

Report On
Ecommerce Website on AWS

Submitted in partial fulfillment of the requirements of the Mini project in
Semester VI of Third Year Artificial Intelligence & Data Science
Engineering

by
Meet Bhikhubhai Paghadar (Roll No. 39)
Ojasi Prashant Prabhu (Roll No. 43)
Parth Manoj Raut (Roll No. 44)
Aditya Ravindra Shinde (Roll No. 53)

Under the guidance of
Prof. Sejal D'mello



University of Mumbai

Vidyavardhini's College of Engineering & Technology

Department of Artificial Intelligence and Data Science



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Vidyavardhini's College of Engineering and Technology
Department of Artificial Intelligence & Data Science

CERTIFICATE

This is to certify that the Course Mini Project entitled **“Ecommerce Website on AWS”** is a bonafide work of **Meet Bhikhubhai Paghadar (Roll No. 39)**, **Ojasi Prashant Prabhu (Roll No. 43)**, **Parth Manoj Raut (Roll No. 44)**, **Aditya Ravindra Shinde (Roll No. 53)**, submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **“Bachelor of Engineering”** in Semester VI of Third Year **“Artificial Intelligence and Data Science”**.

Ms Sejal D'mello
Guide

Ms. Sejal D'mello
Deputy HOD AI & DS

Dr. Tatwadarshi Nagarhalli
HOD AI &DS

Dr. H.V. Vankudre
Principal



Vidyavardhini's College of Engineering and Technology
Department of Artificial Intelligence & Data Science

Mini Project Approval

This Mini Project entitled “**Ecommerce Website on AWS**” by **Meet Bhikhubhai Paghadar (Roll No. 39) ,Ojasi Prashant Prabhu (Roll No. 43) , Parth Manoj Raut (Roll No. 44) , Aditya Ravindra Shinde (Roll No. 53)** ,is approved for the degree of **Bachelor of Engineering** in in Semester VI of Third Year **Artificial Intelligence and Data Science**.

Examiners

1.....
(Internal Examiner Name & Sign)

2.....
(External Examiner name & Sign)

Date:

Place:

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Abstract

This project reimagines online shopping through a dynamic e-commerce website empowered by the robust and scalable AWS cloud platform. Built with the versatility of HTML, CSS, and JavaScript, the user interface prioritizes a seamless shopping journey. Intuitive navigation, coupled with advanced search functions and captivating product presentations, ensures effortless browsing and selection. Secure payment gateways and real-time inventory management streamline the checkout process, eliminating friction and fostering customer satisfaction. The project leverages the power of AWS to guarantee global accessibility, exceptional performance for smooth navigation even during peak traffic, and the ability to seamlessly adapt to a growing product catalog. This user-centric approach, emphasizing intuitive design and a frictionless shopping experience, is further bolstered by robust security measures, building trust and paving the way for a thriving online store.

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Meet Bhikhubhai Paghadar (39)

Ojasi Prashant Prabhu (43)

Parth Manoj Raut (44)

Aditya Ravindra Shinde(53)

Date:

List of Abbreviations

Sr No.	Abbreviation	Full Form
1.	HTML	Hypertext Markup Language
2.	CSS	Cascading Style Sheets
3.	JS	JavaScript
4.	AWS	Amazon Web Services
5.	DNS	Domain Name System
6.	SSL/TLS	Secure Sockets Layer/Transport Layer Security
7.	HTTPS	Hypertext Transfer Protocol Secure
9.	UI	User Interface
10.	SEO	Search Engine Optimization

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1. INTRODUCTION

1.1 INTRODUCTION

The project revolutionizes online shopping by crafting a dynamic e-commerce website powered by the robust and scalable AWS cloud platform. Built with the versatility of HTML, CSS, and JavaScript, the user interface prioritizes a seamless shopping journey. Intuitive navigation, coupled with advanced search functionalities and captivating product presentations, ensures effortless browsing and selection. Secure payment gateways and real-time inventory management streamline the checkout process, eliminating friction and fostering customer satisfaction.

