

**PROJECT REPORT**  
**ONLINE STORE FOR COLLEGE CONVENIENCE STORE**



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## **INTRODUCTION:**

We will be creating an ecommerce site for college convenience that serves as a one-stop shop for all Northeastern University students. This website will allow students to order local food ingredients from the comfort of their own homes.

The website would cost the shopkeeper onetime fee as we would be building this website for him and would be absolutely free for the customers to use. The shopkeeper would be charged accordingly in future if he needs an additional feature to be added to the website.

This topic fascinated us because one of the most difficult challenges we faced after moving to the United States was finding local ingredients such as spices. The major shopping chains near our homes do not hold local spices, and visiting the college convenience store in these harsh winters appears difficult. As a result, we thought it would be fantastic if college convenience offered an online ordering platform. It will additionally benefit the shop's owner because he will understand the nature of sales.

## **BUSINESS ANALYSIS:**

People who would be using this app:

1. Persona 1 – Raj Malhotra: Raj is busy college student who uses the college convenience website to save time and money while keeping up with his studies. He relies on the website to quickly find and order groceries and spices online, browse sales and deals and schedule delivery. He also uses the website to create shopping lists and track their spending. He has already signed up on the website and uses the website by simply logging in using email id and password.
2. Persona 2 – Seung Jang: Seung is a working professional in Boston. He is from Korea. He uses the college convenience website to order his favourite Kimchi which reminds him of his home in Korea. He uses the website by logging in as a guest.
3. Persona 3 – Priya Sharma: Priya is one of the many students who doesn't know how to cook. She relies on college convenience website to order ready to Indian cook packed foods and chapati. She has an account with the website and logs in using email id and password.

4. Persona 4 – Shopkeeper: The shopkeeper persona posts and manages his products on the e-commerce website where he also processes orders. He appreciates features that make it simple for him to measure sales and revenue, update product descriptions and prices and manage inventory. He values being able to interact with customers, solve problems and get feedback. He has been given admin account and logs in using email id and password.

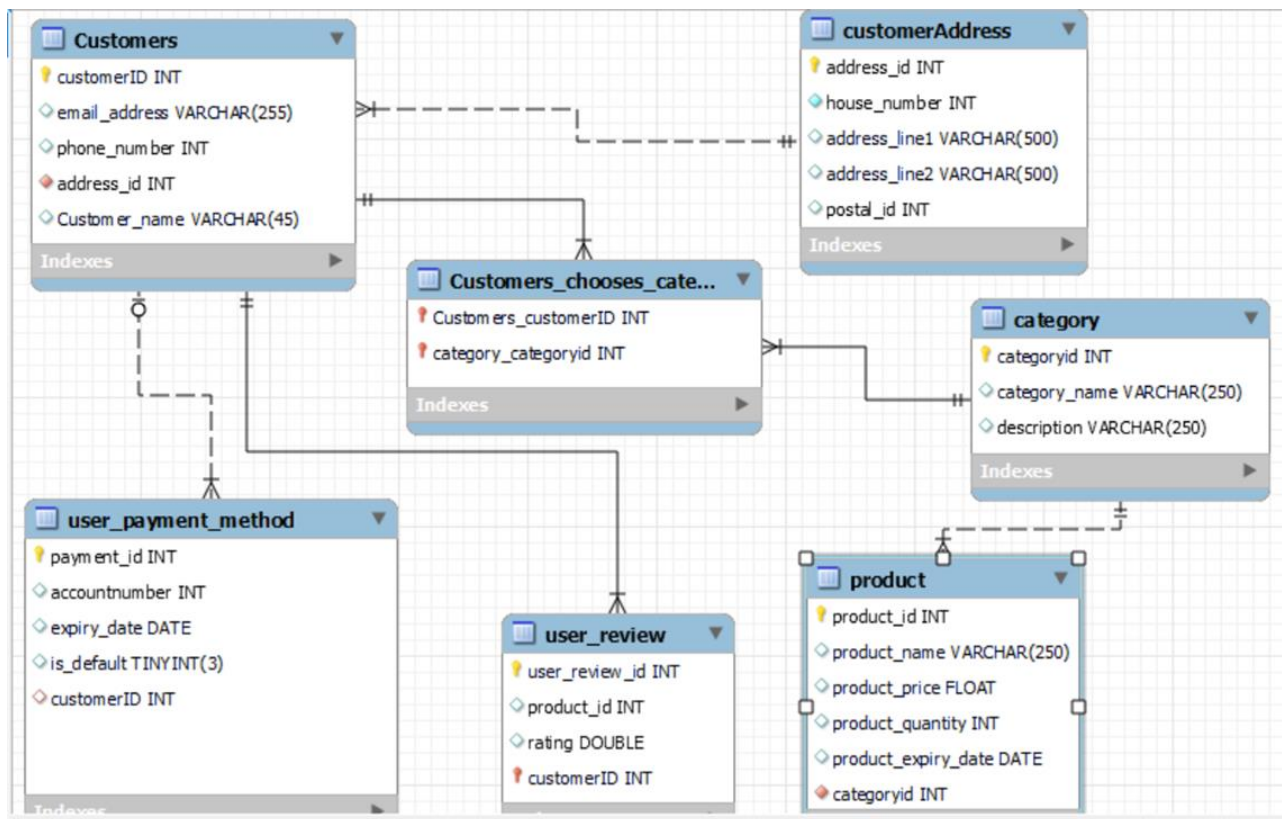
Business rules or logic that the website uses:

