PHASE1
Brainstorm & Idea Prioritization

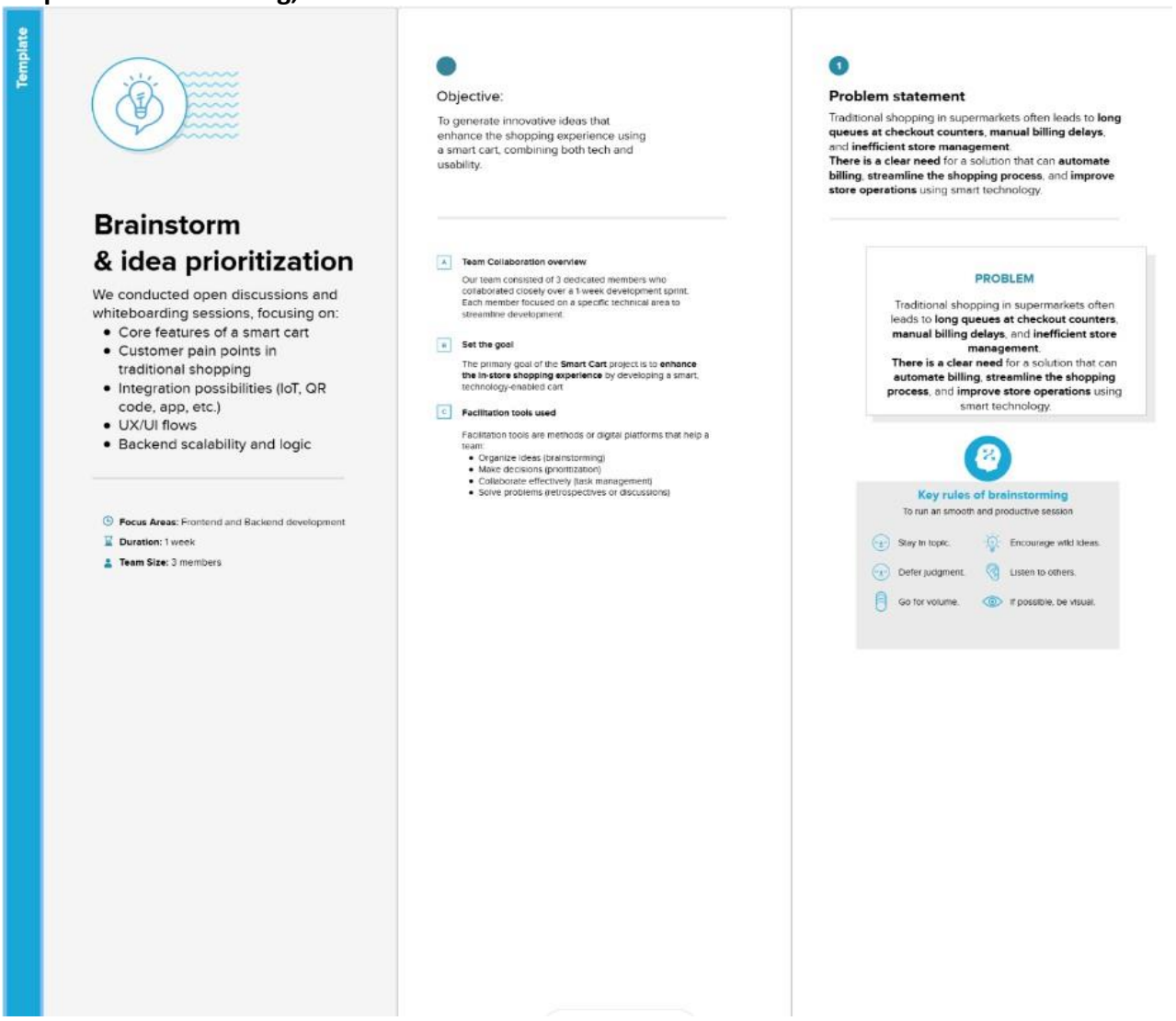
Ideation Phase
Brainstorm & Idea Prioritization Template

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	4 Marks

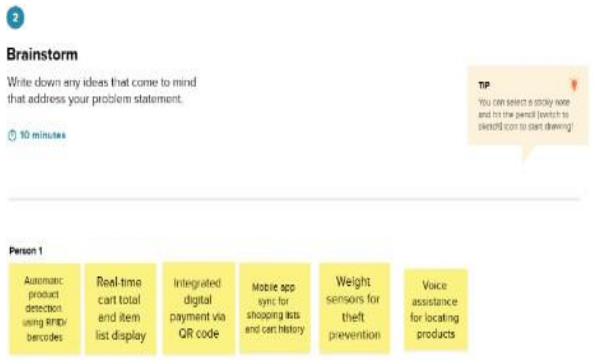
Brainstorm & Idea Prioritization:

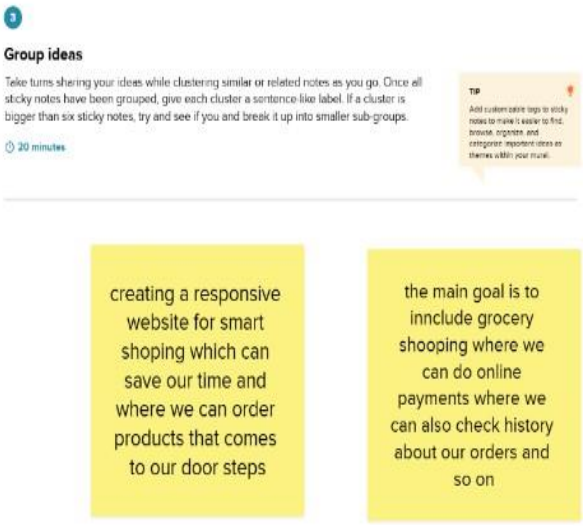
The brainstorming phase focused on identifying the key challenges faced by both shoppers and store owners in traditional grocery shopping. Our team explored ideas to reduce queue times, enhance shopping convenience, and improve billing accuracy. We discussed integrating QR code scanning, real-time cart updates, and online payment methods. Suggestions for an admin dashboard to manage inventory and monitor customer behavior were also considered. We prioritized features that ensure a user-friendly interface and reduce manual tasks. Environmental concerns led us to include digital receipts. This session helped shape a clear vision for a smart, digital grocery shopping experience.