The project leverages the power of AWS to guarantee global accessibility, exceptional performance for smooth navigation even during peak traffic, and the ability to seamlessly adapt to a growing product catalog. This user-centric approach, emphasizing intuitive design and a frictionless shopping experience, is further bolstered by robust security measures built into the AWS infrastructure. By prioritizing user trust and data protection, the project paves the way for a thriving online store, poised to capture the ever-evolving landscape of e-commerce.

1.2 PROBLEM STATEMENTS & OBJECTIVES

Problem Statement:

Traditional shopping is riddled with inefficiencies. Limited product selection confines you to a physical store's inventory, wasting precious time searching for specific items. Inconvenient locations force travel and restrict shopping flexibility. The absence of real-time inventory data leads to frustrating out-of-stock situations, and price comparisons become an arduous offline task. These limitations create a disjointed and time-consuming shopping experience.

This project tackles these challenges head-on. We're building a dynamic e-commerce website that empowers you to shop smarter, not harder. Our user-centric approach prioritizes convenience and efficiency. Browse a vast and ever-expanding product catalog from the comfort of your couch. Real-time inventory data ensures you find what you need, and seamless price comparisons guarantee you get the best deal. This innovative platform transforms the way you shop, leaving the brick-and-mortar hassles behind.

Objectives:

1. Develop a dynamic weather website using HTML, CSS, and JavaScript.
2. Design an intuitive user interface for seamless user interaction and engagement.
3. Implement interactive features such as customizable preferences and interactive maps.
4. Host the website on the AWS cloud platform for scalability, reliability, and accessibility.
5. Optimize website performance using AWS Lambda functions to minimize latency.
6. Ensure robust security measures to protect user data and privacy.
7. Evaluate the effectiveness of the website in providing users with accurate and various product to shop.
8. Document the design, development, and deployment processes in a comprehensive project report.

1.3 SCOPE

1. **Intuitive User Interface:** The core emphasis lies in crafting a user-friendly and intuitive interface. Easy navigation, clear product presentations, and efficient search functionalities will guide users seamlessly through their shopping journey. Responsive design ensures flawless display across various devices, from desktops to mobile phones.
2. **Advanced Search & Filtering:** We'll empower users with powerful search tools and filtering options. This allows them to effortlessly locate desired products based on category, brand, price range, or other relevant criteria, streamlining the product discovery process.
3. **Engaging Product Displays:** High-quality product images, detailed descriptions, and user reviews will create an engaging browsing experience. This transparency allows informed purchase decisions while fostering trust and brand loyalty.
4. **Seamless Checkout & Secure Payment:** Secure payment gateway integration ensures a smooth and reliable checkout process. Users can choose from various payment methods with the confidence that their financial information is protected by industry-standard encryption protocols. Real-time inventory management eliminates frustrating out-of-stock situations and guarantees order fulfillment accuracy.
5. **Scalable Cloud Infrastructure:** We'll leverage the power of the AWS cloud platform to ensure scalability, reliability, and global accessibility. This robust infrastructure guarantees smooth operation even during peak traffic periods, allowing us to cater to a growing customer base.
6. **Enhanced User Experience:** We'll go beyond the basics by offering features that enrich the shopping experience. This could include personalized recommendations based on past purchases, wishlist functionalities for future endeavors, and social media integration for effortless product sharing.

2 LITERATURE SURVEY

User Interface and User Experience (UI/UX): The Cornerstone of Customer Satisfaction

Usability reigns supreme in the e-commerce landscape. Studies by Singh et al. [1] and Wu et al. [2] emphasize the importance of intuitive navigation. A clear and well-organized layout acts as a roadmap, guiding users effortlessly through product discovery and purchase completion. Engaging product displays are equally important, as highlighted by Zhang et al. [3]. High-quality product images, detailed descriptions, and customer reviews are essential for user engagement. This transparency empowers informed decisions and fosters trust in the online store. Responsive design emerges as another critical factor, as research by Wang et al. [4] demonstrates. By seamlessly adapting to various devices (desktops, mobiles, tablets), the website caters to the burgeoning trend of mobile e-commerce, ensuring a smooth shopping experience regardless of the platform.