1. User Registration: The website should allow users to create accounts that stores personal details such as their name, email address, phone number and shipping address. Consumers should also be capable of altering their username and password. This data will be stored in user database.
2. Product Catalogue: The website should include a thorough product catalogue that includes name, characterizations, photos, costs and available stock. This should enable simple searching and filtering of products. All the products the owner uploads will be stored in product entity.
3. Shopping Cart: The website should enable users to add items to their shopping cart and showcase a summary of the items in the cart. Users should also be able to change the number of items in their cart or remove them entirely. This data will be stored in the database as this will help to improve personalization.
4. Checkout Process: The website's checkout process should be simple, allowing customers to input their shipping and billing information, select their preferred method of payment and review their order before completing it. This data will be stored with proper security so that no data privacy can be breached.
5. Order Management: The website should allow the administrator to manage orders, view order history and update order status.
6. Security: The website should have proper security measures to protect user data such as encryption and secure storage.
7. Feedback and review: The website should allow users to provide feedback and reviews for products and services. The reviews and ratings by user will be stored which will help the shopkeeper understand the areas of improvement.
8. Overall, it is important to ensure that the website is user-friendly, reliable and scalable to handle large volumes of data and traffic.

9. Online shopping is definitely so much fun and it certainly has a therapeutic effect on your mood too. It can also save a lot of your money and time, if done wisely. So, to have a happy and satisfied online shopping experience, you need to be a little cautious and careful to avoid unnecessary troubles. (Maheshwari,2022)

### TABLE DESIGN AND ANALYSIS:

ER DIAGRAM:



The above diagram is ER diagram for the online website of college convenience. The primary key is depicted using a golden key and the red key/diamond shows the foreign key. There are various entities like Customers, CustomerAddress, user\_payment\_method, user\_review, product and category. Customer\_chooses\_category is a link table between customers and category

