VALUEVUE: A DYNAMIC AND REVOLUTIONIZING RETAIL

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ABSTRACT

In today's retail landscape, traditional stores face unprecedented challenges due to the dominance of e-commerce giants. Small businesses struggle to compete with the convenience and variety offered by online platforms, leading to declining sales and foot traffic. Recognizing the urgent need for innovation, ValueVue emerges as a transformative solution. Built on the powerful MERN (MongoDB, Express.js, React.js, Node.js) stack, ValueVue revolutionizes the retail experience by seamlessly integrating local businesses into the digital sphere. Through intuitive interfaces and personalized features, ValueVue empowers customers to discover nearby stores with price and proximity sorting, aiding in making informed purchasing decisions. Meanwhile, for retailers, ValueVue offers a lifeline, providing tools to showcase their offerings to a wider audience, drive foot traffic, and compete effectively in the digital marketplace. With a commitment to user-centric design and innovation, ValueVue not only revitalizes local economies but also fosters community engagement and connectivity. In a world where traditional retail is under threat, ValueVue stands as a beacon of hope, offering a pathway to sustainable growth and prosperity for brick-and-mortar businesses.

Keyword: *Unprecedented, Foot Traffic, MERN, MongoDB, Express.js, React.js, Node.js, Proximity, Beacon, Brick-and-Mortar Business.*

1. INTRODUCTION

In today's retail landscape, e-commerce giants have redefined how consumers shop by providing unmatched convenience and a vast selection with just a few clicks [4]. This digital revolution has put brick-and-mortar retailers in a challenging position, struggling with declining foot traffic and sales as online shopping gains dominance. These traditional retailers face a double challenge: not only must they compete with the convenience of online shopping, but they also must contend with the expansive visibility and reach of e-commerce platforms. As a result, local businesses often find themselves marginalized, losing out to online marketplaces where consumers might not even be aware of the unique offerings from nearby retailers [7].

To address this challenge, local retailers need innovative solutions to reengage with customers and compete effectively. This is where ValueVue steps in, a platform designed to bridge the gap between consumers and local retailers. By providing a seamless way for customers to connect with nearby businesses, ValueVue revitalizes traditional shopping, enabling local retailers to remain relevant and competitive. The platform offers features like local store locators and a user-friendly interface, allowing consumers to discover and support local shops while enjoying a convenient and engaging shopping experience [11].

ValueVue's integration of price sorting functionality further enhances the shopping experience by allowing users to easily find the most affordable products from nearby retailers [1]. This not only helps consumers make informed choices but also promotes a competitive edge for local businesses. Developed using the MERN stack, ValueVue delivers real-time pricing information and intuitive navigation, catering to the evolving needs of today's consumers [2-3].

In a world where convenience and technology drive shopping trends, ValueVue serves as a crucial bridge, empowering local retailers to thrive in the digital age while meeting consumers' demands for a seamless, affordable shopping experience.

2. LITERATURE REVIEW

The retail industry has been significantly impacted by the rapid rise of technology, which has changed customer shopping habits and business operations. The traditional retail environment has changed as a result of developments in e-commerce, mobile technology, and digital marketing, which have given retailers new and creative methods to engage with their customers. Numerous writers have examined these technological changes, stressing both their advantages and disadvantages for the retail industry. The following are the main conclusions from the body of existing literature.

According to Vandana Kawadkar [13], Technology's Place in the Retail Sector Customers had to wait in long lines to buy their items until lately. But thanks to technology, consumers may use printers, scanners, and portable computers to check out from wherever in the store. Before, roughly 10% of consumers would leave without completing a purchase if they had to wait a long time in a lengthy queue. This has greatly increased customer satisfaction. Contactless payments have further simplified payment procedures thanks to the usage of technology in retail. With these payment options, customers may use their watch or smartphone to make purchases thanks to Near Field Communication (NFC) or Radio Frequency Identification (RFID) technology.

Roberto Rivera et al., [4] highlights the evolution of technology in retail, observing that the industry has experienced significant technological change over the past few decades, and a number of electronic and digital devices are being employed to enable the automation of production processes and generate value for the company. Bellis and Johar state that the autonomy of payments, automated delivery, and customer service are currently the main areas of attention for this revolution. Studies that look into the application of predictive analysis and the usage of new technologies in the retail industry, which have an immediate effect on the economy and social well-being, provide proof of this trend in the literature. In retail procedures, with a focus on technology applications and their effects on supermarkets. A thorough assessment of the literature was conducted for this reason, leading to the selection and assessment of studies that have been published during the last 40 years. The findings cover a number of technological resources that were developed and applied to fulfill particular needs, or that changed and upgraded in response to market demands. Although there are many retail technical tools in the literature, this research focuses on those that have the most effects on production processes, to help readers who are interested in particular subjects.

