**Internship Project Report on**



**Website and Application Development for Vegetable Market Logs**



**Submitted in partial fulfilment of the requirement for the award of the degree of**

**BACHELOR OF TECHNOLOGY**

**IN**

**COMPUTER SCIENCE & ENGINEERING**

**Submitted by: Team Beta**

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**Dehradun, Uttarakhand**

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**CANDIDATE’S DECLARATION**

I hereby certify that the work which is being presented in the project report entitled **“Website and Application Development for Vegetable Market Logs”** in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science and Engineeringof the Graphic Era (D eemed to be University), Dehradun shall be carried out by the under the mentorship of **Mr. Yuvraj Joshi, Assistant Professor**, Department of Computer Science and Engineering, Graphic Era (Deemed to be University), Dehradun.

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**Chapter 1**

**INTRODUCTION**

**1.1 Problem statement**

There is currently a lack of a centralized and user-friendly platform for accessing comprehensive information about vegetable market prices in various cities across India. This absence of a reliable source hinders farmers, traders, consumers, and researchers from gathering accurate and up-to-date data, accessing historical rates, and making informed decisions. Existing information sources are fragmented and often unreliable, leaving a gap in transparency and the ability to analyze market trends effectively. To address this issue, we aim to create a centralized website that provides easy access to vegetable market logs, historical rates, city-wise data, and rate predictions. Using machine learning algorithms for accurate predictions and deploying the platform on the cloud for scalability and security, our project aims to empower users with valuable insights for informed decision-making in the vegetable market sector.

**1.2 MOTIVATION**

Our motivation springs from the desire to address a pressing need in the world of e-commerce - the lack of transparency and predictability when shopping for fresh produce. With modern lifestyles often leaving little room for proper meal planning and budgeting, consumers are often left grappling with fluctuating prices and uncertain quality. Our project is fuelled by the vision of transforming this experience into one that's not just convenient but empowering.

By introducing machine learning-driven price prediction into the e-commerce of fruits and vegetables, we aim to equip consumers with the tools they need to make informed choices. The motivation comes from our belief that everyone should have access to fresh, healthy produce and the ability to plan their purchases effectively. Furthermore, this project inspires us to harness technology in the service of healthier lifestyles and sustainable food consumption.

Ultimately, our project is motivated by the idea that e-commerce should be a force for good, providing accessibility, convenience, and reliability in the pursuit of healthier and more mindful living.

**1.3 INRTODUCTION**

In India, where agriculture has flourished for centuries, we recognize a critical gap that demands our attention. The agricultural landscape is rich and diverse, yet the absence of a centralized and user-friendly platform for accessing comprehensive information about vegetable market prices in various cities across this vast nation. This void prevents farmers, traders, consumers, and researchers alike, depriving them of accurate, up-to-date data, historical rates, and the ability to make well-informed decisions.

Existing information sources are fragmented and unreliable. This fragmentation not only complicates the lives of those involved in the agricultural sector but also hinders our ability to follow patterns and trends in vegetable market dynamics effectively. There is a lack of transparency and a significant barrier to conducting insightful market analyses.

To bridge this critical gap, we created a centralized and easily accessible platform for accessing comprehensive information about vegetable market prices in various cities across India. We have used machine learning algorithms for accurate price predictions and have deployed the platform on the cloud for scalability.

**What Our Project Does:**

We are providing comprehensive information about vegetable market prices in different Indian cities. Our platform offers historical rates, city-wise data, vegetable ecommerce and even predictions about future prices. It's user-friendly and designed to help farmers, traders, consumers, and researchers make informed decisions.

**Key Objectives:**

**Comprehensive Data**: We aim to provide comprehensive data on vegetable market logs, historical rates, smooth vegetable buying experience and city-wise information, making it easily accessible through our platform.

**Predictive Insights**: Our machine learning algorithms will offer accurate predictions of market rates, empowering users to make timely decisions.

**User-Friendly Experience**: Our platform will be designed with the end-users in mind, ensuring that it is user-friendly and intuitive.

**Cloud Deployment**: By hosting our platform on the cloud, we ensure scalability and robust security.

This project is created using the MERN stack - MongoDB, Express.js, React, and Node.js. It's all about making vegetable shopping and market data more accessible and user-friendly.

The backbone of our project is the MERN stack:

MongoDB: This flexible database stores all our data, ensuring it's well-organized and easy to access.

Express.js: It powers the backend, making sure data flows smoothly between the frontend and database.

React: This library creates our user interfaces, making the shopping experience dynamic and intuitive.

Node.js: Open-source server environment.