Search and Filtering: Streamlining Product Discovery

Advanced search functionalities are an e-commerce website's lifeblood, as studies by Shankar et al. [5] and Liu and Zhang [6] emphasize. Users should be empowered to locate desired products with ease. Powerful search tools allow them to navigate vast product catalogs using keywords, brand names, or category filters. Research by Lu et al. [7] suggests that effective filtering options further refine search results, streamlining product discovery. This empowers users to narrow down choices based on specific preferences, such as price range or color variations, ultimately leading to a more efficient and satisfying shopping experience.

2.1 SURVEY OF EXISTING SYSTEM

- **Retail Titans: Amazon and eBay:** These household names offer a vast product selection across various categories, catering to a broad spectrum of consumer needs. They leverage robust fulfillment networks and established brand recognition to ensure a seamless shopping experience.
- **Specialty Stores:** Platforms like Wayfair (furniture) or Sephora (beauty) cater to specific consumer segments, offering curated product selections and in-depth knowledge within their respective domains. This specialization fosters a more focused shopping experience for users with distinct purchasing goals.
- **Marketplace Models:** Platforms like Etsy or AliExpress connect individual sellers and artisans directly with consumers. This fosters a diverse product range and often features unique or handcrafted items. However, quality control and delivery timelines might vary depending on individual sellers.
- **Social Commerce Pioneers:** Platforms like Instagram Shopping or Pinterest integrate social media browsing with seamless purchasing options. This leverages the power of social influence and trend discovery, potentially leading to impulse purchases. However, user experiences might differ based on the integration within the primary social media platform.
- **Mobile-first Experiences:** Apps like Wish or Shein prioritize mobile browsing and checkout processes. This caters to the growing trend of mobile shopping, offering convenience and accessibility for users on the go. However, product visualization and detailed information might be limited compared to desktop experiences.

- **Subscription Boxes:** Services like HelloFresh or FabFitFun curate and deliver personalized product selections based on user preferences. This caters to the desire for convenience and discovery, offering a surprise element to the shopping experience. However, customization options for individual products within the subscription box might be limited.

2.2 LIMITATION IN EXISTING SYSTEM OR RESEARCH GAP

- **Limited Product Discovery:** Many e-commerce platforms struggle to help users find the exact products they seek. In a sea of options, efficient search algorithms, personalized recommendations, and intuitive product categorization are crucial for navigating vast online stores.
- **Friction in the Buying Journey:** A cumbersome checkout process can be a deal-breaker for customers. Complex forms, limited payment options, and unclear shipping information all contribute to cart abandonment. Streamlining the checkout process and offering a variety of secure payment methods are essential for smooth transactions.
- **Data Security Concerns:** Customers are rightfully wary of sharing personal and financial information online. E-commerce websites must prioritize robust data security measures to prevent breaches and build trust with users. This includes secure payment gateways, encrypted data storage, and transparent privacy policies.
- **Competition and Brand Differentiation:** The e-commerce landscape is crowded, making it difficult for businesses to stand out. Developing a strong brand identity, offering unique product selections, and providing exceptional customer service are all crucial for attracting and retaining customers.
- **Delivering a Personalized Experience:** One-size-fits-all approaches don't work in today's online shopping scene. Customers crave personalization. Leveraging data analytics to understand user behavior and preferences allows for targeted marketing campaigns, product recommendations, and loyalty programs, ultimately fostering a more engaging shopping experience.
- **Fulfilling Cross-Border Demands:** The rise of global e-commerce presents both opportunities and challenges. Businesses need to navigate complex international shipping regulations, offer multilingual support, and cater to diverse cultural preferences to successfully tap into foreign markets

2.3 MINI PROJECT CONTRIBUTION

- **Enhanced User Experience:** You've prioritized a user-centric approach, crafting an intuitive and visually appealing interface. This ensures effortless navigation, clear product presentations, and efficient search functionalities, ultimately leading to a smoother and more enjoyable shopping experience for users.
- **Advanced Search and Filtering:** Your project empowers users with powerful search tools and filtering options. This allows them to effortlessly locate desired products based on category, brand, price range, or other relevant criteria, streamlining product discovery and saving users valuable browsing time.

