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Bringing the Garden Online: An Exploration of Best Practices for E-Commerce Plant Sales

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Abstract: ***As we've learned from reading many research papers and other sources, many people want to acquire plants and go right to the nursery, but occasionally they don't know all there is to know about a certain plant or the seller is not technically skilled. Customers don't compare plant prices between different retailers, and there is no online payment option available in nurseries. The e-nursery in this instance is a platform where customers can quickly compare plant prices and make online payments.***

Excellent customer service is crucial. Our staff intends to provide knowledgeable answers to inquiries and advise when we feel it is necessary since we want every customer to have a positive shopping experience.This study investigates the user experience and best practises for a website that sells plants online. An analysis of the functionality and design elements of an existing online plant marketplace is included in the study, along with user comments and evaluations. The study also looks at the difficulties and possibilities brought on by e-commerce plant sales, such as problems with shipping and handling, plant quality control, and customer service. Through this investigation, the paper pinpoints crucial tactics for profitable online plant sales, such as persuasive product descriptions, simple website navigation, and helpful customer service. In the end, this study emphasizes the potential of online plant sales as a successful and long-lasting business model for the green sector while offering advice and suggestions to business owners and developers.

Keywords: Plants, User-Experience, Marketplace, Sustainability, Green Industry.

I. INTRODUCTION

The number of consumers shopping online for a wide range of goods and services has led to a huge increase inthe global e-commerce business in recent years. This trend has extended throughout the plant industry as more nurseries and retailers start to sell live plants online. The ability to offer a broader assortment of plants, a largercustomer base, and lower administrative costs are just a few advantages that online plant sales have over traditional brick-and-mortar businesses.

Online plant sales have a lot of potential as a successful and long-lasting business model for the green industry, especially in a post-pandemic era where customers are increasingly looking for contactless shopping opportunities. However, creating a web application for successfully selling plants online necessitates a thoroughunderstanding of the particular difficulties and factors at play. Through this research, we hope to offer perceptions and suggestions to business owners, developers, and startups looking to get into this expanding market as well as to established companies looking to improve their online plant sales strategy.

II. PROBLEM DESCRIPTION

Online plant selling websites face a range of challenges and issues that can impact the user experience andultimately, the success of the business. Some of the key problems include:

1) *Plant Quality Assurance:* One of the most significant challenges of online plant sales is ensuring that the plants are healthy, disease-free, and of high quality when they arrive at the customer's doorstep. The inability for customers to inspect the plant physically can lead to dissatisfaction and negative reviews.
2) *Shipping And Handling:* Shipping plants can be a logistical challenge, and improper handling during transit can damage the plants. Ensuring that the plants are properly packaged, shipped, and tracked is essential to minimizing damage during transit.
3) *Website Design And Functionality:* A poorly designed website can negatively impact the user experience and lead to lower sales. Ensuring that the website is intuitive, easy to navigate, and provides adequate information on plant care and delivery is essential for building trust and customer loyalty.
4) *Customer Service:* Addressing customer inquiries and concerns is critical for building trust with customers and encouraging repeat business. Ensuring that customer service is responsive, friendly, and helpful is essential to maintaining a positive reputation and generating positive reviews.

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5) *Limited Plant Selection:* Online plant selling websites may face challenges in sourcing a diverse range of plants, leading to limited selection for customers. Ensuring that the website offers a wide variety of plants, including rare and exotic varieties, can help to attract and retain customers.

By addressing these challenges and issues, online plant selling websites can improve the user experience and ultimately, the success of their business.