Venkatesh Shankar et al., [5] discusses the impact of technology on the retails sector, noting that numerous sectors have changed and will continue to change as a result of recent technological advancements. This also applies to retail. Technology advancements have recently expedited major changes and produced major disruptions in the retail industry. For instance, technology has revolutionized purchasing and driven the demise of many traditional brick-and-mortar stores. Examples of these developments include one-click ordering, personalized recommendations, smart speakers, and anticipatory shipping. Artificial intelligence (AI), which powers many of these technologies and is drastically changing the retail industry, is defined as "programs, algorithms, systems, or machines that demonstrate intelligence." It refers, more broadly, to a group of instruments that can raise the level of intelligence of a good, service, or solution. Personalization and recommendation systems, sales and customer relationship management, customer service management, supply chain optimization, inventory management, and shop task creation are just a few of the retail applications of artificial intelligence.

Furthermore, He notes that COVID-19 epidemic has caused a significant surge in the use of technology in retailing. Many brick and mortar retailers have been forced to close physical stores and shift more quickly toward technology-based solutions like online ordering and fulfillment, click and collect, and robot-assisted operations as a result of the shelter-in-place and lockdowns implemented to contain the spread of the coronavirus.

Sudheer Chava et al., [22] stated that, based on an administrative payroll data set covering 2.6 million retail workers, the staggered rollout of a major e-commerce firm's fulfillment centers has caused a 2.4% reduction in income for traditional retail workers in geographically proximate counties. This income decline among hourly workers, particularly part-time employees, is largely due to a decrease in the number of hours worked. Chava observed a U-shaped pattern, with both young and older workers experiencing more significant drops in wage income, leading to an increase in credit card delinquency for some. Additionally, using data from 3.2 million stores, he found that sales and employment in nearby stores decreased by 4% and 2.1%, respectively. Furthermore, the number of business closures, particularly among younger and smaller stores, increased while new business entries declined. These findings underscore how e-commerce-driven creative destruction is affecting local labor markets.

Alberto Americo et al., [23] stated that, the impact of electronic commerce on retail employment in 35 European countries over the past decade. Although e-commerce is still in its early stages, it's becoming a critical factor for business success, affecting firms of all sizes. Americo's analysis examines the influence of e-commerce on retail employment, considering factors like retail sales, firm turnover from e-commerce, internet accessibility, and online purchasing trends. The study employs various estimation methodologies, including Instrumental Variable (IV) estimation through a Two-Stage Least Squares (2SLS) approach. Results indicate that higher firm turnover from e-commerce is associated with reduced employment in the traditional retail sector, highlighting the disruptive effects of digital trade. However, the paper points out that without data on e-commerce industry employment, it's unclear if the growth of electronic commerce will create enough jobs to offset the decline in traditional retail employment, suggesting further research is needed to fully understand the impact of e-commerce on the job market.

3. METHODOLOGY

3.1 EXISTING SYSTEM – TRADITIONAL BRICK-AND-MORTAR PRACTICES

The retail sector has traditionally been built on traditional brick-and-mortar retail, which offers actual locations where consumers can interact with products face-to-face. The distinct benefit of brick-and-mortar stores over internet buying is the ability for shoppers to view, feel, and test items before making a purchase. In order to draw foot traffic, these establishments are usually positioned in prime areas like shopping malls, busy avenues, and metropolitan areas. While salespeople with expertise and individualized attention to detail enhance in-store experiences, retailers frequently employ window displays, signage, and inventory placements to draw in customers.

Brick and mortar stores also put a lot of effort into making their storefronts welcoming and consistent with their brand. To provide a satisfying consumer experience, this entails giving great thought to the interior design, atmosphere, and retail layout. Even with the growth of online shopping, many customers still prefer the tactile experience of going to physical stores and the instant satisfaction of bringing their goods home. Consequently, conventional retailers are progressively incorporating technology and implementing omnichannel tactics to provide a smooth experience on both digital and physical platforms, guaranteeing their continued relevance in a changing retail environment.

Disadvantages of Brick-and-Mortar Practices:
- Brick-and-mortar stores have a confined geographic reach, typically serving customers in a local or regional area, unlike e-commerce platforms which can sell to a global audience
- Brick-and-mortar retailers face stiff competition from e-commerce, which can offer greater convenience, often lower prices, and a broader range of products, making it difficult to compete.
- Brick-and-mortar stores may not provide as much detailed product information.
- In traditional stores, direct communication with sellers is typically confined to business hours or in-person interactions.

3.1 PROPOSED SYSTEM – VALUEVUE

ValueVue presents itself as a game-changing solution that is ready to completely transform the conventional brick-and-mortar retail experience in response to the dynamic changes in the retail sector brought about by technology breakthroughs and shifting consumer preferences. ValueVue seeks to overcome the drawbacks of current retail methods and provide consumers and local companies with unmatched convenience, variety, and affordability by utilizing state-of-the-art technology and creative ways.