**Chapter 2**

**Literature Survey**

Kanchan et al. (2015) analyzed percentage analysis and chi-square test in consumer purchasing pattern. The result of the study shows that both the genders are likely to purchase fruits and vegetables online but as compared to females, males do more online shopping. People in the age group between 30-45 years are more interested in doing online shopping as compared to other age groups. People having higher income are more engaged in purchasing goods over the internet. The technology familiarity of the respondents is found to be positively related with past online purchase frequency and people having high knowledge of technology are more likely to shop online. In this study it was concluded that online shopping is gaining popularity among people of the younger generation. Higher income groups and educated people are purchasing more via e-retailing websites. People have hesitations in doing online shopping due to security concerns. At the same time people are resistant to change because of technological complexity in making online purchases.

Khadar (2020) analyzed the data regarding the consumer purchasing pattern through online using tools viz., percentage analysis, Likert scale analysis and chi square test. In this study, the results revealed that majority of the consumers were males within an age group of 21 years. The majority (47.4%) of the consumers reported in using the internet for 3 to 4 hours per day with Sunday (78.9 %) being the most active day when they used the internet. Flipkart (72.4%) and Amazon (65.8%) were highly rated as the topmost used sites for shopping followed by Myntra (25%). In this study it was also mentioned about Ad. Channel for advertisement that includes mobile SMS, TV advertisement, newspaper ad, social media (Facebook, Instagram). This study finds that nearly 80% are ready to wait for discounts and festival sales before deciding to make a purchase online. 42% of consumers prefer Wallet payments, the current study highlights the usage of Cash on Delivery (63.2%) as the major mode of preferred payment followed by Wallet payments (13.2%).

Neha (2018) concluded that the consumer’s perception on online shopping varies from individual to individual and the perception is limited to a certain extent with the availability of the proper connectivity and the exposure to online shopping. The perception of the consumer also has similarities and differences based on their personal characteristics. The perception of the consumer also has similarities and differences based on their personal characteristics. The study revealed that mostly youngsters are attached to the online shopping and hence, the elder people don’t use online shopping much as compared to the younger ones. The study highlights the fact that youngsters between the age of 20-25 are mostly poised to use online shopping. It is also found that most of the people who shop online buys books online as it is cheaper compared to the market price with various discounts and offers.

Pooja and Arora (2019) analyzed percentage analysis and factor analysis. In this study it was indicated the position of the factors according to the perception of the consumers i.e., product information, online payment, convenience and variety, consumer attitude, flexibility, price consciousness and challenges of the consumers. In the study it was also mentioned about the specific features of online shopping like easy access with multiple devices, single click to navigate multiple sites, comparison can be made in real time, flexible Payment methods cash back offer, feedback about the product. The study concluded that there are many factors which consumers keep in mind while purchasing online.

**Chapter 3**

**Methodology**

Its methodology is divided into three sub parts i.e,

**1. Front end:** from now onwards we are going to discuss how my website looks and what functionality it persist.

**SabziBazzar E-commerce Web Application (Vegetable Store)**

*Sabzibazzar* is an E-commerce Web Application using MERN stack that can help vegetable.

Retailer and buyer to bring their products to the customers. Main function:

• Sign up and log in: Requires Users to register using their phone number or email

• Shopping cart: this feature helps users buy and check goods directly on the application

• Search: Users can search directly by typing in the search box for the product they

want to see.

• Buy and pay: Customers who buy through the app can pay through many different payment gateways. Top of Form