Step-1: Team Gathering, Collaboration and Select the Problem Statement:

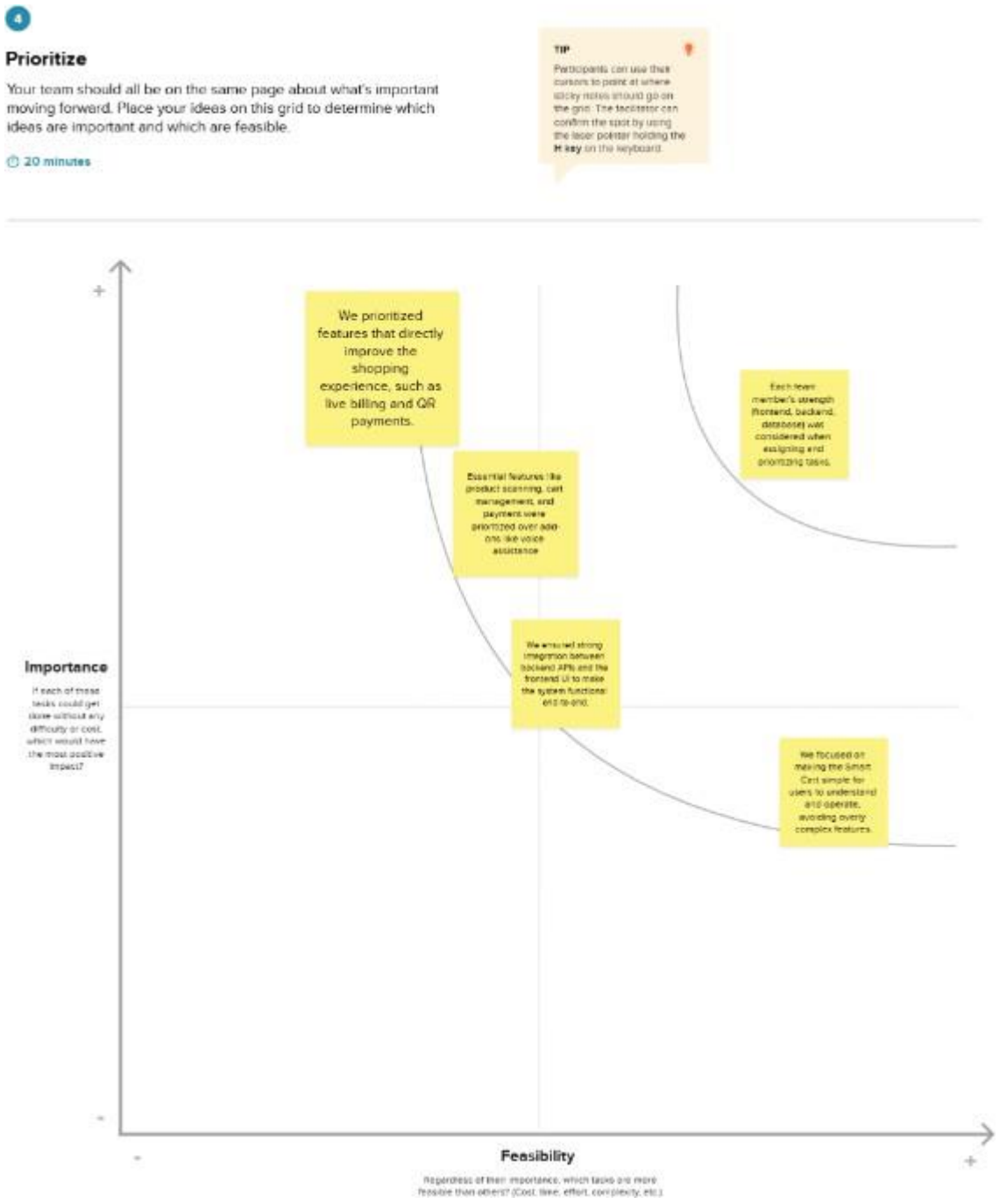


Step-2: Brainstorm, Idea Listing and Grouping





Step-3: Idea Prioritization



DEFINE PROBLEM STATEMENTS

Ideation Phase
Define the Problem Statements

Date	19-may-2025 To 30-june-2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	2 Marks

ShopSmart: Your Digital Grocery store Experience: Problem Statement :

Traditional grocery shopping often results in long checkout lines and slow manual billing.
Customers struggle to track their spending in real time while moving through the store.
There's a lack of digital integration between product selection, billing, and payment.
Store staff face challenges in managing inventory and reducing human error.
Shoppers desire a faster, more convenient, and contactless shopping experience.
There is a need for a smart solution that automates billing, enhances user control, and improves store operations.

Problem Statement (PS)	I am	I'm trying to	But	Because	Which makes me feel
PS-1	a student working on a tech solution to improve grocery shopping.	create a smart cart system that automates billing and simplifies in-store shopping.	traditional shopping is time-consuming, with long queues, manual billing, and no real-time cost tracking.	today's consumers value convenience, speed, and digital payment methods in their shopping experience.	empowered to create a solution that solves real-world problems and improves everyday life.

Empathize & Discover

Ideation Phase
Empathize & Discover

Date	19th may 2025 – 30th June 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	4 Marks

Empathy Map :

As a student working on the Smart Cart, the empathy map helped me understand real user problems deeply.

I realized shoppers are often frustrated with long queues and slow billing.

Many customers worry about spending too much without realizing it.