To have a deeper understanding of the present status of the retail industry, including the obstacles faced by physical merchants and the new trends that are changing customer behavior, conduct in-depth research and analysis. Determine the drawbacks of conventional brick and mortar retailing, such as restricted customer base, expensive operating costs, and challenges with inventory control, that impede local shops' capacity to be competitive and long-lasting.

Describe the main goals and value proposition of ValueVue. See it as a revolutionary platform that connects customers with local companies and provides unmatched affordability, convenience, and choice. Describe ValueVue's distinctive selling characteristics, highlighting its capacity to offer local store locators, real-time pricing comparison, and customized shopping experiences catered to each user's needs and tastes.
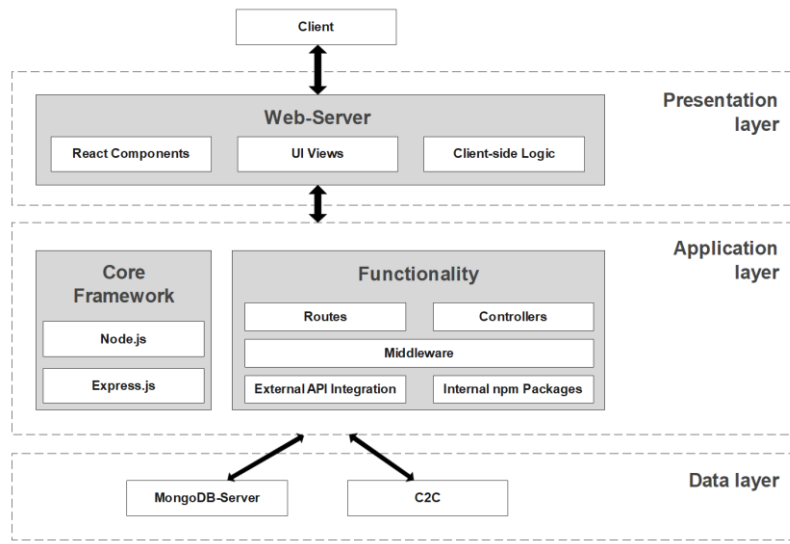
Fig -1: Architecture of ValueVue

3.1 MERN FULL STACK WEB DEVELOPMENT

A well-liked software stack for creating full-stack web applications is the MERN stack. It is an acronym for Express.js, React, Node.js, and MongoDB. Together, the components of the stack offer a comprehensive foundation for creating dynamic and interactive online applications, each with a distinct function.

- MongoDB - A NoSQL database that stores information in documents like JSON.
- Express.js - A Node.js web application framework for creating server-side programs and APIs.
- React.js - It is a JavaScript user interface library that is frequently used to make interactive and dynamic front-end elements.
- Node.js - A JavaScript runtime environment that is frequently used to create server-side applications, allowing JavaScript code to be executed outside of a web browser.

4. MODULES

4.1 SELLER INTERFACE

ValueVue sellers can quickly register and create an account by filling out the registration form, which requests basic information such the name of the retail store, seller data, and shop locations. This data is essential for both preserving platform transparency and assisting customers in identifying and finding the store.

Sellers can manage their store and product listings by logging in to the ValueVue website at any time after completing the registration process. Sellers can add new products, change existing product details, and remove out-of-stock products using the platform's user-friendly interface. Because of this flexibility, merchants are able to maintain the accuracy of their listings, which facilitates customers' ability to locate reliable information on the site.