A diagram of a product

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Home Page

A screenshot of a computer

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A screenshot of a menu

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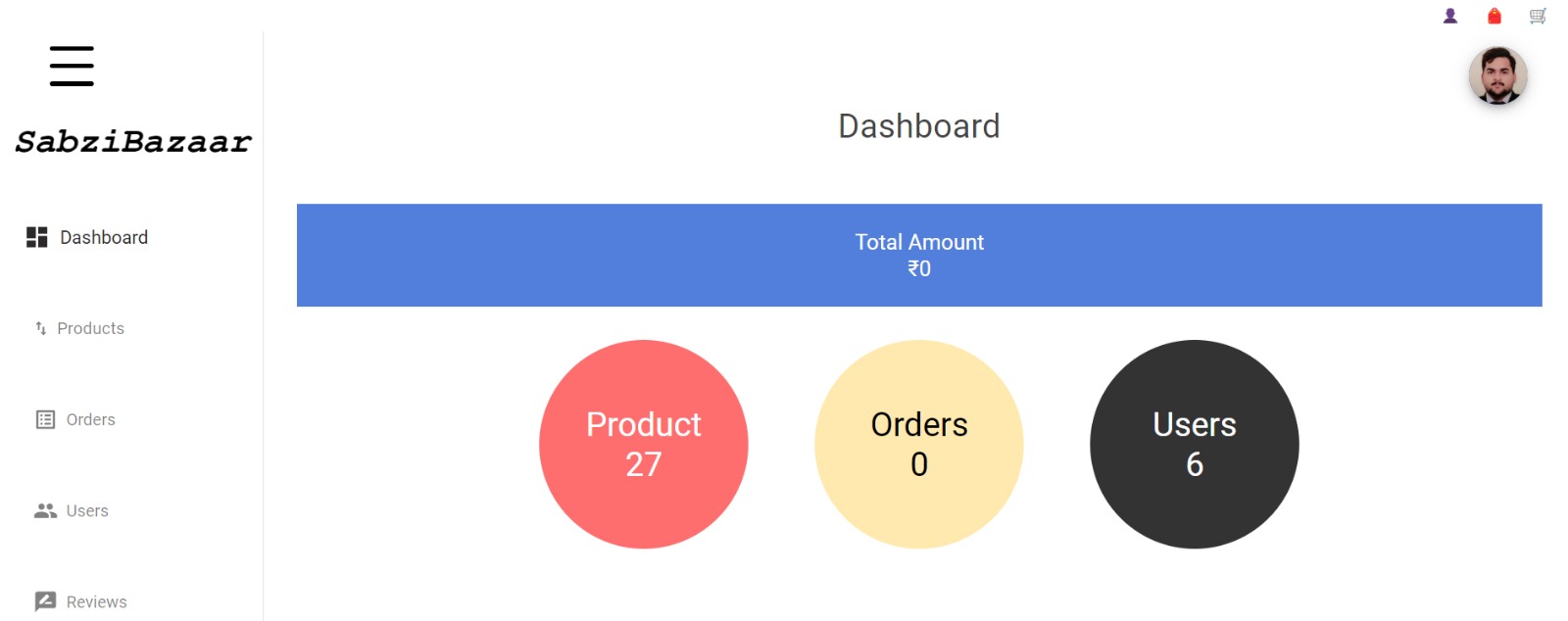
The home page of our ***Sabzibaazar*** is the virtual gateway to our marketplace, serving as the first impression for our visitors. It plays a pivotal role in engaging users, guiding them through our offers, and inspiring them to explore and make purchases.

**Key Elements and Features:**

1. **Visual Appeal:** The home page features high-quality images of fresh, vibrant vegetables. These images not only entice visitors but also convey the freshness and quality of our products.
2. **Clear Navigation:** The navigation menu at the top of the page offers straightforward categories, including "Home," "Products," "About," "Contact”. This intuitive menu ensures users can easily find what they're looking for.
3. **Featured Products:** Prominent sections highlight featured or seasonal products. These eye-catching displays encourage visitors to explore our catalog and consider making a purchase.
4. **Search Functionality:** A prominently placed search bar allows users to quickly find specific vegetables or products. The search function is equipped with smart suggestions for user convenience.
5. **Product Categories:** Users can navigate to specific product categories directly from the home page. These categories are often accompanied by appealing images and brief descriptions.
6. **Special Offers:** If applicable, special offers, discounts, or promotions are prominently displayed. These can include banners or carousel slides showcasing limited-time deals.
7. **Customer Testimonials:** Real customer reviews and testimonials provide social proof and build trust. Quotes from satisfied customers can be displayed prominently.
8. **Newsletter Signup:** Encouraging users to subscribe to newsletters or updates is essential for building a loyal customer base. A subscription form with clear benefits is usually included.

**Dashboard**

**Admin**



The dashboard pages for both administrators and users are central components of our vegetable buying website, each serving distinct purposes to enhance the overall experience for both parties.

**Importance for Admin:**

* The admin dashboard streamlines website management, making it easier to maintain an up-to-date and efficient platform.
* It provides valuable insights into website performance and user behavior, enabling data-driven decisions.
* Efficient order processing and user management contribute to seamless user experience and business growth.
* Content management tools support marketing efforts and brand consistency.

**Importance for User:**

* The user dashboard empowers customers to have control over their account and shopping experience.
* Easy access to order history and Wishlist features simplifies repeat purchases.
* Notifications keep users informed and engaged, improving their overall satisfaction.

