a visual preview as well as an interactive journey through the flow and interaction of the app.

System Architecture

The development of evolving requirements and system architecture is facilitated during iteration using class diagrams or DFDs in the Agile methodology. There are various visual artefacts that illustrate the modifications through sprint planning meetings while ensuring full comprehension of requirements prior to actual programming in the classical Waterfall model. These diagrams are dynamic tools used in mapping procedures in DevOps, RAD and Lean methodologies that lead to better resource management thus allowing organizations and industries to work efficiently. Finally, in OOAD, class diagrams are key to object-oriented analysis and translating requirements into actual software designs during modeling and design. All these methods make use of class diagrams and DFDs which result into better planning, communication, and aligning development with objectives.

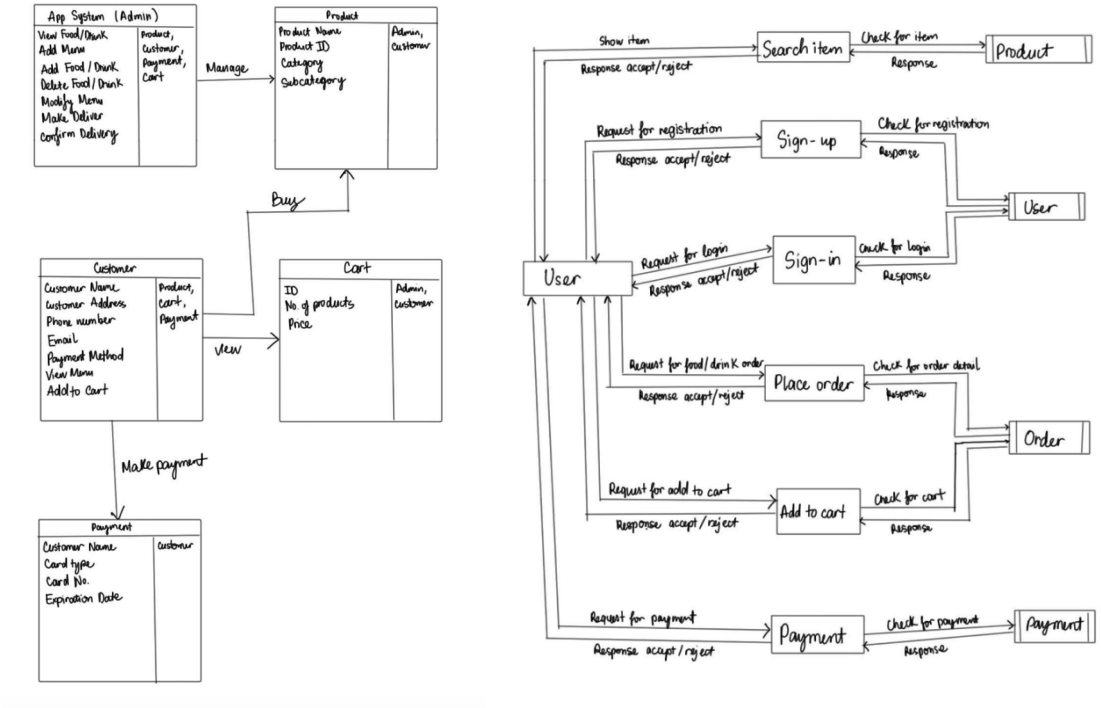


Figure 4. Class Diagram and Level 0 DFD

Epics and Use-cases

Epics and Use-Cases Overview

Main Stories

As a user who values efficiency, I want the mobile app to load quickly, so that I can access information without delays.

As a user who values personalized experiences, I want to have a user profile in the app, so that I can customize my interactions and preferences.

As a user who wants to track my order history, I want the app to store order information, so that I can review past orders and make informed decisions.

As a user seeking an intuitive navigation experience, I want the main menu of the app to be clear and organized, so that I can easily find and explore menu items.

As a user who wants reassurance and information about my order, I want the app to provide a dedicated order confirmation page, so that I can be certain that my order has been received and is being processed.

As a user who values privacy and personalization, I want to have a secure login system, so that I can access personalized features and information.

As a user who values the security of my financial information, I want the payment processing to be secure, ensuring that my sensitive details are encrypted and protected during the transaction.

As a user who wants to track my selected items, I want the app to have a visually distinct cart UI element, so that I can easily identify and manage the items in my shopping cart.

As a user who values a user-friendly experience, I want the app to create a clear and visually appealing menu interface, so that I can easily navigate and explore the available items.

As a user who values a seamless experience, I want the app to implement user registration logic, allowing me to sign up for the app effortlessly.