ValueVue also gives merchants the option to change their shop's location and details whenever necessary. This function comes in particularly handy when a shop moves or the seller wishes to grow by opening more locations. By using these features, sellers can guarantee that the information about their products on ValueVue is accurate at all times, giving customers looking for them a smooth experience.
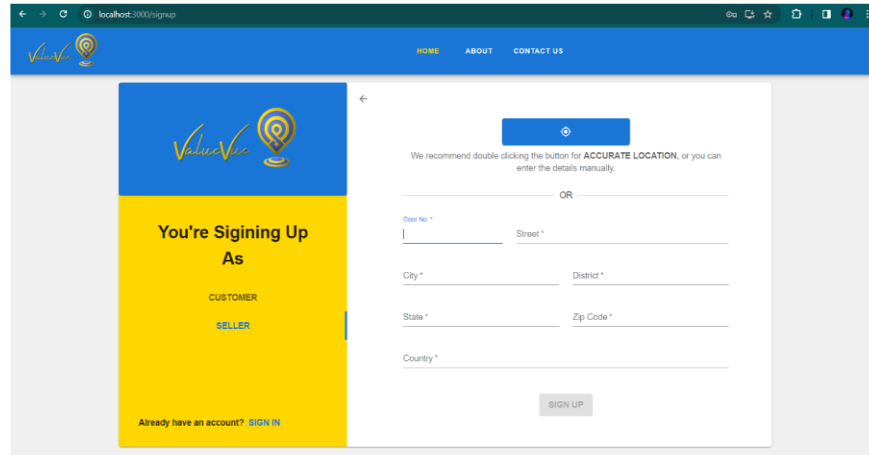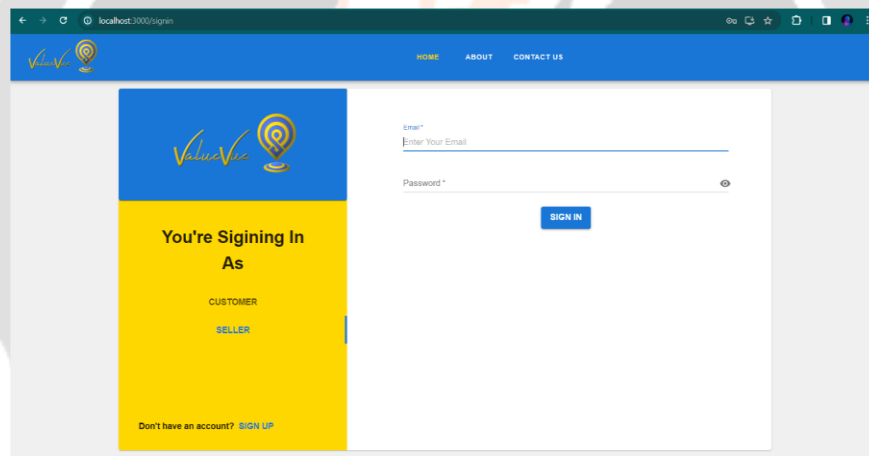