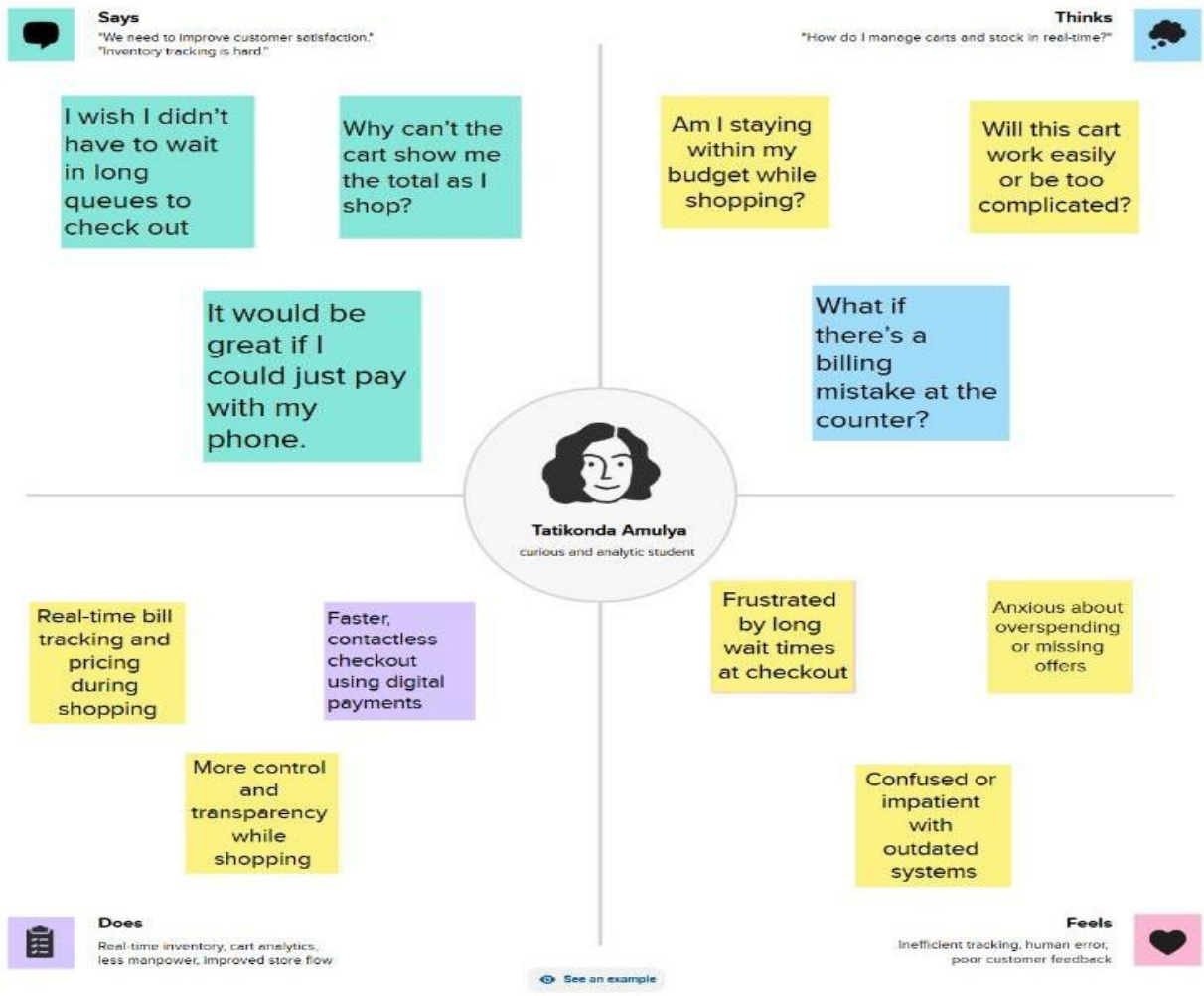
They think digital solutions might be complex, but want something easy and helpful.

They feel anxious about errors and waiting, especially during busy hours.

Our team designed the Smart Cart to show live billing and offer QR payment to solve these pain points.

We also considered store owners who need real-time inventory and cart tracking..

Example:



Link of empathy map:
https://app.mural.co/t/salma4377/m/salma4377/1750859086901/19248543d17a85331b79dae3ba948db215792d44

Says

"We need to improve customer satisfaction."
"Inventory tracking is hard."

I wish I didn't have to wait in long queues to check out

Why can't the cart show me the total as I shop?

It would be great if I could just pay with my phone.

Thinks

"How do I manage carts and stock in real-time?"

Am I staying within my budget while shopping?

Will this cart work easily or be too complicated?

What if there's a billing mistake at the counter?

Tatikonda Amulya

curious and analytic student

Real-time bill tracking and pricing during shopping

Faster, contactless checkout using digital payments

More control and transparency while shopping

Frustrated by long wait times at checkout

Anxious about overspending or missing offers

Confused or impatient with outdated systems

Does

Real-time inventory, cart analytics, less manpower, improved store flow

Feels

Inefficient tracking, human error, poor customer feedback

See an example

PHASE-II:
REQUIREMENT ANALYSIS

- **Python 3.10.0**
- **FastAPI**
- **Streamlit**
- **IBM Watsonx AI & Granite Models**
- **LangChain**
- **Uvicorn**
- **PyMuPDF (fitz)**
- **Git & GitHub**
- **Frontend Libraries**

Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	4 Marks

Technical Architecture:

- **Frontend: Built using HTML, CSS, JavaScript, and React for a responsive user experience.**
- **Backend: Flask or Django handles product data, orders, user sessions, and security.**
- **Data Pipeline: Python scripts for ingestion, validation, and formatting of data.**
- **Visualization Layer: Charts integrated into admin dashboards using tools like Tableau or Chart.js.**
- **Integration: RESTful APIs or GraphQL connect frontend to backend services.**
- **Deployment: Hosted on cloud (AWS, Heroku) with scalable architecture and CI/CD pipelines.**
- **Security: HTTPS, token-based authentication, and access-level control to protect user data.**