III. LITERATURE REVIEW

1) Diane L. Haase and Daniel J. Drummond(2017):"Useful Mobile Applications for Nursery and Field Personne".In this research paper the author talks about the increasing use of mobile applications and their contribution to increase the productivity. The purspose of this researche is to make available apps with potentialapplication to nursery production and outplanting of trees and shrubs for reforestation, restoration, and conservation.
2) Partha Pratim Ray(2017):"Internet of things for smart agriculture: Technologies, practices and future direction".In this research work the author talsks about the use of internet of things for agriulture, hotriculture and plant nursery. The author review various potential IoT applications, and the specific issues and challenges associated with IoT deployment for improved farming.The IoT devices can help in sustainable development of nursery products.
3) Ujang Maman, Yuni Sugiarti, and Nia Kumaladewi(2017):"Design of ECommerce Information Systems for Houseplants: the Case of Yasyifa Nursery Plantation".The researcher in his works talks about the indeed enormous demand for commodities of houseplant in the world. The aim of his study is to design ecommerce information systems for the houseplant, by taking the case of Yasifa Nursery Plantation in West Java, Indonesia. The commodity of horticulture, especially houseplants have had a good prospect in agribusiness. It is based on the fact that the demand for the houseplants has had a tendency to increase. The world of houseplant trade in 2010 was about US$ 90 billion, but Indonesian export in the same period was only US$ 9,042 million.
4) R.R. Singh, L.K. Meenaand Paramveer Singh(2017):"High Tech Nursery Management in Horticultural Crops: A Way for Enhancing Income". RR Singh and LK Meenaand talks about the high technursery management in horticultural crops.They say that aim of good nursery management is to make available planting material of the highest possible quality for new development areas and replanting and poor planting materials lead to low yield and unnecessary thinning cost top rid off runts in planted field.The researchers give the many suggestions such as installation of nursery inventory, packing of nursery plants, sale management, keeping plant development register and record of experiments.
5) Madhurima Khosla, Harish Kumar (2018):"Growth of E-commerce in India: An Analytical Review of Literature".Through this paper authors convey the enormous growth speed of the E-commerce in India. E- commerce is the use of electronic communications and digital information processing technology in business transactions to create, transform, and redefine relationships for value creation between or among organizations, and between organizations and individuals. The use of E-commerce can make your business to reach till the broad customer range. The paper provides insight into the evolution of e-commerce in India, while understanding the nitty gritties of its different aspects, with special emphasis on B2C e-commerce: which has shown tremendous growth.
6) Manali Bachhav, Snehal Jadhav,Anushri Sonawane(2018):"Online Herbs & Fruits".This research informing us about the online buying of herbs and fruits with the usefulness of these for the health.The herbs and fruits have been used for a long time to cure deseases.The authors talk about the such online platform which make available many types of fruits and herbs.The user can buy the fruit by according to his desease by enteringthe details.
7) Snezhana Sulova(2019):"A SYSTEM FOR E-COMMERCE WEBSITE EVALUATION".This research paper is focused on the multiple functionalities of e commerce website through which the sale is carried out. E-commerce platform are both a marketing tool that attracts customers, dynamic systems that allow interaction with the users, and the realization of transactions and a portal with useful information about the soldgoods and services. The success of esales depends on many factors, but Web-based platforms are crucial for their implementation.
8) Olufemi Johnson and Tiko liyamu(2019): "Framework for adoption of Ecommerce : A case of South African retail grocery sector". This research focuses on the enormous power and multiple functionalities to of E-commerce website to develope a successful online business. The E-commerce platform can help any type of business to reach its potential irrespective of its category.Hence the author talks about grocery business which can be beneficial if attached with ecommerce.
9) Dr.Mahendra Makesar, Yogendra Nikam, Pratik Dudhkawde, Shubham Kathane, Suraj Kawadkar(2020): "Design & Implementation of Web Based Application for Plant Nursery".

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In this research paper the author describes how they have developed an approach to allow customers to buy plants without even visiting shop.The customer will be able to buy plants online from anyplace, anytime.They have developed their site in such a way that it enables user to browse before they shop, and to research the product sothey have more confidence in what they are buying.The author talks about how the payment method can be put together in the web application.

10) Rashbir Singh, Prateek Singh and Latika Kharb (2020): "Smart Nursery with Health Monitoring System Through Integration of IoT and Machine Learning". In this research paper the authors introduce thenew emerging technologies i.e. Internet of Things and Artificial Intelligence for the management of plant nursery.These technologies provide the means to monitor the overall growth and health of the nursery products.The IoT and AI will have various sensors for pressure, humidity, temperature, light, moisture, conductivity, air quality, etc. to monitor the nursery internal environment and maintain the control and flow of water and other minerals inside the nursery.

Comparison table given below:

Sr. No.	Title	Author	Objective	Limitation
1.	Useful Mobile Applications for Nursery and FieldPersonnel	1. Diane L. Haase 2. Daniel J.Drummond	In this research paper the author talks about the increasing use of mobile applications and their contribution to increase the productivity. The purspose of this researche is to make available apps with potential application to nursery production and outplanting of trees and shrubs for reforestation, restoration, and conservation.	We draw attention to an unsolved problem in available literature that the work performed in this research was only limited to the field.The development of mobile app was used for field production.
2.	Internet of things for smart agriculture: Technologies, practices and future direction	Partha Pratim Ray	In this research work the author talsks about the use of internet of things for agriulture, hotriculture and plant nursery. The author review various potential IoT applications, and the specific issues and challenges associated with IoT deployment for improved farming.	The IoT technology used in this research was only for the production of the plants and nursery in the field.It was not related to online selling of plants.
3.	Design of ECommerce Information Systems for Houseplants: the Case of Yasyifa Nursery Plantation	1.Ujang Maman 2.Yuni Sugiarti 3.Nia Kumaladewi	The researcher in his works talks about the indeed enormous demand for commodities of houseplant in the world. The aim of his studyis to design ecommerce information systems for the houseplant, by taking the case of Yasifa Nursery Plantation in West Java, Indonesia.	The technology used in this development was not so goodin comparison with today's technology.