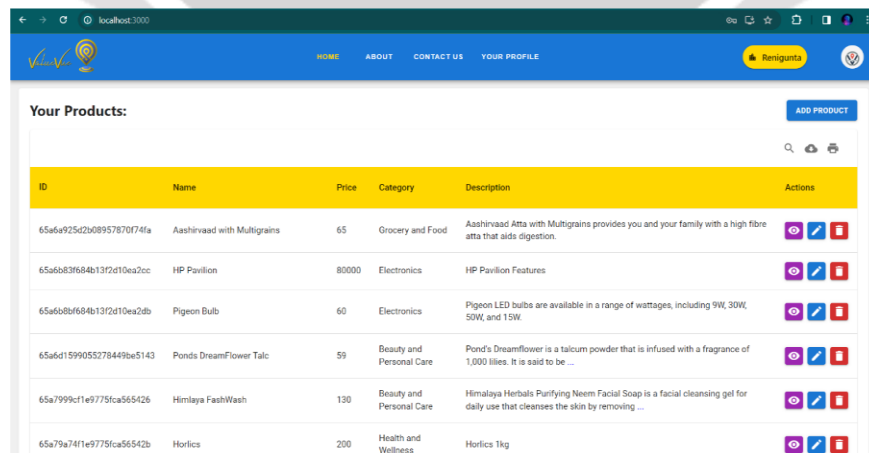**Fig -2**: Signup page for sellers

Fig -3: Signin page for sellers

Fig -4: Sellers homepage
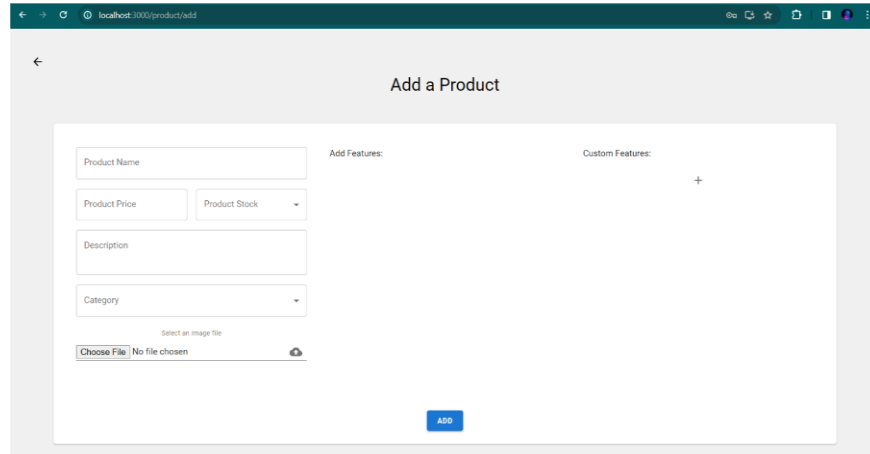
Fig -5: Add product page
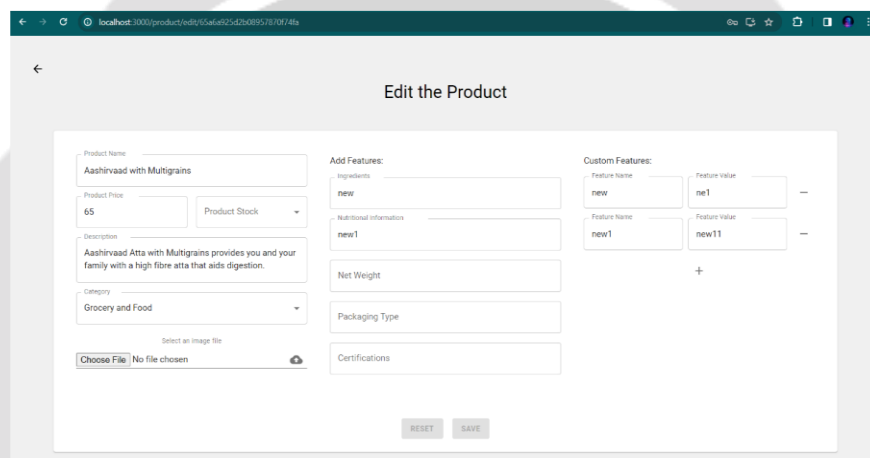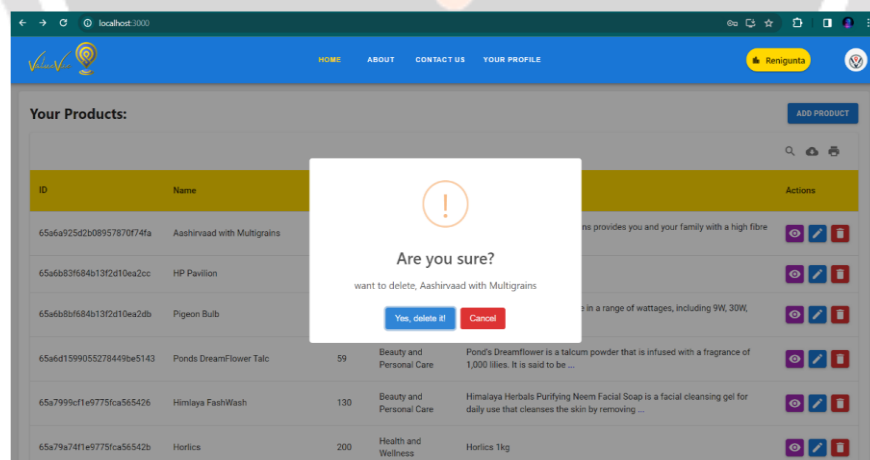

Fig -6: Edit product page

Fig -7: Delete product confirmation

4.2 USER INTERFACE

Clients using ValueVue can quickly register and log in to enjoy a variety of services and functions by creating an account. Customers give basic details like their name, email address, and a strong password throughout the registration process. They may now customize their ValueVue experience thanks to this.

Customers who have registered can browse ValueVue's product offers by category or by utilizing the search option to locate particular products. The website gives customers all the information they need to make educated purchasing decisions by offering comprehensive details on every product, including prices, descriptions, and user reviews. Additionally, customers have access to seller data, which give them more information on the companies selling the goods and their contact details in case they have any more questions.
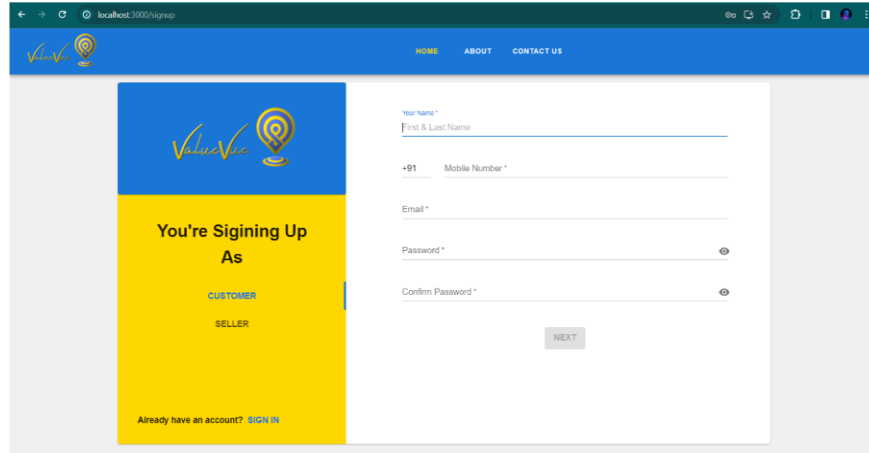