A screenshot of a website

Description automatically generated

**Admin Dashboard:**

*Key Features and Functions:*

1. **User Management:** The admin dashboard provides tools for managing user accounts, including the ability to create, edit, or deactivate accounts. It also enables admin to assign roles and permissions to users.
2. **Product Management:** Admins can add new vegetables, update product information, adjust pricing, and manage inventory. They can also categorize products for better organization.
3. **Order Processing:** Admins can view and manage customer orders, process payments, and track order status. This feature ensures smooth order fulfillment.
4. **Analytics and Reports:** The admin dashboard provides access to valuable analytics, including sales data, user behavior, and inventory trends. Customizable reports assist in making informed decisions.
5. **Content Management:** Admins can control content on the website, including banners, promotions, and informational pages. This allows for flexibility in marketing and branding efforts.

A screenshot of a computer

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**User Dashboard:**

*Key Features and Functions:*

1. **Account Management:** Users can view and edit their profiles, update contact information, and manage their preferences, including notification settings.
2. **Shopping Cart:** Users can add, remove, and update items in their shopping cart, review product details, and proceed to checkout.
3. **Order History:** A record of past orders and their status allows users to track deliveries and view their purchase history.
4. **Wishlist:** Users can create and manage Wishlist, making it convenient to save products for future purchases.
5. **Notifications:** Users receive notifications about order confirmations, shipping updates, and special offers, enhancing their engagement with the website.
6. **Support and Help:** Access to a support system or FAQs assists users in finding information or resolving issues.

**Shop Page**

A screenshot of a food store

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The main shop page is where customers can select the products that they want to add to their cart. Users can scroll down the mouse to browse all the products, or filter by categories or filter by price range in each product, user can see it short description and their available status. Therefore, customers can consider buying it or not.

1. **Product Showcase:**
   * This section highlights featured or popular vegetable products.
   * It may include high-resolution images of individual vegetables or product categories.
   * Each product/item typically includes its name, price, and a brief description.
   * Clickable product tiles that take users to detailed product pages.
2. **Categories or Sections:**
   * A section that lists main product categories (e.g., fruits, vegetables, organic).
   * Clickable category images or icons to help users quickly navigate to specific product types.
   * A brief description or benefits of each category.
3. **Special Offers or Promotions:**
   * If applicable, this section can showcase ongoing promotions or discounts.
   * Eye-catching banners or graphics to draw attention to special deals.
   * CTA buttons to encourage users to explore these offers.

**Cart Page**

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A close up of fruit

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The cart page of our vegetable buying website is an integral component of the user experience and plays a pivotal role in the customer's purchasing journey. This page is designed to provide users with a clear overview of their selected items, offer convenient management options, and ultimately facilitate the seamless completion of their orders.

**Key Features and Components:**

**Item Summary:** At the top of the page, users can see a summary of the items they've added to their cart. Each item typically includes an image, name, quantity, and price.

**Item Details:** Customers can click on individual items to view more details, such as product descriptions, nutritional information, and customer reviews. This additional information helps users make informed decisions.

**Quantity Adjustment:** Users can easily modify the quantity of each item or remove items altogether. This flexibility is crucial for customers to tailor their orders according to their preferences and needs.

**Subtotal:** A real-time subtotal is displayed, showing the total cost of the items in the cart. This feature allows customers to keep track of their spending.

**Promotions and Discounts:** If applicable, any promotions, discounts, or coupon codes that can be applied to the order are prominently displayed. This can encourage customers to take advantage of available deals.

**Continue Shopping:** A "Continue Shopping" button allows users to return to the product catalog and add more items to their cart.

**Proceed to Checkout:** A clear and prominent "Proceed to Checkout" button guides users to the next step in the purchasing process. This button should be easily accessible to encourage conversions.

**Secure Shopping:** A reassuring message about the security of their personnel and payment information is often displayed to build trust with customers.

**Footer**

A screenshot of a website

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The footer section of our vegetable buying website is a fundamental component that often goes unnoticed but serves a vital role in ensuring a smooth and trust-building user experience.

**Key Elements and Functions:**

1. **Navigation Links:** The footer typically contains a set of navigation links that provide quick access to important pages, including:
   * **FAQs:** Frequently Asked Questions, which help users find answers to common queries.
   * **Terms of Service:** The legal terms and conditions that govern the use of the website.
   * **Privacy Policy:** Information on how user data is collected, used, and protected.
   * **Shipping Information:** Details regarding shipping options, rates, and delivery times.
   * **Returns and Refunds:** Policies and procedures for returning products and obtaining refunds.
   * **Follow Us:** Contact details, including an email address, phone number, and possibly a physical address.
2. **Social Media Links:** Icons or links to the website's official social media profiles, allowing users to connect and stay updated with the latest news, promotions, and announcements.
3. **Payment Method Logos:** Displaying logos of accepted payment methods (e.g., Visa, Mastercard, PayPal) to reassure users about secure and convenient payment options.
4. **Newsletter Signup:** An option for users to subscribe to newsletters or updates, often accompanied by an email input field and a CTA (Call to Action) button, such as "Subscribe."
5. **Trust and Security Badges:** Icons or seals that signify the website's commitment to security, privacy, and trustworthiness. This can include SSL certificates, security badges, and industry certifications.
6. **Copyright Information:** A copyright notice indicating the ownership and protection of website content.