4.	High Tech Nursery Management in Horticultural Crops: A Way for Enhancing Income	1.R.R. Singh 2. L.K. Meenaand 3. Paramveer Singh	RR Singh and LK Meenaand talks about the high tech nursery management in horticultural crops.They say that aim of good nursery management is to make available planting material of the highest possible quality fornew development areas and replanting and poor planting materials lead to low yield and unnecessary thinning cost toprid off runts in planted field.	This research was only limitedto the development of the species and seeds using high tech management and technologies.
5.	Growth of E- commerce in India: AnAnalytical Review of Literature	1.Madhurima Khosla 2.Harish Kumar	Through this paper authors convey the enormous growth speed of the E-commerce in India. E-commerce is the use ofelectronic communications anddigital information processing technology in business transactions to create, transform, and redefine relationships for value creation between or among organizations, and between organizations and individuals. The use of E-commerce can make your business to reach till the broad customer range.	As many people want to buy a plants and they directly concerned to nursery and buy the plants but sometimes people doesn't know specific information about particular Plant items as well as seller are not technically skilled.
6.	Online Herbs & Fruits	1.Manali Bachhav 2.Snehal Jadhav 3.Anushri Sonawane	This research informing us about the online buying of herbs and fruits with the usefulness of these for the health.The herbs and fruits havebeen used for a long time to cure deseases.The authors talk about the such online platform which make available many types of fruits and herbs.The user can buy the fruit by according to his desease by entering the details.	The limitation of this project was that it helps the user to easily search for herbs and fruits that will be good for thehealth of the user depending on any health issue or diseasethat he/she is suffering from but not for plants.
7.	A System For E-Commerce Website Evaluation	Snezhana Sulova	This research paper is focused on the multiple functionalities of e commerce website through which the sale is carried out. E-commerce platform are both a marketing tool that attracts customers, dynamic systems that allow interaction with the users, and the realization of transactions and a portal with useful information about the sold goods and services.	Customer doesn't compare plant price with other shopkeepers at the same time.

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8.	Framework for adoption of Ecommerce : A caseof South African retail grocery sector	1. Olufemi Johnson 2. Tiko liyamu	This research focuses on the enormous power and multiple functionalities to of E- commerce website to develope a successful online business.The E-commerce platform can help any type of business to reach its potential irrespective of its category.Hence the author talksabout grocery business which can be beneficial if attached with ecommerce.	In this paper the author discusses the five factors thosecritically influence the adoption of e-commerce.
9.	Design & Implementation of Web Based Application for PlantNursery	1. Dr.Mahendra Makesar 2.Yogendra Nikam 3.Pratik Dudhkawde 4.Shubham Kathane, 5.Suraj Kawadkar	In this research paper the author describes how they have developed an approach to allow customers to buy plants without even visiting shop.The customer will be able to buy plants online from anyplace, anytime.They have developed their site in such a way that it enables user to browse before they shop, and to research the product so they have more confidence in what they are buying.The author talks about how the payment method can be put together in the web application.	Their work was highly focused on the development ofthe platform only.Lack of customer support was there.

IV. METHODOLOGY

There are various research papers available related to online web applications and nursery management. After reading many of them we came to know that many people have worked in this field and their work is also good but there is always something which can be improved.The methodology we used for conducting our research was to read and analyze the existing research work in this marketplace related to online plant delivery.There arealso some web applications running on the internet which deliver good quality plants. We visited those websites and analysed their working. We found that there are many chances for the improvement in the existing works. There are several technologies which can be incorporated in our web application.

The enough improvement can be done in the existing systems to get a highly dynamic and resilient system.There are many technologies in the market which are evolving day-by-day.These technologies are playing an important role in the field of e commerce and online marketplace.

V. PROPOSED SYSTEM

The purpose of our work is to make people aware about the plantation and provide a user friendly platform from where they can easily purchase the plants.The platform will have many features which will engage the user to know about the benefits of the plantation as well as user will also get the tips and advices from the nursery experts.Our platform is focused for the benefits of the buyers and sellers.So on this platform the plants vendors will also have their presence direct from the nursery. We will provide a facility to create a room for the users where they can share the live progress of the plants and their experience with our platform.

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VI. HARDWARE AND SOFTWARE REQUIREMENTS

The computer hardware required for this platform must have minimum 2GB RAM. The windows 7 or greaterversions of Windows OS are required to run this web application.The software requirements include visual studio code , mongoDB database , HTML, CSS , JavaScript, Next JS , Node.js, Express JS.