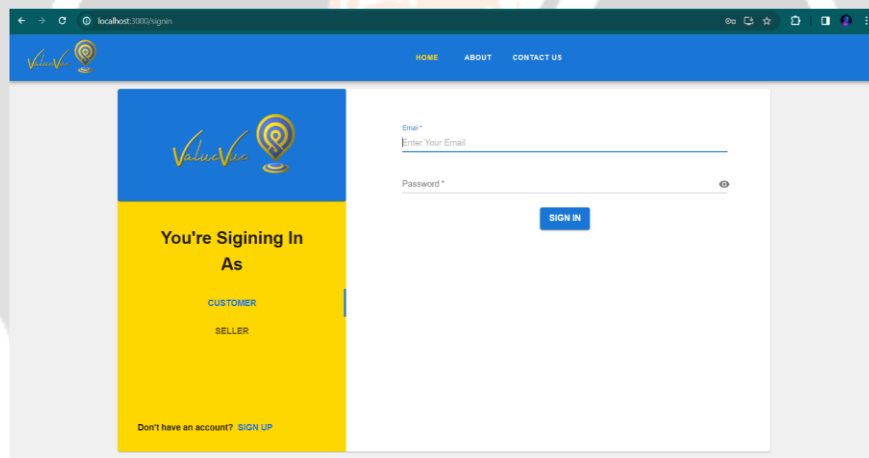**Fig -8**: Signup page for customers
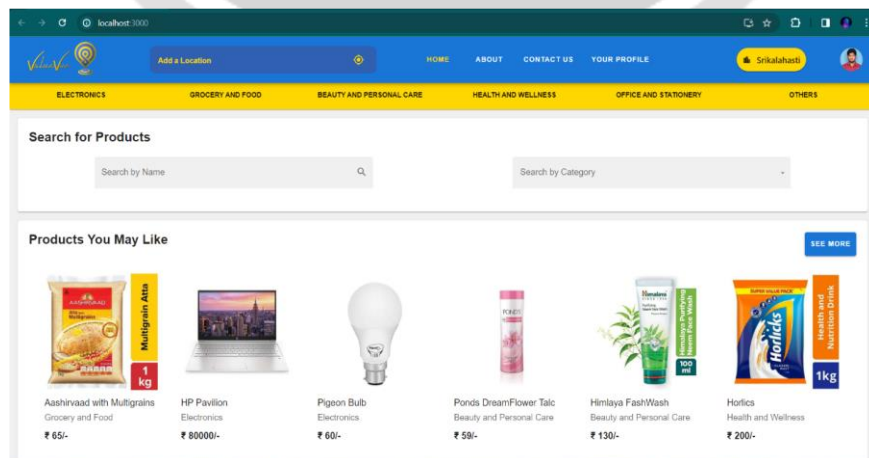

Fig -9: Signin page for customers
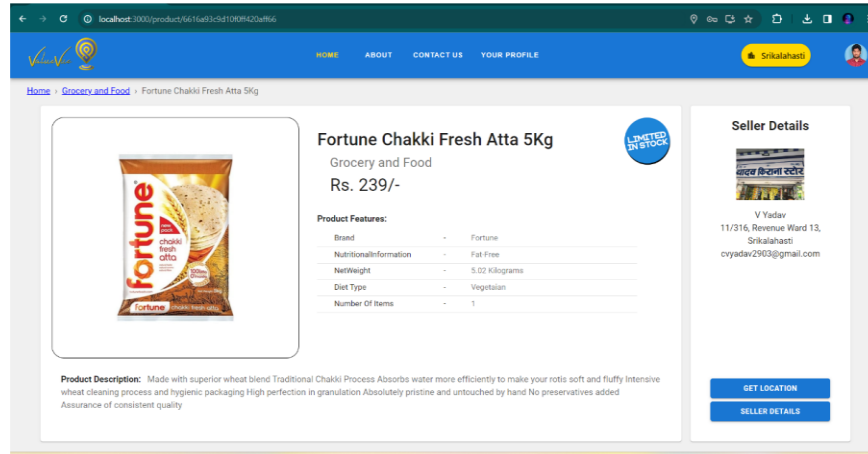

Fig-10: Homepage for customers
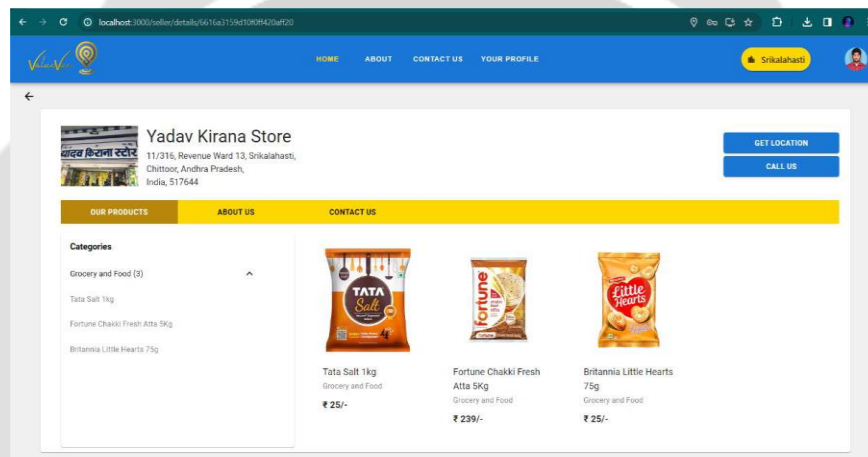
Fig-11: Product details page