Main Milestones

User registration and authentication, Menu and ordering functionality, User interface design, User flow planning, Architecture design, Database design, Payment and checkout

Overall Goals

Streamlined the prioritization process, provide intuitive visualizations and customizable reports within Kanban board, allowing users to quickly access their orders, enhance the overall performance of the mobile app to provide users with a seamless and responsive experience.

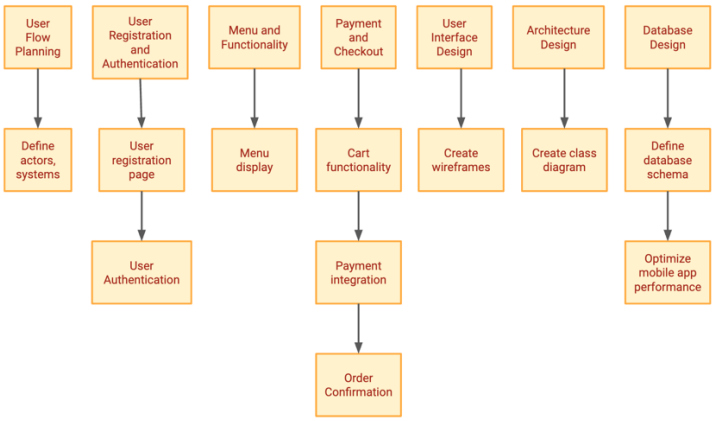


Figure 5. Epics and User Stories

Use-Case Diagram

Goals

Potential customers using the website to place an order, view product information, or check order status.

Actors

Primary Actors: Potential Customer, Unregistered Customer, New Customer

Secondary Actor: Inventory System

Pre-Conditions

New customers must register with the site to log in. Customers should reach the site through linked advertisements or partnerships, a product webpage, a web search, or the website search function.

Post-Conditions

The user is waiting on product information, and order status, or has received order status and moved to payment or follow-up options.

Use-Case Steps

1. Customer will log in to the site using Customer Account.

2. Customer will select from options on the main menu:

- Request Product Information
- Select Payment
- Place an Order
- Check Order Status

3. If Request Product Information, the site will load the appropriate secondary site for task completion.

4. If Place an Order is selected, the site shall load the order page for completion. Upon completion and submission of the order page, the customer will be redirected to the main menu.

5. If Check Order Status is selected, the order status will be displayed for the customer with an option to return to the main menu after viewing.

Alternate Paths

1. Customer has not registered for an account, a link to "Sin up for an account" will be displayed for the customer to register. No parts of the customer order process can be accessed without login.

2. If Check Order Status is selected with no order found, then the customer will be redirected to the Place an Order page.

3. Customer forgot the password. A link to "Forgot Password" will be provided on the login page with instructions. If no username is found by the system, the link will direct to "Register Account" instead.

4. Website cannot validate the password/username due to the validation system not working or loading. Notify the user of the condition and suggest they try at a later time or contact the cashier directly through other means.

5. Website cannot validate username/password, and the user has attempted more than 5 times. Notify and direct the user to contact IT Support for further assistance.

Linked Use-Cases

200-0001: Order Status Check, 200-0002: Product Information Requests, 200-0003: Event Participation, 001-0010: Order Placement, 003-0025: Inventory Tracking

Summary

Potential customers are an essential factor for running a retail business, and attracting them ensures we can continue operating. To facilitate this, we must ensure those accessing our website with the goal of requesting product information or registering for our events can quickly access these parts of the website. More importantly, any customer ready to place an order or checking their order status should have as near a direct path as possible to the order page to ensure their continued participation and successful order completion. This use-case focuses on the interactions needed for a potential customer to log in and access all the features available to them, particularly focusing on placing an order and checking the status of the order through the website. Any potential customer who arrives at the main website and then navigates to the login page or arrives at the login page via a direct link will be required to log in to the site for full access. If they are a new customer, then the website will provide information (on the same login page) on registering for an account and provide links directly to the registration page. Once registered, the customer would then be able to log in and either:

1. Place an order, or Check the status of an order

2. View Product information

The main menu page shall link and securely share session information with our partner networks that handle product information requests and event registrations. For orders, it will check for an order submission, and if one is found, provide links to check it. If no submission is found, the customer will be provided links to the order page where they can complete the order process. The order page should validate all information being submitted to ensure required fields are correctly filled out before allowing the customer to submit their order, and if successfully submitted, notify the user of the success before returning to the main menu page.