VII. SYSTEM ARCHITECTURE

The flow diagram shown below in fig.1 gives an entire view of the working of this platform. By seeing the block-diagram the task performed by every entity on this platform are very clear. The task performed by user include surfing the website without logining in, viewing the product along with the product description.The website provides an Frequently Asked Questions section and contact team where the user can contact the adminfor any issue and query and also can put his review there.The user can buy the plant with or without going to theproduct description page and can add the product to the cart from the product description page.The user an viewthe items already added into the cart and remove the unwanted products from the cart. After deciding on the item , the user can checkout from the page after buying.

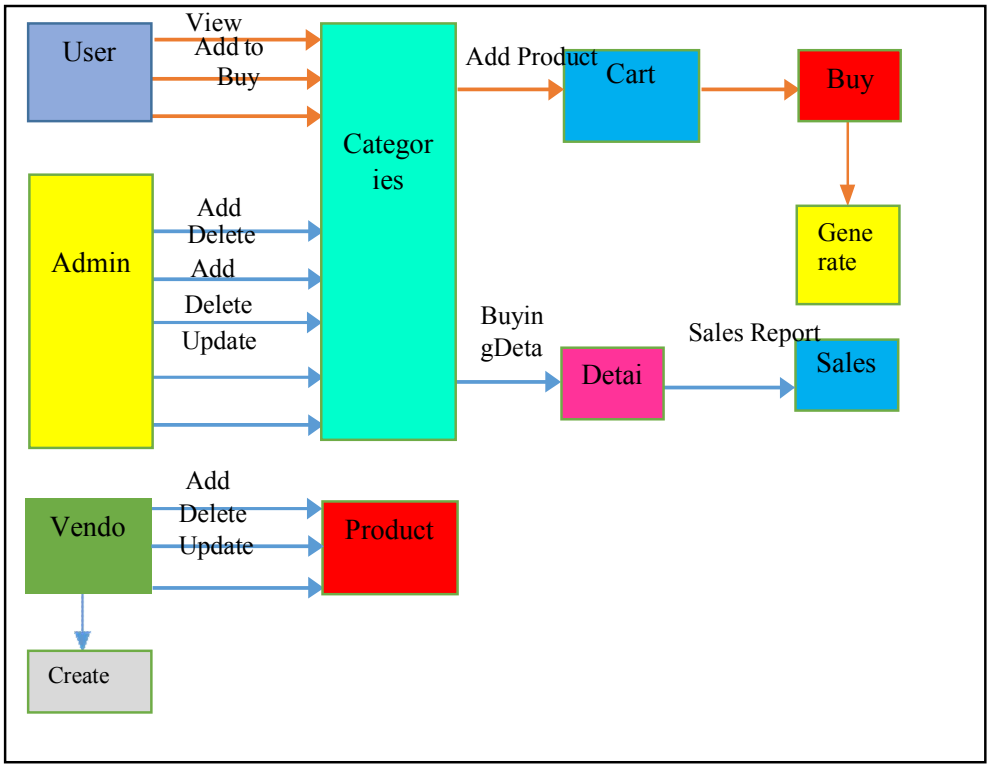


Fig 1. System Block Diagram

VIII. DESIGN AND DEVELOPMENT

Now in the figure 2 we have the another system architecture which show that how the website works when uservisit it.When user goes to the website then he or she will have two choices i.e.; if user already has an account then he will be able to sign in or log in otherwise he will have to first register on the website and after this he can login.After registering process the user will be taken directly to the categories and items page where he can surf around the website , purchase products and also view the complete detail of the product and add product tothe cart for later process.

There is a search bar for searching for a product.There is a option to view the cart, add products in it and delete products from cart when not needed.There is also a section for the user which can be used by the user to contactthe admin for the review and query purpose.After successfully purchasing the product the user will get a reciepton his mail having all details about the product and transaction process.

The website also provides a Know Your Plant section where you can get all the details related to the plant.Many people are not aware about the plant and how to take care of the plant so to help such people this section is helpful.