Fig-12: Seller details page

5. RESULTS & PERFORMANCE

5.1 SHORTEST DISTANCE TO REACH SELLER

The ValueVue website's findings show how well our integration of mapping technology improves the consumer experience. Customers may browse interactive maps thanks to our implementation of the Google Maps JavaScript API, which makes it easy for them to traverse the website and clearly visualize the locations of sellers. Users can locate the best routes to seller businesses by using the Google Maps Directions API, which supports driving, walking, and public transportation.

The feature of the platform that allows it to determine the quickest path between customers and sellers has proven useful. To help clients find the closest seller locations, we calculate the great-circle distance between two geographic points using the Haversine formula. The whole user experience has been improved by this functionality, which has made in-person visits faster and more effective.

The convenience and involvement of customers have significantly improved, as seen by these outcomes. Users may contact with merchants more easily thanks to the mapping tools, which also make it easier for them to locate nearby establishments and choose the most effective routes. This simplified method makes the ValueVue platform's primary objectives easier to achieve and makes the user experience more pleasant.
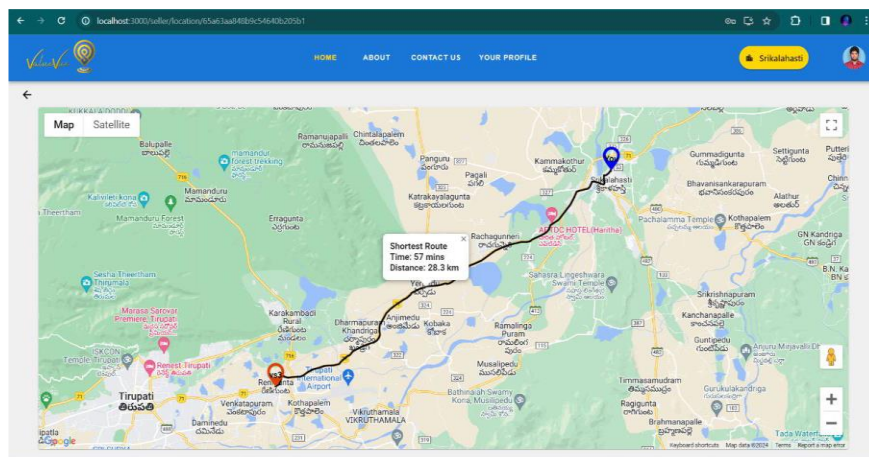
Fig-12: Shortest distance between customer and seller

5.2 GOOGLE LIGHTHOUSE PERFORMANCE ANALYSIS

We conducted a thorough performance audit of our ValueVue using Google Lighthouse, a tool for assessing important web application features. Lighthouse evaluates in four main areas: SEO, Best Practices, Performance, and Accessibility. Below is a synopsis of our results along with an explanation of each category.

- Performance: The speed and effectiveness with which a webpage loads and activates is measured. Metrics such as First Contentful Paint (FCP), Largest Contentful Paint (LCP), Total Blocking Time (TBT), and Cumulative Layout Shift (CLS) are analyzed by Lighthouse.
- Accessibility: This evaluates if the website satisfies common accessibility standards and may be used by individuals with impairments. Lighthouse inspections for ARIA roles, keyboard navigation, alt text, and color contrast.
- Best Practices: This section looks at the website's adherence to suggested development practices with an emphasis on code quality, security, and performance. Lighthouse examines connections for security, No out-of-date APIs, error correction.
- SEO: Search Engine Optimization evaluates a website's search engine optimization. Lighthouse tests for crawlability, structured data, and meta tags.
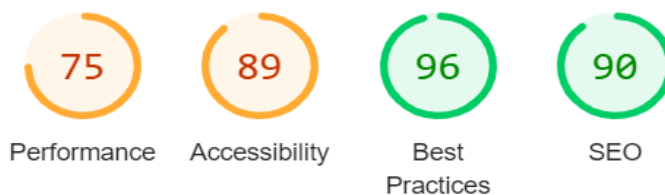

Fig-13: ValueVue performance in Google lighthouse

6. CONCLUSION

In conclusion, the ValueVue web application, which combines cutting-edge technology with user-centric design, represents a huge advancement in retail. The platform offers users vital information into product availability, pricing, and proximity to local businesses, enabling them to traverse the shopping landscape with ease thanks to its complete features and intuitive design. ValueVue serves as a digital bridge for physical businesses, assisting them in being more visible, interacting with clients, and competing in a market that is becoming more and more digital. ValueVue offers scalability, stability, and security, establishing it as a catalyst for reviving the conventional retail experience. It is built on the robust MERN stack and supported by MongoDB integration.