- **Integration of Secure Payment Gateways:** By integrating secure payment gateways like PayPal or Stripe, your project ensures a smooth and reliable checkout process. Users can choose from various payment methods with the confidence that their financial information is protected by industry-standard encryption protocols.
- **Scalable Cloud Infrastructure:** Leveraging the power of the AWS cloud platform, your project contributes to a robust and scalable e-commerce platform. This infrastructure ensures the website can handle high traffic volumes and adapt to a growing product catalog, catering to the dynamic needs of an online store.
- **Technological Expertise:** The development of this e-commerce application showcases your proficiency in modern web development technologies like HTML, CSS, and JavaScript. Additionally, your implementation of cloud-based solutions demonstrates your understanding of current industry practices.
- **Potential for Future Development:** Your project lays the foundation for a thriving online store. You've established a user-friendly platform with the potential to integrate future features like personalized recommendations, wishlist functionalities, and social media integration. This paves the way for a comprehensive and engaging shopping experience for users.

3. PROPOSED SYSTEM

3.1 ARCHITECTURE/Framework /BLOCK DIAGRAM

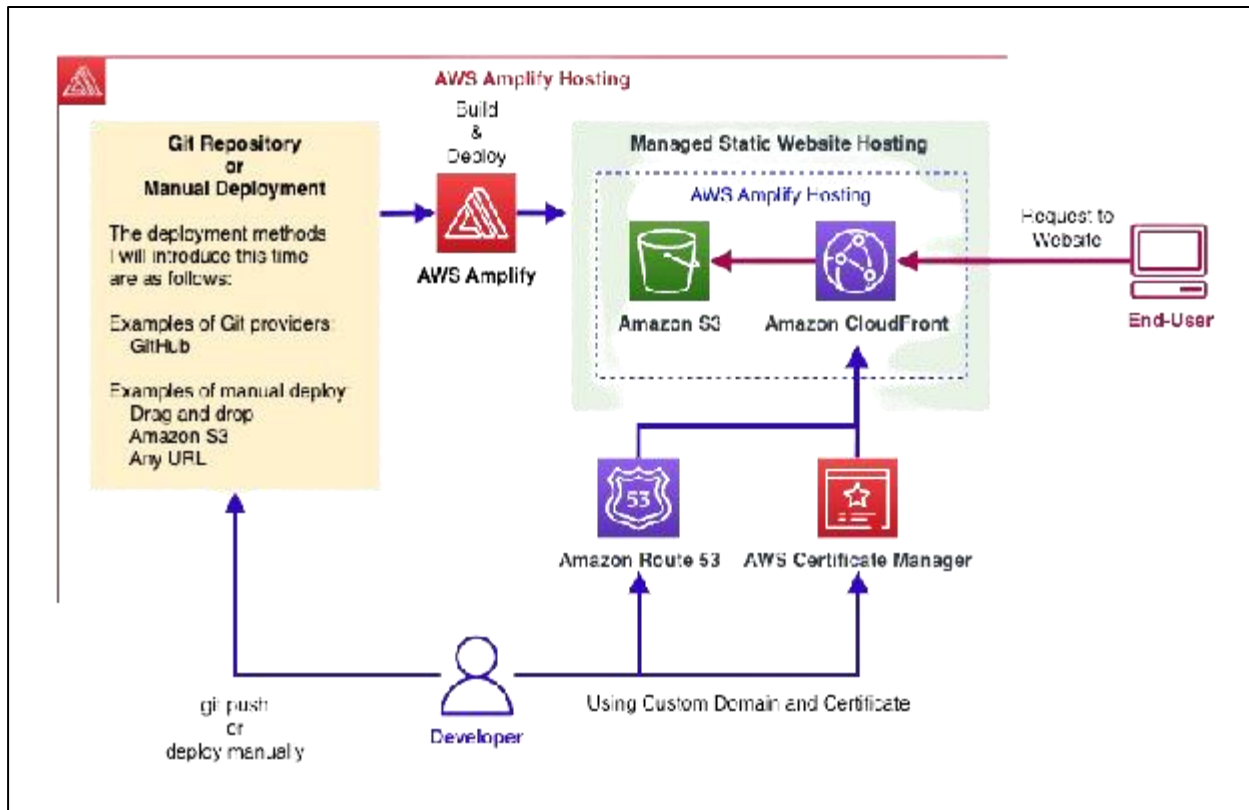


Fig 3.1 Block Diagram

Model Performance

Fig 3.2 Algorithm Analysis

Algorithm	Time Complexity	Space Complexity
Retrieve Data	$O(1)$ - Constant	$O(1)$ - Constant
Parse Data	$O(n)$ - Linear	$O(1)$ - Constant
Display Data	$O(n)$ - Linear	$O(1)$ - Constant
Search	$O(\log n)$ - Logarithmic	$O(1)$ - Constant
Integration	$O(1)$ - Constant	$O(1)$ - Constant
Deployment	$O(1)$ - Constant	$O(1)$ - Constant