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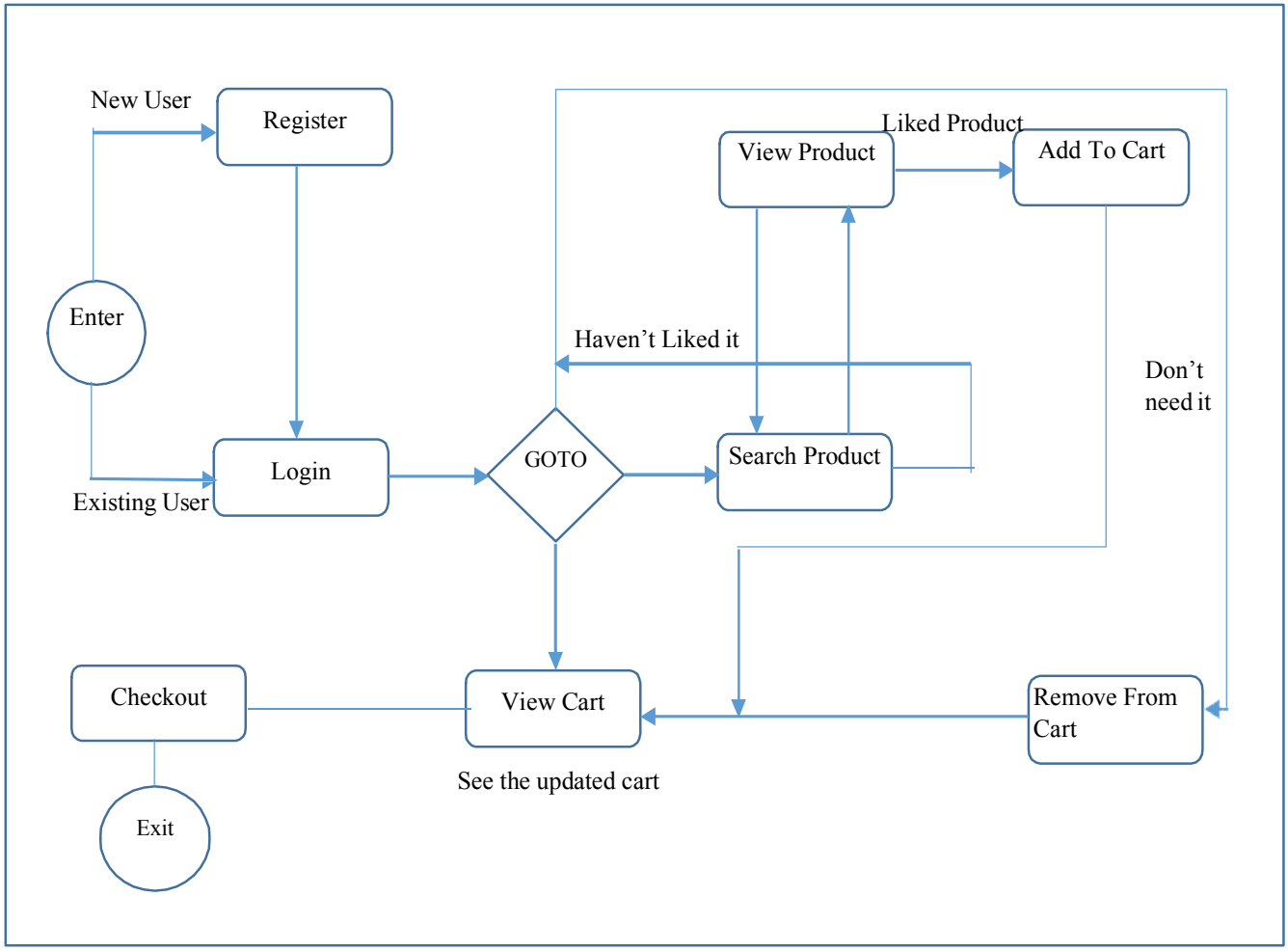