## DATABASE IMPLEMENTATION:

### SQL QUERIES

#### CREATE STATEMENT

-- creating tables

```
CREATE TABLE `category` (  
  `categoryid` int NOT NULL,  
  `category_name` varchar(250) DEFAULT NULL,  
  `description` varchar(250) DEFAULT NULL,  
  PRIMARY KEY (`categoryid`)  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb3;
```

```
CREATE TABLE `customeraddress` (  
  `address_id` int NOT NULL,  
  `house_number` int NOT NULL,  
  `address_line1` varchar(500) DEFAULT NULL,  
  `address_line2` varchar(500) DEFAULT NULL,  
  `postal_id` int unsigned DEFAULT NULL,  
  PRIMARY KEY (`address_id`)  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb3;
```

```
CREATE TABLE `customers` (  
  `customerID` int NOT NULL,  
  `email_address` varchar(255) DEFAULT NULL,  
  `phone_number` int DEFAULT NULL,  
  `address_id` int NOT NULL,  
  `Customer_name` varchar(45) DEFAULT NULL,  
  PRIMARY KEY (`customerID`),  
  UNIQUE KEY `customerID_UNIQUE` (`customerID`),  
  KEY `address_id_idx` (`address_id`)  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb3;
```

```
CREATE TABLE `customers_chooses_category` (  
  `Customers_customerID` int NOT NULL,  
  `category_categoryid` int NOT NULL,  
  PRIMARY KEY (`Customers_customerID`,`category_categoryid`),  
  KEY `fk_Customers_has_category_category1_idx` (`category_categoryid`),  
  KEY `fk_Customers_has_category_Customers1_idx` (`Customers_customerID`),  
  CONSTRAINT `fk_Customers_has_category_category1` FOREIGN KEY (`category_categoryid`)  
  REFERENCES `category` (`categoryid`),  
  CONSTRAINT `fk_Customers_has_category_Customers1` FOREIGN KEY (`Customers_customerID`)  
  REFERENCES `customers` (`customerID`)  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb3;
```

```
CREATE TABLE `product` (  
  `productID` int DEFAULT NULL,  
  `product_name` text,  
  `product_price` double DEFAULT NULL,  
  `product_quantity` int DEFAULT NULL,  
  `product_date` text,  
  `category_id` int DEFAULT NULL  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb3;
```

```
CREATE TABLE `user_review` (  
  `user_review_id` int DEFAULT NULL,  
  `customer_id` int DEFAULT NULL,  
  `product_id` int DEFAULT NULL,  
  `rating` double DEFAULT NULL  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb3;
```

```
CREATE TABLE `user_payment_method` (  
  `payment_id` int DEFAULT NULL,  
  `account_number` int DEFAULT NULL,  
  `expiry_date` text,  
  `is_default` int DEFAULT NULL,  
  `customerID` int DEFAULT NULL  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb3;
```

## INSERT STATEMENT

-- inserting last row using insert statement

```
insert into `category`  
values (894,"Vegetables","Different types of vegetables from all over the world");
```

```
insert into `customerAddress`  
values (1244,77,"R Road","Kenmore",2129);
```

```
insert into `customers`  
values (123456,"prajaktaw@gmail.com",234555,1244,"Prajakta W");
```

```
insert into `customers_chooses_category`  
values (123456,655);
```

```
insert into `product`  
values (602,"Desi Dahi",9,2,"May-24",500);
```

```
insert into `user_payment_method`  
values (224,145876,"May-25",1,123456);
```

```
insert into `user_review`  
values (436,123456,602,7.5);
```

## SELECT STATEMENTS

```
-- using select statement  
-- 1) Find out the highest rated product till date
```

```
select product_name from product where productID in (  
select product_id from user_review  
where rating = (select max(rating) from user_review));
```

OUTPUT:

	product_name
▶	TATA Salt
	Aashirwad aata

Using the SQL select statement, the shopkeeper can understand that TATA Salt and aashirwad aata are the highest rated items hence implying that they are good quality product.

```
-- 2) Give the name and address of the customers who have given rating less than  
the average rating
```

```
with average_rating_table as  
(select customer_id from user_review where rating < (select avg(rating) from user_review))
```

```
select a.*,b.*  
from (select * from customeraddress where address_id in (select address_id from customers  
where customerID in (select * from average_rating_table))) a  
left join customers b  
on a.address_id = b.address_id;
```

OUTPUT:

	address_id	house_number	address_line1	address_line2	postal_id	customerID	email_address	phone_number	address_id	Customer_name
▶	1238	71	L road	near Target	2124	12349	daviddsouza@gmail.com	467970	1238	David Dsouza
	1239	72	M road	Daisy apartments	2125	12350	apurwasontakke@gmail.com	897945	1239	Apurwa Sontakke
	1244	77	R Road	Kenmore	2129	123456	prajaktaw@gmail.com	234555	1244	Prajakta W



Using this query the shopkeeper can find out unsatisfied customers, these customers may be the ones who might not order again. The shopkeeper can send an automated email to these customers to know about their customers and assure them this issue will not arise again.