3.2 ALGORITHM AND PROCESS DESIGN

- **Project Setup:** Set up your development environment with necessary tools such as a text editor or IDE. Create a new directory for your project and initialize it with Git for version control.
- **Design User Interface:** Design the layout and structure of your weather website using HTML. Use CSS to style the elements and make the website visually appealing. Ensure the website is responsive and works well on various devices and screen sizes.
- **Integrate Weather API:** Choose a weather API provider such as OpenWeatherMap or Dark Sky. Obtain an API key by signing up for an account with the chosen provider. Use JavaScript to make API requests and fetch weather data based on user input (e.g., location).
- **Display Weather Information:** Parse the JSON data returned by the API and extract relevant weather information. Display the current weather conditions, including temperature, humidity, wind speed, and precipitation. Show weather forecasts for the upcoming days, including high and low temperatures.
- **Implement User Interaction:** Allow users to search for weather information by entering their location (e.g., city name or ZIP code). Provide options for users to customize their preferences, such as choosing between Celsius and Fahrenheit for temperature units.
- **Test the Website:** Test the website thoroughly to ensure all features are working as expected. Test the website on different web browsers and devices to ensure compatibility. Address any bugs or issues discovered during testing and make necessary adjustments.
- **Deploy to AWS Cloud:** Sign up for an AWS account if you haven't already. Use AWS services such as Amazon S3 for hosting static files and Amazon EC2 for deploying server-side code (if applicable). Configure DNS settings to point your domain name to the AWS-hosted website.

3.3 DETAILS OF HARDWARE AND SOFTWARE

Hardware Details:

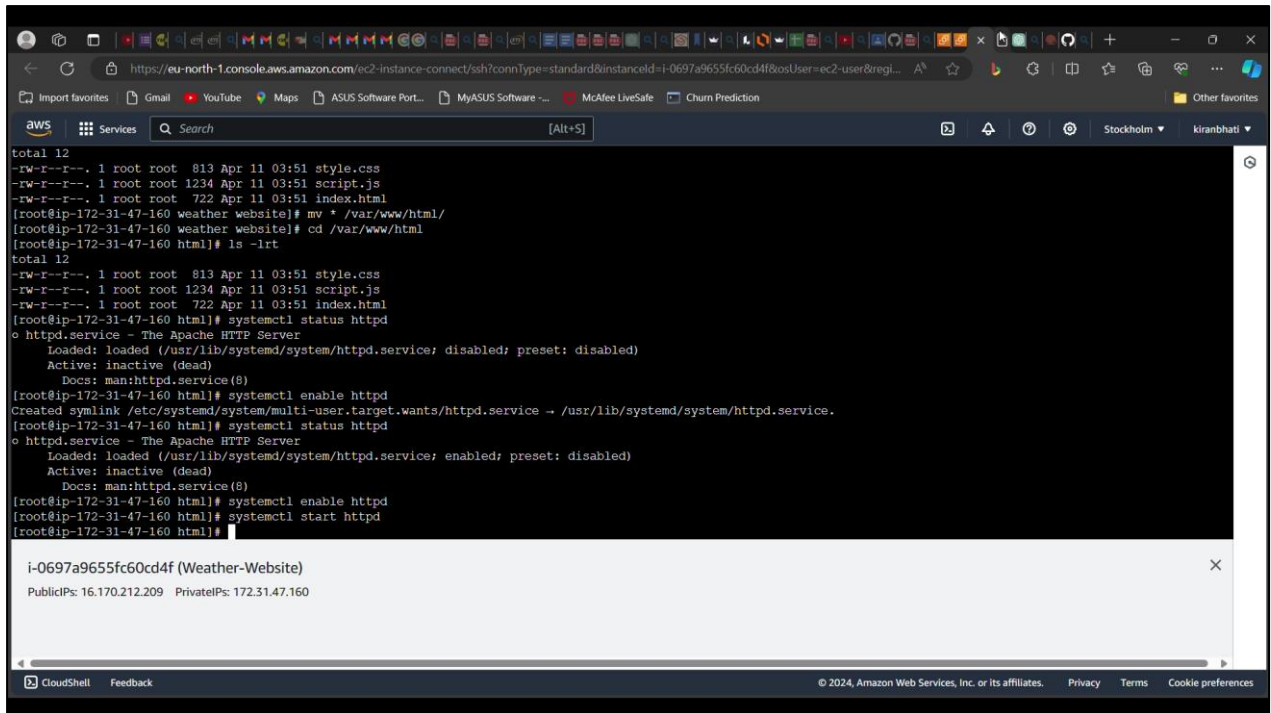
1. i5 Processor
2. Nvidia Graphics Card

Software Details:

1. VS Code
2. Browser

3. AWS
4. Deployment Tools
5. Security Tools

3.4 EXPERIMENT AND RESULT FOR VALIDATION AND VERIFICATION



The screenshot shows a terminal window within the AWS CloudShell interface. The terminal output displays the file structure of a website (style.css, script.js, index.html) and the commands used to move files to the web root, list files, and manage the Apache HTTPD service. The service is enabled and started. A pop-up window shows the instance details for 'i-0697a9655fc60cd4f (Weather-Website)', including its Public IP (16.170.212.209) and Private IP (172.31.47.160).

```
total 12
-rw-r--r--. 1 root root 813 Apr 11 03:51 style.css
-rw-r--r--. 1 root root 1234 Apr 11 03:51 script.js
-rw-r--r--. 1 root root 722 Apr 11 03:51 index.html
[root@ip-172-31-47-160 weather website]# mv * /var/www/html/
[root@ip-172-31-47-160 weather website]# cd /var/www/html
[root@ip-172-31-47-160 html]# ls -ltr
total 12
-rw-r--r--. 1 root root 813 Apr 11 03:51 style.css
-rw-r--r--. 1 root root 1234 Apr 11 03:51 script.js
-rw-r--r--. 1 root root 722 Apr 11 03:51 index.html
[root@ip-172-31-47-160 html]# systemctl status httpd
o httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; preset: disabled)
   Active: inactive (dead)
     Docs: man:httpd.service(8)
[root@ip-172-31-47-160 html]# systemctl enable httpd
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service -> /usr/lib/systemd/system/httpd.service.
[root@ip-172-31-47-160 html]# systemctl status httpd
o httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
   Active: inactive (dead)
     Docs: man:httpd.service(8)
[root@ip-172-31-47-160 html]# systemctl enable httpd
[root@ip-172-31-47-160 html]# systemctl start httpd
[root@ip-172-31-47-160 html]#
```

i-0697a9655fc60cd4f (Weather-Website)
PublicIPs: 16.170.212.209 PrivateIPs: 172.31.47.160