Fig 2 The System Architecture

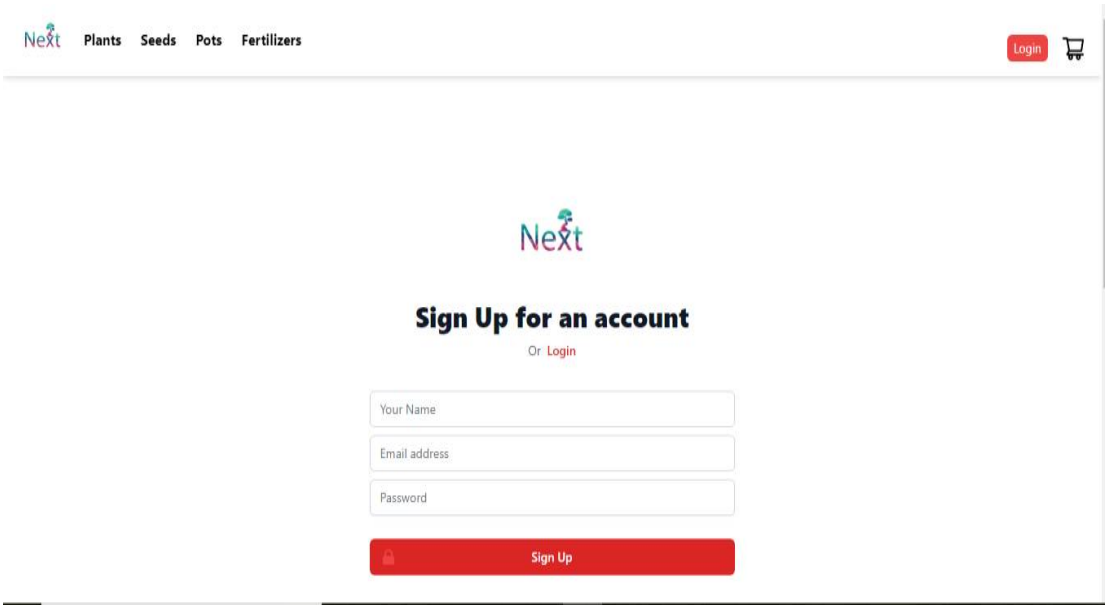


Fig 3. Registration Form

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Figure 3 represents the registration form for the new user.User first have to register for making anypurchase.User will have to fill up his full name, email id and settting up a strong password.

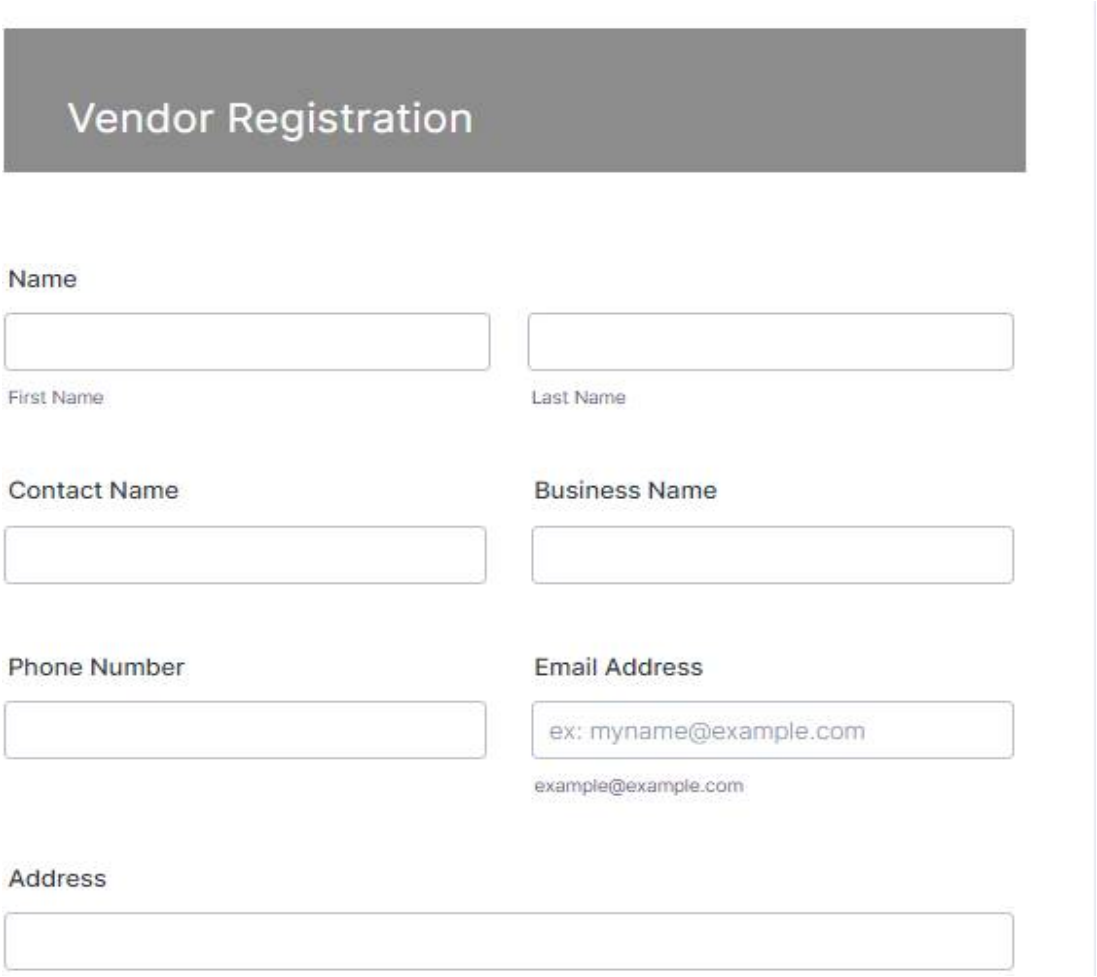


Fig 4. Vendor Registration

Figure 4 shows the vendor registration form. The nursery vendor can register with this form on our website togrow his business.The vendor can reach to a wider market by using this site.