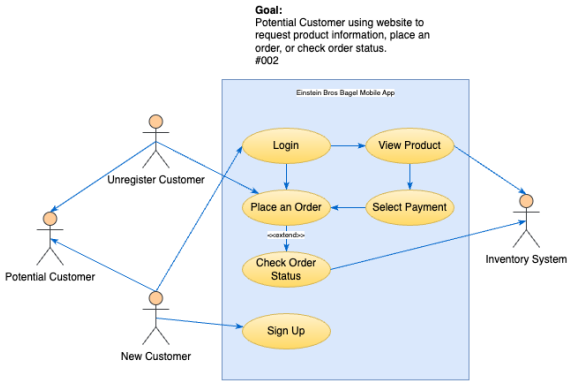


Figure 6. Use-Cases Diagram

Rationale for Use-Cases

The prioritization of these use-cases is based on user-centric design principles and iterative feedback. It includes user registration and authentication that form an initial step toward securing and personalizing the experience. The menu browsing and item selection are tailored towards

facilitating an informative and user-friendly interface. Personalized services are expected by users to be accompanied with order customization. Also of importance is secure payment processing, which fosters trust and allows users to trace orders in real time. Lastly, promotions and a loyalty program are added value to users' experience. Adjustments to use-cases will be guided by continuous feedback analysis to ensure that the solutions developed correspond to what users expect and prefer.

Use-case Feedback Analysis

Feedback Methods

Split Testing: Users were asked to provide feedback on the wireframes before and after the theme color change. The "A" and "B" refer to the two versions being tested—A being the control (current version) and B being the variation (with changes or modifications).

Sentiment Analysis: The feedback was categorized into positive, negative, and neutral sentiments to gauge overall user reactions. This sentiment analysis provides a quantitative overview of user responses.

Positive, Negative, Neutral Chart

Person	Dislike	Neutral	Like	Key Features
Before I change the theme color				
1			1	He likes it because the wireframe looks streamlined and clean
2			1	She likes it because the app is simple and easy to use
3			1	She likes it because the app is simple, engaging, and clear
4			1	Simple, nice, no distraction features
5			1	Visualize the store well, nice transition
6			1	Nice colors, easy to navigate
Total	0	0	6	
After I change the theme color				
1	-1			Blue and gray do not fit the food services
2		0		Yellow is brighter and more attractive than gray
3	-1			The color does not seem suitable
Total	-2	0	0	

Users appreciated the simple, engaging, and clear design, with positive remarks on visualizing the store and smooth transitions. After the theme color change, opinions diverged. Some expressed dislike, arguing that blue and gray did not complement food services, while others found the yellow to be a brighter and more attractive alternative to gray. One user remained neutral, pointing out that the color change did not seem suitable without explicitly favoring or disliking it.

User Management Architecture

The Level 1 DFD focuses specifically on User Management in our Einstein's Bros Bagel mobile app should detail the processes of connections taking place within the user centered subsystem. Detailed analysis of flows for user's activities including registration, authentication and profiles management based on data flows are shown in this illustration. User Management subsystem is portrayed as a dynamic entity that collects users' data, validates their permissions and stores user profiles. The diagram depicts continuous exchange of information between the frontend and backends systems representing user-centered activities that guarantee effective operations of the app. This focused view on User Management within the Level 1 DFD serves as

a foundational guide for the development team, elucidating the intricacies of user interactions and data flow for a streamlined and secure user experience.

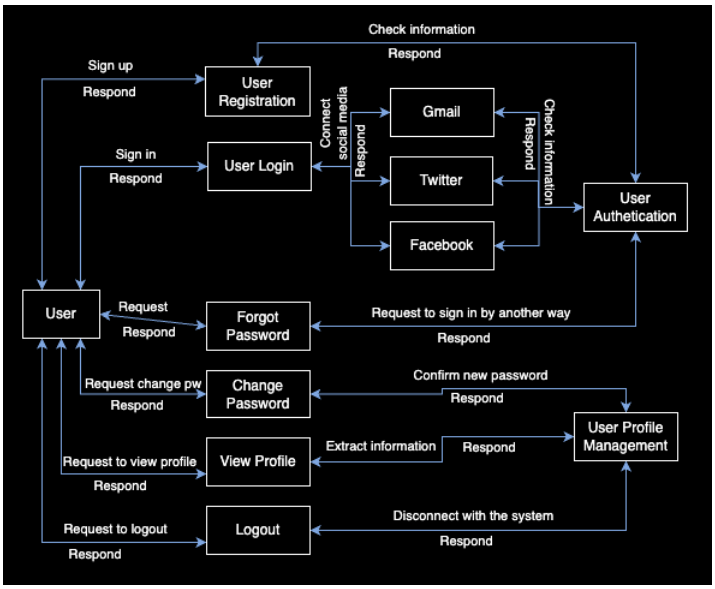


Figure 7. Level 1 DFD of User Management

User Management Rationale

Design Considerations

User Authentication:

- Choose an appropriate industry-standard authentication protocol, using hashed passwords for users' passwords and token-based systems for user sessions.
- Choose a conventional username-password model for broad compatibility over considered alternatives such as biometric authentication.