Technology Stack for ShopSmart

S.No	Component	Description	Technology Used
1	**Data Source**	Source of product and inventory data	MySQL / Google Sheets / Firebase
2	**Data Ingestion**	Fetching item/category data into the backend	Python / APIs / Webhooks
3	**Data Storage**	Stores product details, user data, and orders	PostgreSQL / Firebase / MongoDB
4	**Data Preprocessing**	Cleansing product names, categorization, and availability tagging	Python (Pandas) / Node.js
5	**Data Visualization**	Graphical display of orders, sales trends, and inventory	Chart.js / Google Charts / Tableau
6	**Backend Framework**	Business logic for cart, payments, delivery, etc.	Flask / Django / Node.js
7	**Frontend Interface**	Customer-facing UI: homepage, cart, checkout, profile	HTML, CSS, JavaScript, React.js
8	**Authentication**	User login, sign-up, and role-based access control	Firebase Auth / OAuth / JWT
9	**Payment Integration**	Secure transaction processing	Razorpay / Stripe / PayPal
10	**Hosting/Deployment**	Hosting the platform and dashboards	Heroku / Vercel / AWS

Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	4 Marks

Functional Requirements

Following are the functional requirements of the ShopSmart digital grocery solution:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration & Authentication	Allow customers to sign up, log in, and manage accounts securely.
FR-2	Product Browsing & Search	Enable users to browse categories or search for grocery items by keyword.
FR-3	Shopping Cart	Allow customers to add, remove, and update items in their cart.
FR-4	Order Placement & Checkout	Enable users to place orders and process payments securely.
FR-5	Order Tracking	Allow customers to view order status and track delivery.
FR-6	Admin Dashboard	Provide admin interface to manage inventory, prices, and users.
FR-7	Customer Support	Enable support team to manage queries and complaints.

Non-functional Requirements

Following are the non-functional requirements of the ShopSmart digital grocery solution:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The interface should be user-friendly, responsive, and easy to navigate.
NFR-2	Security	User data and payment information must be

		securely stored and transmitted.
NFR-3	**Reliability**	**The system should operate consistently without downtime or data loss.**
NFR-4	**Performance**	**Pages and dashboards should load within 2 seconds for optimal UX.**
NFR-5	**Availability**	**The platform should maintain 99.9% uptime and be accessible 24/7.**
NFR-6	**Scalability**	**The system should handle increasing number of users and orders smoothly.**
NFR-7	**Maintainability**	**The codebase should support easy updates and bug fixing.**

Phase III: Project Design (STEP-1)

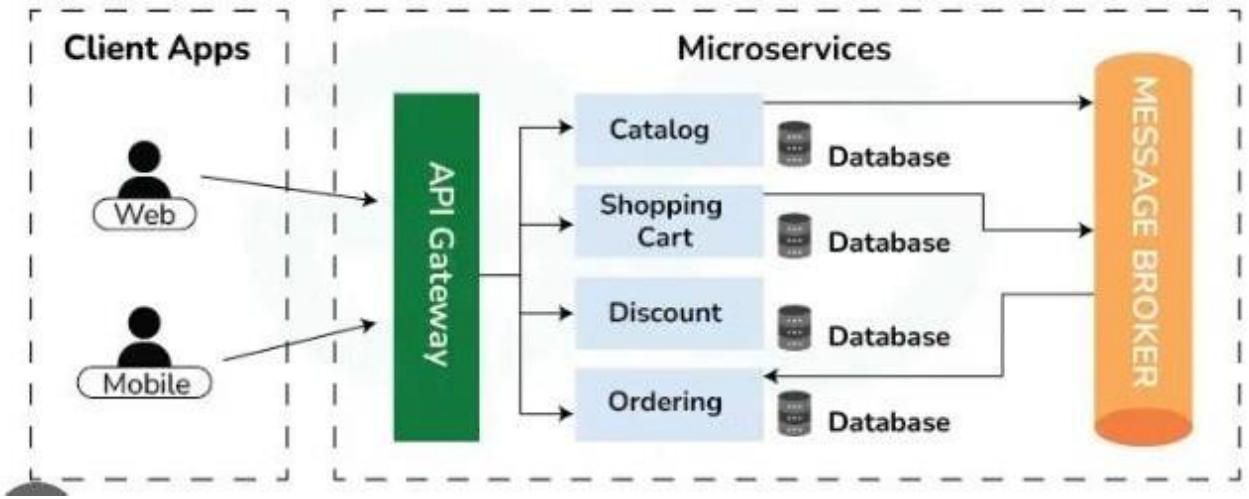
Project Design Phase-II
Data Flow Diagram & User Stories

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	4 Marks

Data Flow Diagrams:

The Data Flow Diagram (DFD) for ShopSmart illustrates the flow of data across user interfaces, backend services, and external systems. It describes how a customer interacts with the platform to register, search for products, add them to the cart, and complete the order using integrated payment gateways.

Backend services handle catalog management, order processing, and real-time inventory updates. Data is then stored in cloud-based databases and used for generating reports and recommendations. Admins and customer support teams interact with the system via their respective dashboards to manage content and respond to queries



Example: (Simplified)

User Stories

Below are the user stories designed for the ShopSmart platform:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	Register and create profile	I can create an account and login	High	Sprint-1
Customer (Mobile user)	Browse & Search	USN-2	Search for grocery items	Search shows accurate and relevant results	High	Sprint-1
Customer (Mobile user)	Cart Management	USN-3	Add and remove items in cart	Cart updates reflect in real-time	High	Sprint-2
Customer (Mobile user)	Checkout & Payment	USN-4	Make payment and place order	I receive confirmation with order ID	High	Sprint-2
Customer (Web user)	Order History	USN-5	View past orders and invoices	I can see past purchases under my account	Medium	Sprint-2
Customer Care Executive	Support	USN-6	View and resolve	I can access and respond	Medium	Sprint-3

			customer complaints	to customer queries		
Administrator	Inventory Management	USN-7	Update product prices and stock	System reflects updated inventory instantly	High	Sprint-3

Project Design Phase
Problem – Solution

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	2 Marks

Problem – Solution:

The Smart Cart Online Grocery Website addresses several key problems faced by traditional grocery shoppers. Customers often deal with long queues and limited store hours, which lead to inconvenience and time loss. Manual billing processes are slow and prone to errors, making the shopping experience inefficient. Additionally, traditional stores rarely offer personalized suggestions, and shoppers frequently forget to purchase essential items without proper reminders.