**Review Page**

A screenshot of a computer

Description automatically generated

The review page of our vegetable buying website is a dynamic and interactive space where our valued customers can contribute their thoughts, experiences, and feedback about the products they have purchased. This section plays a pivotal role in building trust, assisting other shoppers, and continuously improving our offerings.

**Key Features and Functions:**

1. **Product Reviews:** On this page, customers can submit detailed reviews for the vegetables they have purchased. These reviews typically include:
   * **Ratings:** A numerical rating or star rating system (e.g., out of 5 stars) to provide a quick overview of product satisfaction.
   * **Written Feedback:** A text box where customers can share detailed comments, including their impressions of taste, freshness, and overall quality.
2. **User Ratings:** Reviews are usually accompanied by the customer's username or initials, adding a personal touch to the feedback.
3. **Sort and Filter:** Users can often sort reviews by date, rating, or relevance. Additionally, they may have the option to filter reviews by specific criteria like product type or user rating.
4. **Helpful Votes:** Other users can indicate whether a review was helpful or not. This helps surface the most informative and relevant reviews.
5. **Review Guidelines:** Clear guidelines may be provided to encourage constructive and unbiased feedback while discouraging spam or inappropriate content.
6. **Seller Response:** In some cases, sellers or administrators can respond to reviews to address customer concerns, help, or provide additional information.

**2. Backend Implementation**

In the backend implementation of our vegetable e-commerce and state wise vegetable logs and vegetable price prediction project, we utilized the Express.js framework along with Node.js to establish an efficient API for handling various operations related to user authentication along with product, state data and cart management. Using the power of Express.js, we created routes that seamlessly interact with our MongoDB database, enabling us to retrieve and manipulate data while ensuring the security and reliability of our application.

**Middleware**: middleware are functions that are executed in a sequential order during the processing of an HTTP request. Middleware functions have access to the all the request objects and response objects, and they can perform various tasks such as modifying the request or response, logging, authentication, error handling, and more.

**Route**: A route is a Express code that associates HTTP method (GET, POST, PUT, DELETE, etc.), a URL path/pattern, and a function which is called to handle that pattern. In our project we have used the express. Router middleware as it allows us to group route handlers for a particular part of a site together and to access them using a common route prefix.

**API:** "Application Programming Interface." It is set of protocols, rules along with tools that allows us to communicate with different software applications.

A diagram of a software system

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**User Authentication Routes:**

We began by developing API endpoints to manage user authentication. These routes are responsible for handling user signup and login processes securely:

**User Signup (POST /api/signup):**

1. Utilized Express.js to create a route that receives user registration data from the frontend.
2. Ensured input validation to prevent common security vulnerabilities.

**User Login (POST /api/login):**

1. Designed an Express route that accepts login credentials from the front end through a form.
2. If login credentials are matched then user will be granted access.

**Product Management Routes:**

To manage product-related functionalities, we established API endpoints that interact with the MongoDB "products" collection:

**Retrieve Products (GET /api/products):**

1. Created an Express route to fetch all available product data from the "products" collection.
2. Sent the retrieved product data as a JSON response back to the front end for dynamic display.

**Add Product (POST /api/products):**

1. Developed a route that receives product details from the front-end and inserts them into the "products" collection.
2. Ensured that only authorized users(admins) can access this route.

**Update Product (PUT /api/products/:productId):**

1. Implemented a route to update product information based on the provided product ID.
2. Verifying user authorization before allowing updates.

**Delete Product (DELETE /api/products/:productId):**

1. Created a route that deletes a product based on the specified product ID.
2. Ensured that only authorized users can perform deletion actions.

**Cart Management Routes:**

To provide users with a seamless shopping experience, we've carefully designed and implemented API endpoints that facilitate efficient cart management. These routes play a critical role in allowing users to customize their selections, view their chosen products, and make purchases effortlessly.

**Retrieve Cart (GET /api/cart):**

1. Developed an Express route at '/api/cart', designed to handle GET requests related to the user's cart.
2. We can access MongoDB "users" collection and retrieve the user's cart information.
3. Processed the retrieved cart data, transforming it into a JSON format suitable for sending to the frontend.