3) Give the category and description and price of product and product name which is rated more than average  
with more\_than\_avg as (select product\_id from user\_review where rating > (select avg(rating) from user\_review))

```
select a.productid,a.product_name,a.product_price,b.category_name,b.description
from product a
left join category b
on a.category_id = b.categoryid
where a.productid in (select * from more_than_avg);
```

OUTPUT:

	productid	product_name	product_price	category_name	description
▶	6700	Saffola cooking oil	68	Cooking oil	contains wide range of Cooking oil
	10866	TATA Salt	2	Condiments	salts, spices and flavouring agents from all over...
	13916	Aashirwad aata	26	Flour	different types of flour

Using this query we can shopkeeper can come to about the product and the categories of items which are rated above average. These are one of the best quality products belonging to different categories in his shop.

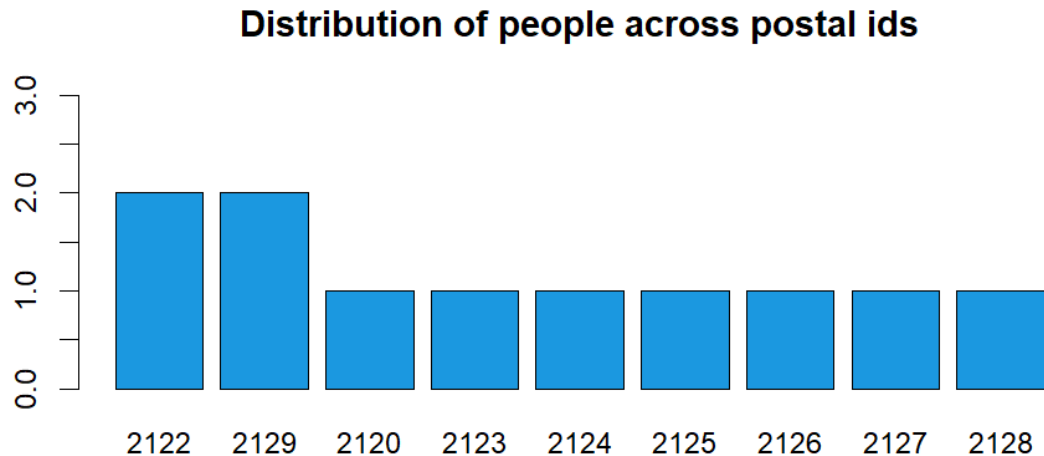
-- 4) Give the number of customers belonging to different postal id

```
select postal_id, count(*) as number_of_customers
from customeraddress
group by postal_id
order by number_of_customers desc;
```

OUTPUT:

	postal_id	number_of_customers
▶	2122	2
	2129	2
	2120	1
	2123	1
	2124	1
	2125	1
	2126	1
	2127	1
	2128	1

The shopkeeper can visualize this information to see the know how his customers are distributed.



From the above graph the shopkeeper can see that most of his customers belong to 2122 and 2129 zip codes

-- 5) Show different products in each category

```
select a.*,b.category_name
from
(select category_id, group_concat(product_name) as different_products
from product
group by category_id) a
left join category b
on a.category_id = b.categoryid;
```

OUTPUT:

	category_id	different_products	category_name
▶	111	Aashirwad aata	Flour
	500	Amul ghee,Desi Dahi	Dairy products
	655	TATA Salt	Condiments
	879	Maggie,Ramen noodles,Swad chapati	Ready to cook
	900	Saffola cooking oil	Cooking oil

In this way, the shopkeeper will be able to see different products present in each category.

## ANALYTICS, REPORTS, AND METRICS:

The shopkeeper/store owner can generate the metrics shown on the slide.