Smart Cart solves these issues by providing a seamless online grocery shopping experience available 24/7. The platform features automated billing that eliminates human error and speeds up the checkout process. It uses AI to offer personalized product recommendations based on users' shopping history. Furthermore, smart reminders and wish lists help users keep track of essentials, ensuring they never miss important items. With secure payment options and user-friendly design, Smart Cart enhances convenience, efficiency, and satisfaction in grocery shopping.

Smart Cart – Problem/Solution Canvas

Section	Details
1. Customer Segment(s) (CS)	Working professionals, parents, students, elderly people, and tech-savvy users seeking convenient grocery solutions.
2. Jobs-to-be-Done / Problems (J&P)	- Avoid physical store visits - Save time - Accurate billing - Personalized recommendations - Grocery reminders
3. Triggers (TR)	- Busy lifestyle - Health concerns - Smart Cart promotions - Poor offline service
4. Emotions: Before / After (EM)	Before: Stressed, frustrated, overwhelmed After: Confident, relaxed, satisfied
5. Available Solutions (AS)	- Supermarkets - Online competitors (BigBasket, Amazon Fresh) - Phone orders

	Cons: Less personalized, manual, or time-consuming
6. Customer Constraints (CC)	- Low digital literacy - Internet issues - Budget concerns - Trust in online orders/payments
7. Behaviour (BE)	- Browse online - Compare prices - Use reviews - Set up wishlists or repeat orders
8. Channels of Behaviour (CH)	Online: Website, App, Social Media, Emails Offline: Word of mouth, flyers/posters
9. Problem Root Cause (RC)	- Time scarcity - Outdated offline retail process - Poor stock visibility and inconsistent pricing
10. Your Solution (SL)	Smart Cart is an online grocery platform offering real-time stock, personalized recommendations, reminders, and fast checkout with secure payments.

Project Design Phase
Proposed Solution Template

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	2 Marks

Proposed Solution Template:

S.No.	Parameter	Description
1	Problem Statement (Problem to be solved)	Despite advancements in e-commerce, many customers still face issues with grocery shopping, such as long queues, fixed store hours, and inconsistent product availability. These challenges create stress, reduce shopping efficiency, and limit access to quality groceries, especially for busy professionals, elderly individuals, and people with mobility issues. There is a need for a convenient, reliable, and efficient platform to simplify and improve the grocery shopping experience.
2	Idea / Solution Description	Smart Cart is an online grocery shopping platform that allows users to browse, select, and purchase groceries with just a few clicks. The system provides real-time product availability, personalized recommendations, smart reminders, and secure payment gateways. The goal is to streamline the shopping experience, reduce time and effort, and enhance customer satisfaction.
3	Novelty / Uniqueness	Unlike general e-commerce platforms, Smart Cart is specifically optimized for grocery shopping. It integrates AI for personalized product suggestions, uses smart reminders for recurring

		purchases, and ensures real-time inventory tracking. This specialized focus allows for a more efficient and user-friendly shopping experience tailored to daily household needs.
4	Social Impact / Customer Satisfaction	Smart Cart promotes convenience, reduces stress, and helps users manage their time more effectively. It supports digital inclusion, particularly for those unable to visit stores easily. With timely delivery, accurate billing, and personalized service, it fosters trust and loyalty, ultimately leading to higher customer satisfaction and better quality of life.
5	Business Model (Revenue Model)	Smart Cart can operate on a freemium model. Basic access is free for browsing and placing orders, while premium services—such as subscription for priority delivery, bulk discounts, and exclusive offers—are available at a cost. Additional revenue streams can include vendor partnerships, ad placements, and data analytics for suppliers.
6	Scalability of the Solution	The Smart Cart platform is scalable and can be expanded to multiple cities and regions. It can integrate with local grocery stores, delivery services, and third-party payment gateways. The architecture supports regional customization, multilingual interfaces, and mobile access, enabling easy scaling to new markets and demographics.

Project Design Phase
Solution Architecture

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	4 Marks

Solution Architecture:

The solution architecture for ShopSmart, an online smart- cart grocery platform, starts with multi- channel user interfaces built as a responsive React web app and a Flutter mobile app. All client requests first pass through a CloudFront CDN and an API Gateway that handles routing, rate limiting, and authentication via JWT/OAuth 2.0.

Behind the gateway, a set of stateless microservices—deployed in Docker containers on Kubernetes—manage core domains:
• Catalog Service (product, pricing, inventory)
• Cart & Checkout Service (shopping cart persistence, promotions, coupons)
• Order Service (order orchestration and status tracking)
• Payment Service (PCI- compliant integration with Stripe/Razorpay)
• User Service (profiles, addresses, preferences)
• Recommendation Service (AI/ML model for personalized suggestions)
• Notification Service (email/SMS/push via Twilio & Firebase)

Data is stored in a polyglot persistence layer: a PostgreSQL cluster for transactional data, Redis for session/cache, and Elasticsearch for product search. Inventory updates from partner stores feed into Kafka topics that fan- out to Catalog and Recommendation services in real time.

Orders are dispatched via an Integration Layer that exposes REST/GraphQL endpoints to third- party delivery partners (Dunzo/Swiggy, etc.). Event sourcing through Kafka ensures eventual consistency and auditability across services. Real- time dashboards (Grafana + Prometheus) monitor KPIs such as cart- to- checkout conversion, stockouts, and latency.

All services are packaged into CI/CD pipelines (GitHub Actions → ArgoCD) with automated testing and blue- green deployments to minimize downtime. The platform is container- agnostic, allowing horizontal scaling across regions to support peak demand.