**Update Cart (PUT /api/cart):**

1. Implemented an Express route at '/api/cart' for handling PUT requests related to cart updates.
2. Extracted the updated cart information from the request and interacted with the MongoDB "users" collection to reflect the changes.
3. Verified that the requested modifications are feasible and within product availability limits.

**Clear Cart (DELETE /api/cart):**

1. Developed an Express route at '/api/cart' to handle DELETE requests for clearing the cart.
2. Accessed the MongoDB "users" collection to remove all cart-related information for the respective use.

**Backend-Database Interaction**

**MONGOOSE:**

For the backend implementation of our project, we have established a seamless connection between our Express.js application and the MongoDB database using the Mongoose library. Mongoose is an Object Data Modeling (ODM) library for MongoDB that provides an abstraction layer which simplifies the interaction with the database. This abstraction enhances code organization, promotes data integrity, and enhances data handling operations.

**Key Features and Benefits of Mongoose:**

**Schema Definition**: Mongoose allows us to define clear and structured schemas for the data models we work with.

**Model Creation**: With Mongoose, we can create models that are based on our defined schemas. These models provide a convenient way to interact with MongoDB collections.

**Data Validation**: Mongoose provides a powerful validation mechanism that ensures the data we insert into the database adheres to predefined rules.

**Middleware Support**: Mongoose allows the implementation of middleware functions that can be executed before or after specific operations like saving, updating, or removing documents. This feature is particularly useful for tasks such as data transformation, encryption, or logging.

**Connection Management**: Mongoose manages database connections seamlessly, providing options for connection pooling, reconnection, and handling different database environments (e.g., development, production).

In this section, we explored the backend implementation of our vegetable e-commerce project, where Express.js and Node.js have played a vital role in creating a well-structured API. We established secure and efficient routes that efficiently fetched and manipulated data from our MongoDB database. This backend functionality serves as a foundation for our complete application, enabling seamless communication between the frontend and the database.

**Express.js and Node.js: A Dynamic Duo**

Our choice to utilize Express.js and Node.js for backend development proved to be a strategic one. Express.js, known for its minimalistic yet powerful approach, enabled us to create endpoints that are both clear and structured. Node.js, renowned for its asynchronous and non-blocking I/O model, facilitated the handling of concurrent connections and requests. This played a pivotal role in ensuring that our application-maintained responsiveness, even in scenarios with high user traffic.

**Seamless Data Management with MongoDB and Mongoose**

Our backend-database interaction achieved a new level of efficiency through the integration of MongoDB and the Mongoose library. By defining clear schemas and models using Mongoose, we constructed an abstraction layer that simplified our interaction with the database. This translated to streamlined data retrieval, insertion, updating, and deletion processes. The use of Mongoose's built-in validation and middleware functions further fortified the integrity and security of our database interactions.

**3. ML Model:**

In the world of online shopping, new technologies can help businesses do better. One exciting tool is called "machine learning" (ML), which can predict things based on data. This ML model is all about to guess how much vegetables might cost in the future on your online store. By looking at past information, this ML tool can help you and your customers make smarter decisions. It can show customers expected prices for veggies, helping them plan and shop wisely. And for your business, it can help you manage your vegetable supply better. This report will explain how all of this works, from collecting information to making it work on your website. We'll also talk about the good things this can bring, and the challenges we might face. In the end, using ML for prices isn't just about technology – it's about making your online store even better for everyone.

We are using LSTM model trained to learn from historical price data and then make predictions about future prices. Here's how it works:

1. **Sequence Learning:** LSTM models are designed to work with sequences of data. In this case, historical price data is transformed into sequences where each data point contains a series of prices over a certain time window.
2. **Temporal Patterns:** LSTM can capture temporal patterns in the data, such as seasonality, trends, and repeating cycles. This is crucial for predicting vegetable prices, as prices often exhibit patterns that repeat over time.
3. **Long-Term Dependencies:** Unlike standard feedforward networks, LSTM can remember information from much earlier in a sequence, which is vital for capturing long-term dependencies in time series data.
4. **Gating Mechanisms:** LSTMs have gating mechanisms that control the flow of information within the network. These mechanisms enable the model to learn when to remember and when to forget information, preventing issues like the vanishing gradient problem that can affect traditional RNNs.
5. **Feature Extraction:** The LSTM model learns to automatically extract relevant features from the input data, eliminating the need for manual feature engineering. It can identify complex relationships in the data that might be difficult to uncover with traditional methods.
6. **Prediction:** After training on historical data, the LSTM model becomes capable of making predictions about future vegetable prices. It takes in a sequence of past prices and generates a prediction for the next price in the sequence.