Future plans call for developing a mobile app for ValueVue in order to expand its user base beyond the internet. Users will benefit from more convenience and flexibility thanks to this mobile application, which will let them access platform capabilities from any location. Better features that an app can offer are location-based services, tailored recommendations, and easy interaction.

7. REFERENCES

[1]. MDN Contributors, "Geolocation API," Dec. 2023. [Online]. Available: https://developer.mozilla.org/en-US/docs/Web/API/Geolocation_API

[2]. Nur Islam, "The MERN stack tutorial," Nov. 2023. [Online]. Available: https://blog.logrocket.com/mern-stack-tutorial/

[3]. Greg Lim, "Beginning MERN Stack Development," New York, NY: Greg Lim, July 2021.

[4]. Roberto Rivera et al., "Technological Evolution in Grocery Retail: A Systematic Literature Review," in Proceedings of the 2021 16th Iberian Conference on Information Systems and Technologies (CISTI), Chaves, Portugal, 23-26 June 2021, IEEE 2021.

[5]. Venkatesh Shankar et al., "How Technology is Changing Retail," Journal of Retailing, vol. 97, no. 1, pp. 13-27, March 2021.

[6]. Shama Hoque, "Full-Stack React Projects," Birmingham, UK: Packt Publishing, April 2020.

[7]. Kim Merrill, "Three ways to add a map implementation to your app and when to use each," Dec. 2019. [Online]. Available: https://cloud.google.com/blog/products/maps-platform/three-ways-add-map-implementation-your-app-and-when-use-each

[8]. Vasan Subramaninan, "Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node," California (CA), USA: Apress Berkeley, May 2019.

[9]. Chris Northwood, "The Full Stack Developer: Your Essential Guide to the Everday Skills Expected of a Modern Full Stack Web Developer," California (CA), USA: Apress Berkeley, Nov. 2018.

[10]. Maximiliano Firtman, "Programming the Mobile Web," California (CA), USA: O'Reilly Media, March 2013.

[11]. Gabriel Svennerberg, "Beginning Google Maps API 3", California (CA), USA: Apress Berkeley, July 2010.

[12]. Dan Hopping, "Technology in Retail," Technology in Society, vol. 22, no. 1, pp. 63-74, Jan. 2000.

[13]. Vandana Kawadkar, "Role of Technology in Retail Industry," Journal of Emerging Technologies (JETIR), vol. 6, no. 5, pp. 71-75, May 2019.

[14]. Wayne D. Hoyer et al., "Transforming the Customer Experience Through New Technologies," SageJournals, vol. 51, no. 1, pp. 56-71, Aug. 2020.

[15]. J. Jeffrey Inman et al., "Shopper-Facing Retail Technology," Journal of Retailing, vol. 93, no. 1, pp. 7-28, March 2017.

[16]. Shunfu Hu, "Online Map Service Using Google Maps API and Other Javascript Libraries," Berlin, Germany: Springer, Feb. 2012.

[17]. Colin J. Ihrig, "Finding yourself using Geolocation and the Google Maps API," ACM Digital Library, vol. 19, no. 1, pp. 72-74, Sept. 2012.

[18]. C C Robusto, "The Cosine-Haversine Formula," JSTOR, vol. 64, no. 1, pp. 38-40, Jan. 1957.

[19]. P Dauni et al., "Implementation of Haversine formula for school location tracking," IOP Publishing Ltd., vol 1402, no. 7, 2019.

[20]. E Maria et al., "Measure distance locating nearest public facilities using Haversine and Euclidean Methods," in Proceedings of the International Conference on Applied Science and Technology (iCAST on Engineering Science), Bali, Indonesia, 24-25 Oct. 2019, IOP Publishing Ltd. 2021.

[21]. Monika Mehra et al., "MERN Stack Web Developnent," Annals of the Romanian Society for Cell Biology, vol. 25, no. 6, pp. 11756-11761, May 2021.

[22]. Sudheer Chava et al., "Creative Destruction? Impact of E-Commerce on the Retail Sector," Informs, vol. 70, no. 4, June 2023.

[23]. A Americo et al., "The effect of E-commerce on Employment in Retail Sector," ResearchGate, Jan. 2018.

[24]. Harri Ramcharran, "E-Commerce Growth and the Changing Structure of the Retails Sales Industry," International Journal of E-Business Research (IJEBR), vol. 9, no. 2, pp. 44-60, April 2023.

[25]. Sanchit Aggarwal et al., "Modern Web-Development using ReactJS," International Journal of Recent Research Aspects, vol. 5, no. 1, pp. 133-137, March 2018.