1. Number of items sold per day: This KPI measures the total quantity of products sold by the convenience store website in a single day, allowing the shopkeeper to track sales performance and inventory levels.

2. Total profit per day: Help the shopkeeper to assess the financial performance of the business.
3. Total returns: The shopkeeper to monitor customer satisfaction and identify potential issues with products or services.
4. Products with highest demands: This KPI identifies the products that are most popular or in highest demand among customers, allowing the shopkeeper to optimize inventory and marketing strategies to increase sales.
5. Repeat Customers: This KPI indicates the effectiveness of customer retention strategies and the overall quality of the shopping experience.
6. Average order price: The last KPI Average order price helps shopkeepers to track changes in purchasing behavior and identify opportunities to increase sales through upselling or cross-selling.

### **SECURITY CONCERNS:**

There are several security concerns that should be considered when creating an online website for a convenience store. Some of the most important ones include:

1. Data security: To avoid unauthorized access, sensitive customer data would be kept securely, and access controls would be put in place.
2. Privacy policy: E-commerce websites will have a privacy policy that is transparent and easy to understand and that explains how they gather, use, and safeguard consumer data.
3. HTTPS and SSL Certificates: HTTPS protocols will be used to keep the users' sensitive data secure and boost the website's rankings on Google search page.
4. Security Testing: To find vulnerabilities and to make sure security steps are working properly, regular security testing would be carried out.

## **ARCHITECTURE:**

### Client/Server Architecture:

In a Client/Server architecture, the client makes requests of the server, which the server then answers to. In this model, the server normally operates on a remote machine, while the client typically runs on a user's PC or mobile device. This approach is advantageous for our project since it enables effective client-server communication, allowing for quicker replies and lessening the stress on the client side. (Terra, 2023)

### Hosting Model:

It might be advantageous to host the College Convenience platform on the cloud. The database can be hosted using the scalable and economical cloud hosting service. We may simply raise or decrease storage capacity depending on demands by using a cloud-based hosting service, and can have access to features like automatic backups, high availability, and load balancing. (Snider, 2019)

### Storage Requirements:

Our database's storage requirements will rely on the volume of data we intend to store and the volume of data the website will produce over time. We might require at least 10 GB of storage to start the database, to give you an approximate idea. Yet, if your website develops and produces more data, this number can rise.

In summary, for our project - Online website for College Convenience - a client/server architecture solution is appropriate, with the server being hosted in the cloud. We will likely need a minimum of 10 GB of storage, but this may increase as College Convenience's website grows.

## **PROJECT WRAP-UP AND FUTURE CONSIDERATIONS:**

We Learnt to design database from scratch as well as complex SQL queries. Now that we have mastered these skills, the next step would be to implement the same database with a front-end. This involves building a user interface that allows users to interact with the database and perform various operations such as inserting, updating, and querying data. This can be done using a

variety of front-end technologies such as HTML, CSS, JavaScript, and frameworks like React or Angular.

By combining our database design and SQL query skills with front-end development, we can create powerful applications that can handle complex data and provide a user-friendly experience for interacting with that data. This can be especially useful for businesses and organizations that need to manage large amounts of data and make that data accessible to a wider audience.

## **REFERENCES:**

- Terra, J. (2023, February 14). What is client-server architecture? everything you should know: Simplilearn. Simplilearn.com. Retrieved March 26, 2023, from <https://www.simplilearn.com/what-is-client-server-architecture-article#:~:text=The%20client%2Dserver%20architecture%20refers,model%20or%20client%20server%20network>
- Snider, S. (2019, July 8). How to choose a web hosting model. Hileman Group. Retrieved March 26, 2023, from <https://www.hilemangroup.com/Thought-Leadership/Hilelights-Blog/How-to-Choose-a-Web-Hosting-Model>
- Maheshwari, R. (2022, October 3). Online shopping and its advantages. Forbes. Retrieved March 1, 2023, from <https://www.forbes.com/advisor/in/credit-card/advantages-of-online-shopping/>