**How to integrate the model with website**

let's walk through how you can integrate the LSTM model for vegetable price prediction by creating both the frontend and backend components:

**\*\*Frontend Integration: \*\***

1. \*\*User Interface (UI): \*\* Design a user-friendly interface on your e-commerce website where customers can access the predicted vegetable prices. This can be a dedicated section within your website's navigation or integrated into product pages.

**2. \*\*Input Gathering: \*\*** Within the UI, provide a user input mechanism where customers can select the vegetable, they are interested in predicting the price for. This could be done through drop-down menus, search bars, or buttons.

**3. \*\*Data Submission: \*\*** When a customer selects a vegetable, the front end collects this information and sends it to the backend for processing.

**4. \*\*Data Formatting: \*\*** Format the collected input data into a suitable structure for sending to the backend. This could be in the form of JSON data or other relevant formats.

**5. \*\*Prediction Request: \*\*** Use the formatted data to send a prediction request to the backend using an API call. This request essentially asks the backend to provide a predicted price for the selected vegetable.

**6. \*\*Display Prediction: \*\*** Once the prediction is received from the backend, display it to the customer on the frontend UI. This can be done by updating a designated area on the webpage with the predicted price.

**\*\*Backend Integration: \*\***

1. \*\*API Endpoint: \*\* Set up an API endpoint on your server using a backend framework like Flask (as in the provided code). This endpoint will be responsible for receiving prediction requests from the front end.

**2. \*\*Data Reception: \*\*** When a prediction request is received at the API endpoint, the backend extracts the relevant information from the request. This typically includes the selected vegetable for which the price is to be predicted.

**3. \*\*Data Processing: \*\*** The backend processes the received data to ensure it's in the appropriate format for feeding into the LSTM model. This may involve data transformation, scaling, and formatting.

**4. \*\*Model Prediction: \*\*** Utilize the pre-trained LSTM model to make predictions based on the processed input data. The model generates a predicted price for the selected vegetable.

**5. \*\*Prediction Result: \*\*** Once the model prediction is obtained, the backend sends this prediction back to the frontend as a response to the prediction request.

**6. \*\*Response to Frontend: \*\*** The backends’ response is sent to the frontend, carrying the predicted price information.

**7. \*\*Display Response: \*\*** The frontend updates the UI to display the predicted price obtained from the backend. This completes the communication loop between the frontend and backend.

By following these steps, you establish a seamless interaction between the frontend and backend of your e-commerce platform. Customers can access the prediction feature through the front-end UI, which then triggers a series of actions that involve data transmission, model processing, and response retrieval, ultimately leading to the display of the predicted price on the UI. This integration transforms your e-commerce platform into a dynamic hub where customers can make informed decisions based on AI-driven predictions.

**Payment Gateway**

A group of logos with text

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A close-up of a logo

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The payment gateway page, powered by the Stripe payment processing platform, is the secure and efficient bridge that connects our customers with seamless and trustworthy payment options for their vegetable purchases. This page is instrumental in ensuring a smooth and secure transaction experience, vital for the success of our vegetable buying website.

**Key Features and Functions:**

1. **Payment Methods:** The payment gateway page offers a range of payment options, including credit cards (Visa, Mastercard, American Express), digital wallets (e.g., Apple Pay, Google Pay), and sometimes even bank transfers.
2. **Secure Transactions:** Stripe is renowned for its robust security features, ensuring that sensitive payment information is encrypted and protected against unauthorized access.
3. **Billing Information:** Customers enter their billing details, including card number, expiration date, CVV code, and billing address. Stripe helps verify this information for accuracy.
4. **Real-Time Validation:** Stripe validates payment information in real-time, reducing the risk of declined transactions due to incorrect data.
5. **Automatic Currency Conversion:** For international customers, Stripe can automatically convert and process payments in the local currency, enhancing convenience and transparency.
6. **Order Summary:** An order summary is typically displayed, listing the vegetables and their quantities, along with the total purchase amount.
7. **Payment Confirmation:** Upon successful payment processing, customers receive a confirmation notification, confirming that their order has been successfully placed.

**Importance of the Payment Gateway Page:**

1. **Security:** Stripe's robust security measures, including encryption and fraud detection, provide peace of mind to both customers and our website, ensuring that transactions are secure.
2. **Payment Diversity:** Offering various payment methods accommodates a wide range of customer preferences, enhancing convenience and conversion rates.
3. **User Trust:** The presence of Stripe as a reputable payment processor instills trust and confidence in our website, reducing cart abandonment rates.
4. **Efficiency:** Real-time validation and automatic currency conversion streamline the payment process, reducing errors and ensuring a smooth checkout experience.
5. **International Accessibility:** Stripe's global reach enables us to cater to a broad international audience, expanding our market reach.
6. **Order Accuracy:** The order summary allows customers to review their purchases before finalizing their payments, reducing the risk of errors.