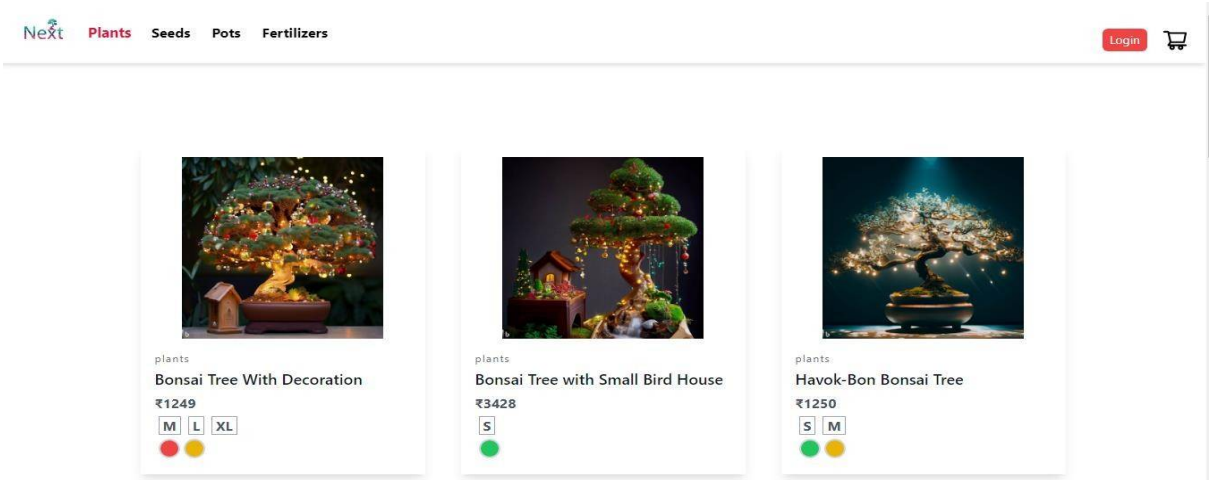


Fig 5. Product Page

Figure 5 shows the product page which is used to see all available plants on the platform.



Fig 6. Product Detail Page

Figure 6 shows the product detail page.On clicking on a partiular product user will be able to buy a product oradd product to the cart.

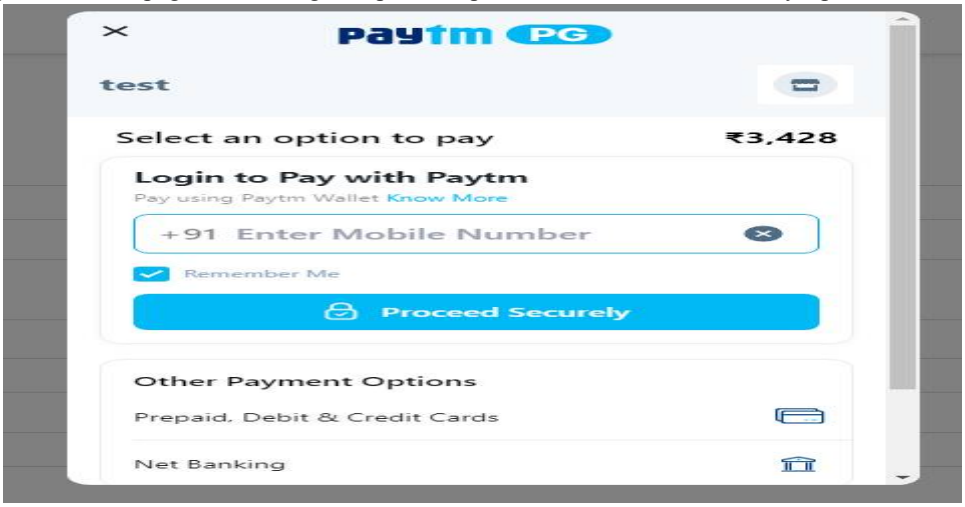


Fig 7. Payment Gateway

Figure 7 shows the payment gateway for complete the purchasing process. User can pay with UPI, Netbankingor can use cards to pay.