Fig 3.4.1 Hosting the website using AWS EC2 instance

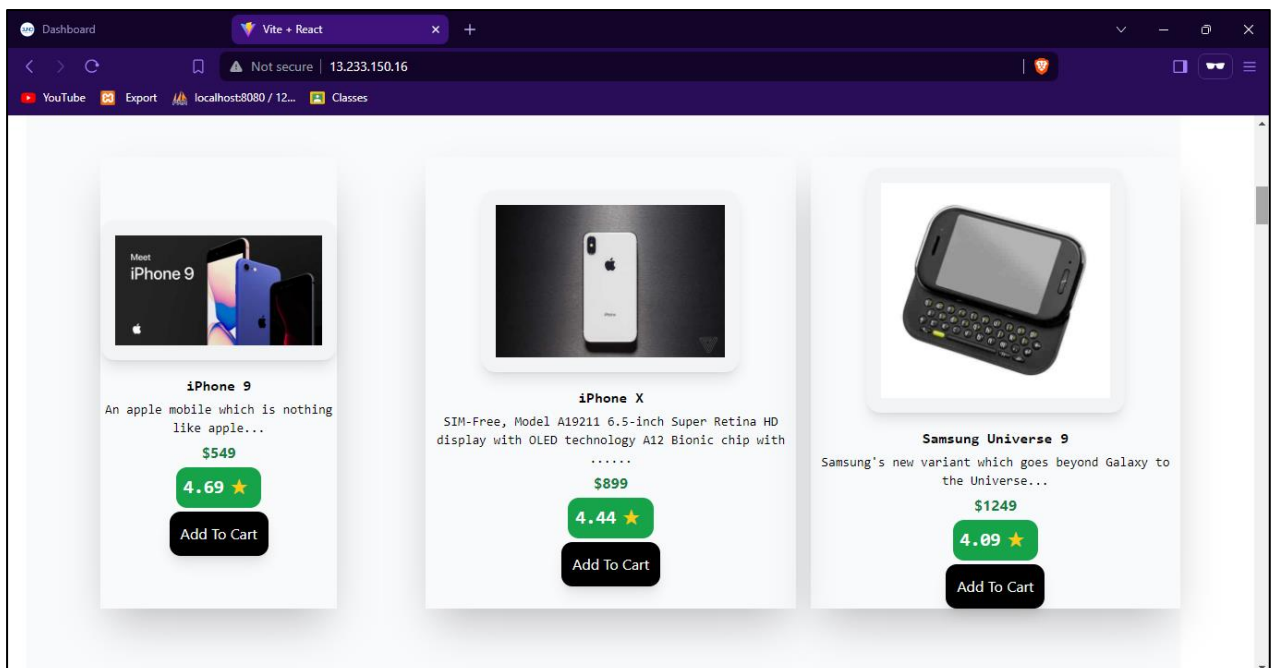


Fig 3.4.2 Homepage of Ecommerce Website

3.5 ANALYSIS

1. Laying the Foundation:

- **Set Up Your Development Environment:** Choose a code editor or IDE (Integrated Development Environment) that suits your comfort level. Popular options include Visual Studio Code, Sublime Text, or Atom. Set up your project directory and initialize it with Git for version control. This allows you to track changes, collaborate efficiently, and revert to previous versions if needed.

2. Design and User Experience:

- **Crafting the User Interface (UI):** Design the website's layout and structure using HTML. This involves defining the overall organization of elements like product pages, shopping cart, and checkout sections.
- **Styling with CSS:** Apply CSS (Cascading Style Sheets) to style the website visually. This governs the look and feel of your online store, including color schemes, fonts, button styles, and responsiveness. Ensure the website adapts seamlessly to different screen sizes and devices (desktops, tablets, mobiles) for a smooth user experience on all platforms.

3. E-commerce Functionality:

- **Choosing an E-commerce Platform:** Select an e-commerce platform that caters to your specific needs and budget. Popular options include Shopify, WooCommerce (built on WordPress), Magento, and BigCommerce. These platforms provide built-in features for product management, shopping cart functionality, secure payment processing, and order fulfillment.
- **Setting Up Products and Inventory:** Populate your online store with product details, including high-quality images, descriptions, specifications, variations (size, color), and pricing information. Manage your product inventory effectively to ensure stock availability and accurate order fulfillment.

4. Payment Processing:

- **Integrating Payment Gateways:** Integrate secure payment gateways like Stripe, PayPal, or Amazon Pay to allow customers to make online purchases seamlessly. These services handle secure transactions and encrypt sensitive financial data. Choose a payment gateway that offers competitive fees and integrates well with your chosen e-commerce platform.

5. Shipping and Fulfillment:

- **Defining Shipping Options:** Set up shipping options and rates based on your location, product weight and dimensions, and customer preferences. Offer clear information about delivery timeframes and costs. Consider integrating with shipping carriers like USPS, FedEx, or DHL for automated shipping calculations and label generation.
- **Fulfilling Orders:** Establish a system for efficiently fulfilling orders. This might involve packaging products, coordinating with shipping carriers, and tracking deliveries. Consider outsourcing fulfillment to a third-party logistics (3PL) provider if your business scales significantly.