A screenshot of a phone

Description automatically generated

**Chapter 4**

**Result and Discussion**

**1. Comprehensive Data Accessibility:**

Our platform now offers centralized access to comprehensive data on vegetable market logs, historical rates, and city-wise information. This breakthrough bridges a critical information gap, enabling farmers, traders, consumers, and researchers to access accurate, up-to-date data for informed decision-making.

**2. Predictive Insights:**

Through the seamless integration of machine learning algorithms, our platform provides accurate predictions about future market rates. This feature empowers users to anticipate market trends, minimizing risks and optimizing their agricultural and trading operations.

**3. User-Friendly E-commerce Experience:**

Our platform has been designed with user-friendliness as a core principle, ensuring that every interaction is intuitive and enjoyable for vegetable shopping. This ensures that all users, regardless of their technological familiarity, can seamlessly navigate our platform to browse, select, and purchase vegetables.

By centralizing access to both agricultural data and vegetable e-commerce, our project bridges two crucial gaps in the agricultural landscape. It empowers farmers, traders, consumers, and researchers with the insights they need for decision-making while also offering a seamless and user-friendly shopping experience. With cloud deployment, our e-commerce platform can handle increased user demands without compromising performance.

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**Chapter 5**

**Conclusion and Future Scope**

Our project, where online shopping meets smart predictions, is all about making your grocery shopping easier, especially for fresh fruits and veggies. We've worked really hard to create a system that helps you shop better.

This project shows how technology can simplify things and make your online shopping a breeze. We've made sure that our website not only recommends products you might like but also helps you guess if the prices of fruits and veggies will go up or down.

Looking back, we're excited about what we've achieved. Now, when you shop with us, you can feel more confident, stick to your budget, and enjoy the ease of online shopping. This project is proof that technology can make things fairer and more convenient for you.

But there's more to come. We see lots of exciting possibilities ahead. We want to keep improving our website, reaching more people, and offering even more helpful features. As technology keeps changing and people's needs keep growing, we'll keep working to make your online shopping experience the best it can be.

In closing, we're proud of what we've done so far, and we're thankful for the great team that made it happen. We're excited about what's next. Our goal is to make a positive impact on how people shop online and help you make smarter choices.

**Future scope**

1. More Grocery Goodies: We want to expand our system to cover other groceries besides fruits and vegetables, so you can shop for everything you need in one place.
2. Local Insights: We're looking into providing information about local markets and deals, helping you find the best prices nearby.
3. Easier Mobile Shopping: We're planning to create a handy mobile app, so you can shop on the go with your phone.
4. Smart Shopping Lists: Imagine having a shopping list that updates automatically based on what you need and what's on sale. We're working on it!
5. Green Choices: We're exploring ways to highlight eco-friendly and healthy products, making it easier for you to make better choices.
6. Community and Reviews: We want to create a space for you to share your thoughts and read reviews from other shoppers. It's like getting recommendations from your friends.
7. Better Predictions: Our goal is to make our price predictions even more accurate and useful, so you can shop smarter.
8. 24/7 Support: We're considering adding a chat feature for customer support to assist you anytime you have questions.

**References**

* **Shopify Documentation:** Shopify is a popular e-commerce platform. Their documentation covers everything from setting up your store to customizing themes and handling payments. [Shopify Documentation](https://help.shopify.com/)
* **WooCommerce Documentation:** If you're using WordPress, WooCommerce is a powerful e-commerce plugin. Their documentation explains how to set up an online store using WordPress. [WooCommerce Documentation](https://docs.woocommerce.com/)
* **MDN Web Docs**: Mozilla Developer Network provides comprehensive guides on HTML, CSS, and JavaScript, essential for front-end development. MDN Web Docs.
* **React Documentation:** If you plan to use React.js for your front-end, the official documentation is must-read. React Documentation.
* **Node.js Documentation:** For server-side development, Node.js is a popular choice. The documentation is extensive and covers everything from basic setup to advanced topics. Node.js Documentation.
* **Express.js Documentation:** Express.js is a popular framework for building web applications with Node.js. Their documentation is a valuable resource.
* **MongoDB Documentation:** If you're considering a NoSQL database, MongoDB is well-documented.
* **Stripe Documentation**: Stripe is a widely used payment gateway. Their documentation provides guides and API references for integration.