Example – Solution Architecture Diagram:

[Insert layered diagram showing: UI → CDN/API Gateway → Microservices (Catalog, Cart, Order, Payment, User, Recommendation, Notification) → Databases (PostgreSQL, Redis, Elasticsearch) → Message Bus (Kafka) → External Delivery APIs]

Phase IV Project Planning

Project Planning Phase

Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	5 Marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Tatikonda Amulya
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Syed Sohail
Sprint-2		USN-3	As a user, I can register for the application through Facebook	2	Low	Deepika
Sprint-1		USN-4	As a user, I can register for the application through Gmail	2	Medium	Tatikonda Amulya
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	Syed Sohail
	Dashboard					

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	19 may 2025	25 may 2025	20	25 may 2025
Sprint-2	20	6 Days	27 may 2025	04 june 2025	18	04 june 2025
Sprint-3	20	6 Days	05 june 2025	11 june 2025	15	11 june 2025
Sprint-4	20	6 Days	12 june 2025	17 june 2025	15	17 june 2025

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

https://www.visual-paradigm.com/scrum/scrum-burndown-chart/

https://www.atlassian.com/agile/tutorials/burndown-charts

Reference:

https://www.atlassian.com/agile/project-management

https://www.atlassian.com/agile/tutorials/how-to-do-scrum-with-jira-software

https://www.atlassian.com/agile/tutorials/epics

https://www.atlassian.com/agile/tutorials/sprints

https://www.atlassian.com/agile/project-management/estimation

https://www.atlassian.com/agile/tutorials/burndown-charts

Sprint: A fixed period (5 days) in which a team works to complete a defined set of tasks.

Epic: A large body of work that can be broken into smaller tasks (Stories), completed over multiple Sprints.

Story: A small task that is part of an Epic.

Story Point: A measure of effort for each Story (typically in Fibonacci numbers).

Very Easy = 1

Easy = 2

Moderate = 3

Difficult = 5

🟩 Sprint Planning and Story Breakdown

🟢 Sprint 1 (5 Days)

Epic 1: Data Acquisition and Preparation

Story 1: Collection of Data Sources (Index, GDP, HDI, etc.) → 2 SP

Story 2: Integrate ABLY for live sync or dynamic connection → 3 SP

Story 3: Data Cleaning – Handle Missing Values → 3 SP

Story 4: Data Transformation – Format and Normalize Data → 2 SP

🔶 Total Story Points for Sprint 1 = 10 SP

🟡 Sprint 2 (5 Days)

Epic 2: Data Visualization and Dashboarding

Story 5: Connect Dataset to Tableau → 2 SP

Story 6: Create Visualizations (Charts, Graphs, Maps) → 3 SP

Story 7: Build Interactive Dashboards in Tableau → 5 SP

Story 8: Design Storyboard View for Insights → 3 SP

🔶 Total Story Points for Sprint 2 = 13 SP

🔴 Sprint 3 (5 Days)

Epic 3: Deployment and Web Integration

Story 9: Publish Dashboard to Tableau Public → 2 SP

Story 10: Get Embed Code and Test Responsiveness → 3 SP

Story 11: Create Web App UI (HTML/CSS) → 3 SP

Story 12: Integrate with Flask Backend and Deploy → 5 SP

🔸 Total Story Points for Sprint 3 = 13 SP

📈Velocity Calculation

Total Story Points = 10 (Sprint 1) + 13 (Sprint 2) + 13 (Sprint 3) = 36 SP

Number of Sprints = 3

Velocity = 36 ÷ 3 = 12 Story Points per Sprint

🟩 My Team's Velocity = 12 SP/Sprint

PHASE-V Functional & Performance Testing

19-may-2025 To 30- June- 2025

User Acceptance Testing (UAT) Template

Date	19-may-2025 To 30- June- 2025
Team ID	LTVIP2025TMID49768
Project Name	ShopSmart: Your Digital Grocery Store Experience
Maximum Marks	

Project Overview:

Project Name: ShopSmart: Your Digital Grocery Store Experience

Project Description: **ShopSmart** is a smart cart system designed to digitize and simplify the grocery shopping experience.
It allows customers to scan items, view real-time billing, and pay instantly using QR codes.
This eliminates long queues and manual checkouts in stores.
The system includes a user-friendly frontend, a secure backend, and a connected database.
Customers benefit from faster shopping, while store admins gain better inventory control.
Developed by a 3-member team in one week, the project focuses on practicality and user ease.
ShopSmart blends technology and convenience to modernize retail shopping.

Testing Period: 27-06-2025 to 29-06-2025

Testing Scope:

Features to be tested: Login, Product Browsing, Cart, Checkout, Payment, Search, Offers, Profile Management

User Stories: As a user, I want to browse groceries, add to cart, and checkout securely.

Testing Environment:

URL: https://smartcart.groceryonline.com

Credentials: testuser / Test@123

Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Pass/Fail
TC-001	User Login with valid credentials	1. Navigate to login page2. Enter valid credentials3. Click login	User is redirected to the homepage/dashboard	Works as expected	Pass
TC-002	Add item to cart	1. Browse item2. Click "Add to Cart"3.	Selected item appears in cart with correct details	Item appears in cart correctly	Pass

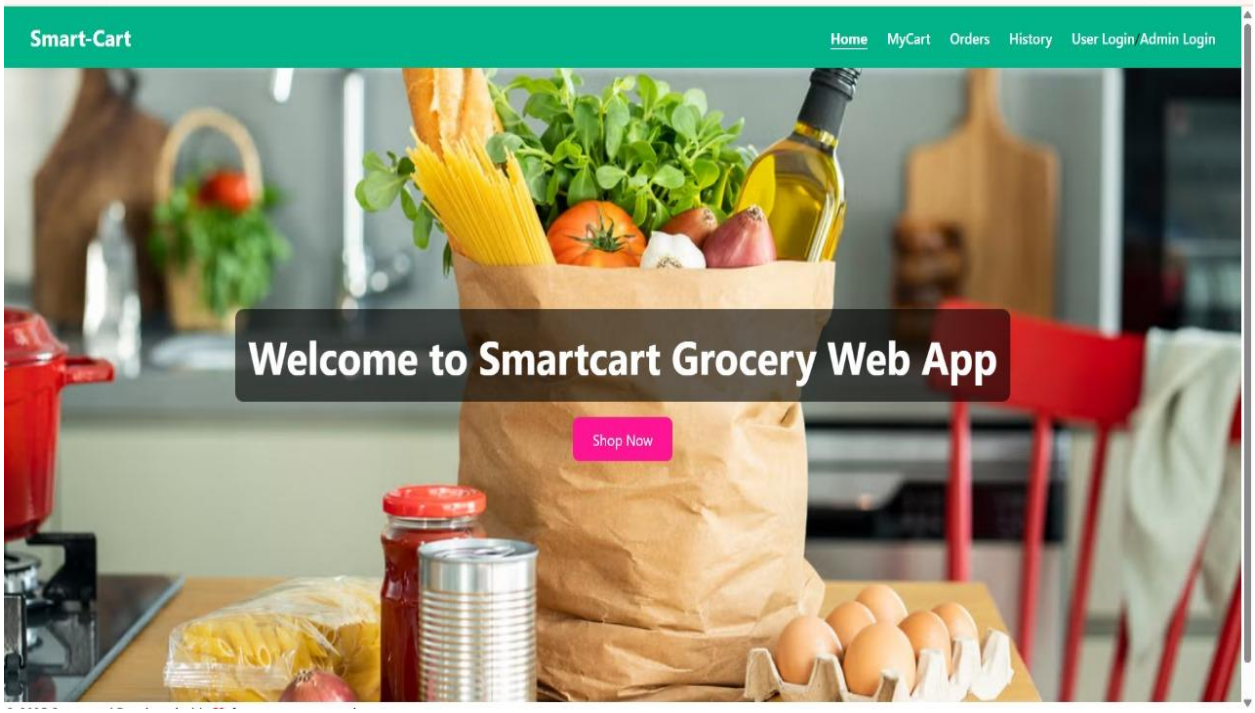
Bug tracking:

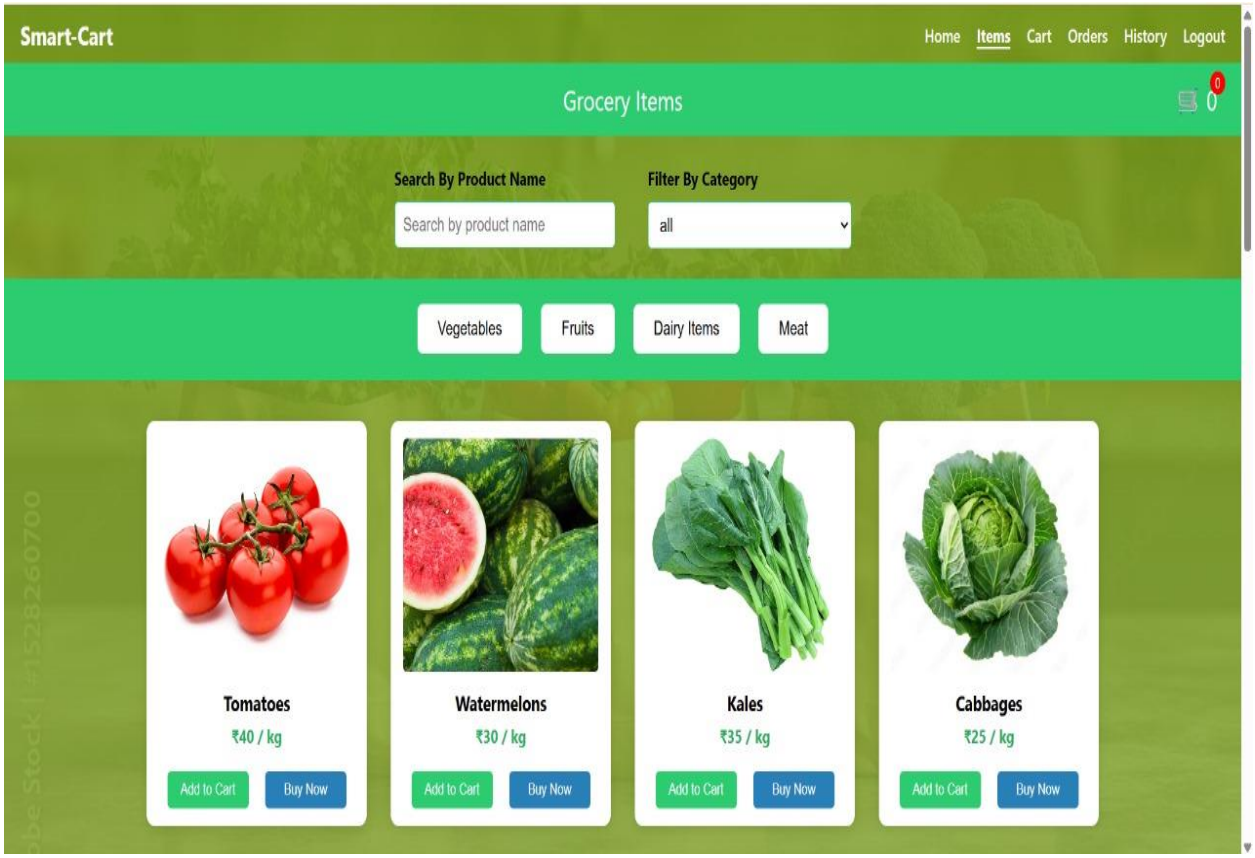
Bug ID	Bug Description	Steps to Reproduce	Severity	Status	Additional Feedback
BG-001	"Place Order" button unresponsive on Safari	1. Open site in Safari2. Add item to cart3. Click "Place Order"	High	In Progress	Works in Chrome/Edge, issue isolated to Safari.
BG-002	Coupon code field accepts more than 50 chars	1. Go to checkout2. Enter long random string in coupon field3. Click Apply	Low	Open	Add validation for character limit.