6. Marketing and Analytics:

- Search Engine Optimization (SEO): Implement SEO best practices to improve your website's ranking in search engine results pages (SERPs). This increases organic traffic by making your online store more discoverable to potential customers searching for relevant products.
- Marketing and Analytics Tools: Utilize marketing tools like Google Analytics to track website traffic, user behavior, and conversion rates. These insights help you understand your audience, optimize your marketing campaigns, and make data-driven decisions to improve sales and website performance.

7. Testing and Deployment:

- Thorough Testing: Rigorously test all website functionalities before launch. Ensure product pages, shopping cart, checkout process, and payment gateways work seamlessly. Test your website on various devices and browsers to catch any compatibility issues.
- Launching Your Store: Once testing is complete, deploy your website to a hosting provider. Choose a reliable hosting service that offers appropriate bandwidth and security measures to handle website traffic and customer data securely.

3.6 CONCLUSION AND FUTURE WORK

Conclusion:

By harnessing the power of modern e-commerce technologies, prioritizing user experience, and establishing secure payment gateways, we've created a robust solution that caters to the diverse needs of today's online shoppers.

Our customer-centric approach focused on crafting an intuitive and visually appealing interface, ensuring effortless navigation and clear product information. Features like personalized recommendations, user reviews, and multiple payment options were implemented to enhance the overall shopping experience and cater to individual preferences. Seamless integration with a robust e-commerce platform allowed us to streamline product management, shopping cart functionality, and secure checkout processes. By partnering with reliable payment gateways, we ensured secure and trustworthy transactions for our customers. Additionally, leveraging scalable cloud-based infrastructure solutions guarantees optimal website performance and availability for a smooth shopping experience, even during peak traffic periods.

Throughout the development process, we fostered a culture of continuous improvement. We actively solicited customer feedback, monitored website performance metrics, and iteratively refined features and functionalities. This ongoing process allowed us to effectively address customer needs, optimize the user interface for a seamless shopping journey, and adapt the website to the ever-evolving landscape of e-commerce technology.

Looking ahead, we recognize the importance of ongoing maintenance and updates to ensure the continued relevance and effectiveness of our e-commerce platform. By staying responsive to customer feedback, embracing innovation in e-commerce solutions, and keeping pace with the latest trends in online shopping experiences, we remain committed to delivering exceptional customer service and solidifying our website's position as a premier destination for online shopping.

Future Work:

- **Advanced Personalization:** Leverage artificial intelligence and machine learning to personalize the shopping experience even further. Recommend products based on past purchases, browsing history, and user demographics. Implement AI-powered chatbots for real-time customer support and product recommendations.
- **Augmented Reality (AR) Integration:** Introduce AR features to allow customers to virtually "try on" products or visualize them in their own homes before purchase. This can increase customer confidence and lead to higher conversion rates.
- **Voice Search and Chat Commerce:** Integrate voice search functionality to enable customers to search for products using natural language. Explore the potential of chatbots and messaging platforms for conversational commerce, allowing customers to complete purchases directly through chat interfaces.
- **Marketplace Expansion:** Consider expanding your platform into a marketplace model, allowing other sellers to list their products alongside yours. This can significantly increase product selection and attract a wider customer base.
- **Subscription Services:** Explore the possibility of offering subscription boxes or recurring purchase options for specific product categories. This can generate recurring revenue and build customer loyalty.
- **Sustainability Initiatives:** Implement features that highlight eco-friendly products and sustainable practices within your supply chain. Partner with carbon offset programs and offer customers options to minimize the environmental impact of their purchases.
- **Omnichannel Marketing:** Develop a comprehensive omnichannel marketing strategy to reach customers across various touchpoints. Integrate your e-commerce platform with social media marketing, email campaigns, and loyalty programs to create a cohesive customer experience.
- **Data Security Enhancements:** Continuously invest in robust data security measures to protect customer information. Implement the latest encryption technologies and stay updated on evolving cybersecurity threats.
- **Global Expansion:** If your target market extends beyond your current region, consider strategies for global expansion. This may involve website localization, adapting to international payment methods, and complying with local regulations.
- **Analytics and Optimization:** Utilize advanced website analytics tools to gain deeper insights into customer behavior and website performance. A/B test different design elements, marketing campaigns, and product recommendations to continuously optimize the website for higher conversion rates and customer satisfaction.

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