User Profiles:

- Develop an all-encompassing user profile system for capturing and storing user specific data information.
- Examine several possibilities of involving social media platforms such as in Gmail, Twitter, Facebook, etcetera; however, decided to go with a third-party standalone profile manager which provides the most privacy of users' personal information.

Tradeoffs and Alternatives

Although biometric authentication is more convenient, we opted for a traditional username – password system due to apprehensions concerning user data confidentiality. Signing up can be simplified by integrating with social media account such as Gmail, Twitter, and Facebook in one click. The graphs below illustrate that people typically access their social media platforms mostly when they are logging on to other applications.

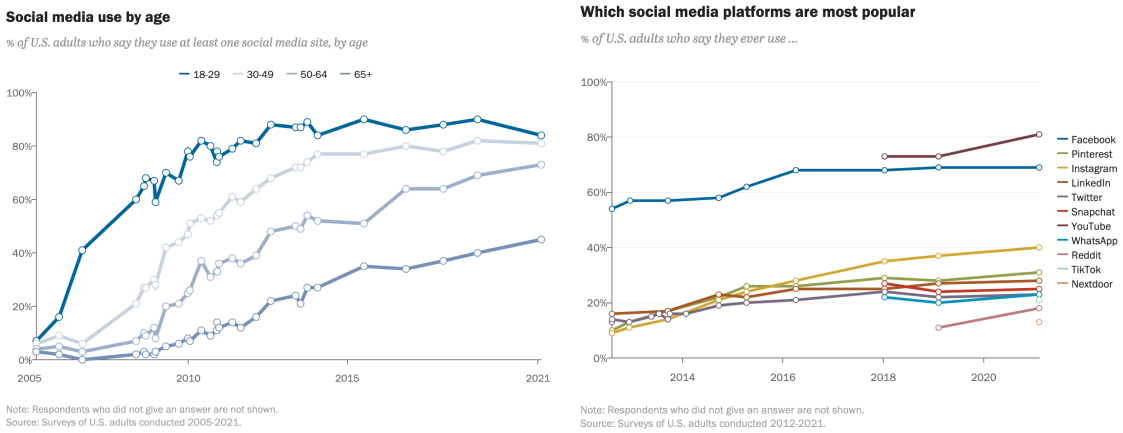


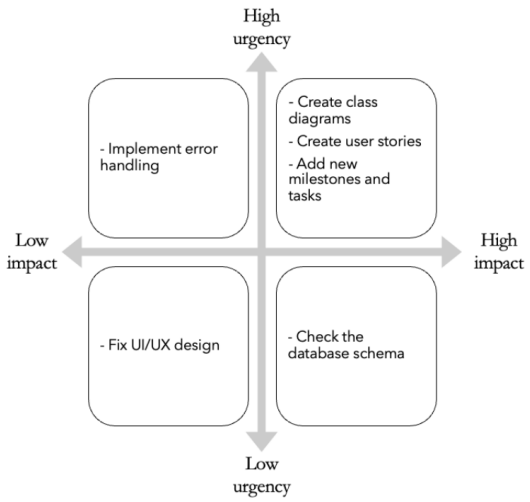
Figure 8. Social Media Platforms Usage

Appendices

Time Line

Wireframe	Storyboard	Class UML Diagram	Epics and User Stories	Goals	Milestones	Tasks	Review Backlog	Feedbacks and editing	Final Proposal
08/25/23	09/11/23	09/18/23	09/30/23	10/07/23	10/14/23	10/18/23	11/15/23	11/30/23	12/17/23

Prioritization Matrix



4Ls Matrix

Loved	Loathed
- Team members' support - Clear process - Helpful resources and references - Outcomes is more than expected	- Procrastination in finishing
Longed For	**Learned**
- Consider SCRUM method - Ask for clarification - Task update	- Kanban Agile method - Create repo on GitHub - Plan and design systems

MoSCoW Prioritization Matrix

Must Have	Should Have
- User authentication - Menu display - Order placement - Payment integration - Location services	- Customization options - Order tracking - Push notifications
Could Have	**Won't Have (at this time)**
- In-app messaging - Social media integration	- Augmented reality features - Offline mode