Sign-off:

Tester Name: John Doe
Date: 2025-06-29

OUTPUT&SCREENSHOTS


Smart-Cart
Home
MyCart
Orders
History
User Login
Admin Login
Welcome to Smartcart Grocery Web App
Shop Now


Smart-Cart
Home
Items
Cart
Orders
History
Logout
Grocery Items
0
Search By Product Name
Search by product name
Filter By Category
all
Vegetables
Fruits
Dairy Items
Meat
Tomatoes
₹40 / kg
Add to Cart
Buy Now
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Kales
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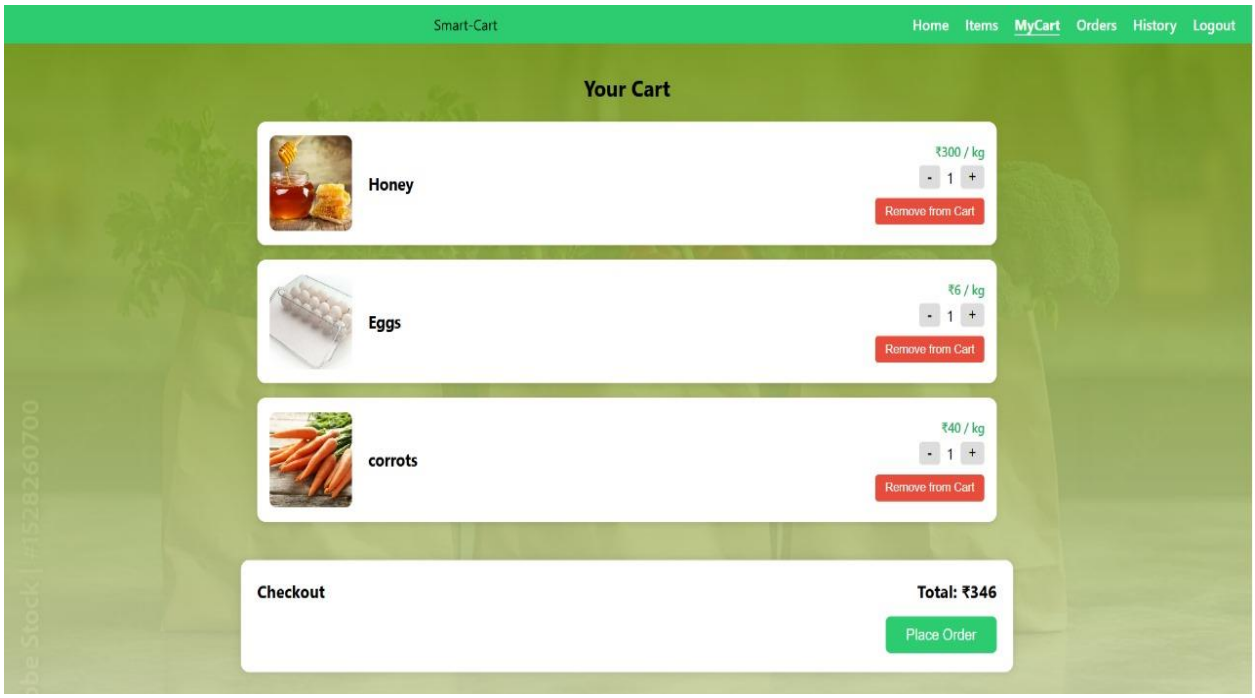
Smart-Cart
Home Items MyCart Orders History Logout
Your Cart
Honey
₹300 / kg
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Eggs
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- 1 +
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Checkout
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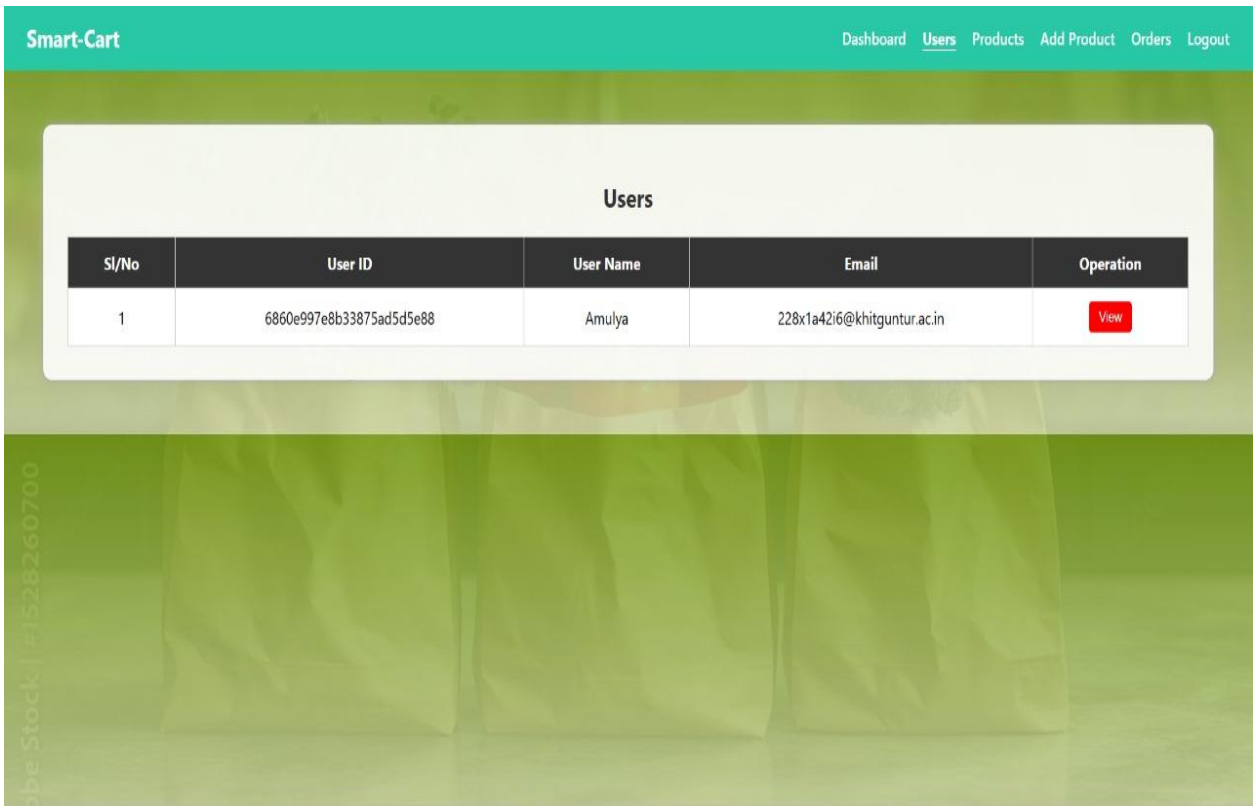
Smart-Cart
Dashboard Users Products Add Product Orders Logout
Users
Sl/No
User ID
User Name
Email
Operation
1
6860e997e8b33875ad5d5e88
Amulya
228x1a42i6@khitguntur.ac.in
View