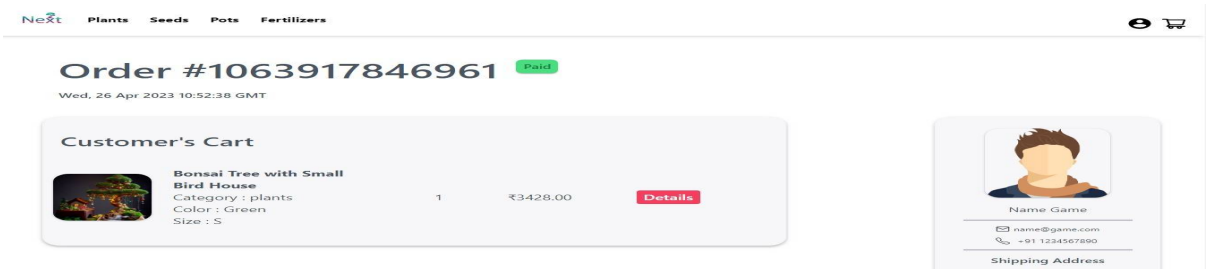


Fig 8. Payment Receipt

Figure 8 shows the payment receipt which is generated after successful payment and can be find in user accountsection.

IX. TECHNOLOGY USEDNEXT JS

Next.js is a popular open-source framework built on top of React.js, a JavaScript library for building user interfaces. It allows developers to build server-side rendered (SSR) web applications, static websites, and hybridapplications that combine both SSR and static generation.

One of the key benefits of Next.js is its performance optimization features. It provides automatic code splitting, prefetching, and client-side rendering (CSR) for faster page loads and improved user experience. It also offers built-in support for popular features like SEO optimization, internationalization, and dynamic imports.

Next.js is highly flexible and can be used with a wide range of technologies and platforms. It has a large andactive community that continuously contributes to the framework's development and offers a wealth of resources, tools, and plugins to help developers get started quickly.

Overall, Next.js is a powerful tool for building modern web applications and offers a lot of advantages over traditional web development approaches.

A. HTML

HTML stands for Hypertext Markup Language, and it is the standard markup language used for creating web pages and applications. HTML is a markup language because it uses a series of tags to describe the structure andcontent of a document.

B. CSS

CSS stands for "Cascading Style Sheets." It is a coding language used in web development to define the look and formatting of HTML elements on a web page. CSS allows developers to separate the design and layout of awebsite from its content, which makes it easier to maintain and update the website. With CSS, developers can create rules that define how different HTML elements, such as text, images, and buttons, should be displayed, including things like font size, color, and spacing. CSS is a fundamental technology in modern web design and is widely used in conjunction with HTML and JavaScript to create interactive and visually appealing websites.

C. TAILWIND

Tailwind is a CSS framework that provides a set of pre-designed classes to simplify the process of styling web pages. It is particularly useful for building responsive and mobile-first websites, as it includes a number of features that allow developers to easily create layouts that adapt to different screen sizes and devices.

One of the key features of Tailwind is its utility-first approach to CSS. Instead of relying on traditional CSS classes that are used to define specific styles for individual elements, Tailwind provides a large set of single-purpose classes that can be combined and reused to create complex layouts and designs.

D. JAVASCRIPT

JavaScript is a high-level, interpreted programming language that is used to create dynamic and interactive websites. It is a client-side scripting language, which means that it runs on the user's computer rather than on theserver. JavaScript is widely used in web development for creating interactive user interfaces, animating elements on a web page, and validating user input.

E. MongoDB

MongoDB is a popular NoSQL document-oriented database management system. It is designed to handle large amounts of data, especially unstructured data, and to be highly scalable and flexible.

In MongoDB, data is stored in JSON-like documents, which allows for more flexible and dynamic data modeling than traditional relational databases. MongoDB uses a query language called the MongoDB QueryLanguage (MQL), which is similar to SQL but is designed specifically for querying JSON documents.

F. Node JS

Node.js is an open-source, cross-platform, JavaScript runtime environment that allows developers to executeJavaScript code outside of a web browser. Node.js is built on the V8 JavaScript engine, which is the same engine used by the Google Chrome browser.

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Node.js enables developers to build server-side applications using JavaScript, which allows for a more seamless development process between the front-end and back-end of an application. With Node.js, developers can build scalable and high-performance applications, handle thousands of simultaneous connections, and easily integrate with other technologies and services.

Node.js has a large and active developer community and is used by many companies and organizations, including LinkedIn, PayPal, and Walmart. It is particularly popular for building real-time applications such as chat applications, online gaming, and social networks. Node.js is also used for building web servers, APIs, command-line tools, and desktop applications.

X. CONCLUSION

in this discourse we have built a method which will allows the users to buy plants without visiting the outside shop.It will be very useful for the customer as well as for the vendors.This will provide the good quality plants and other nursery related items on a genuine price.The users will also get the information related to caring tips for the plants.The users can buy seeds as well as fertilizer from the application. The customer can buy product anytime , anywhere from the application. Our website gives the features to browse before they buy the products also research the products so the customers are confident about what they buy.This web application also provides the online payment system with secure transactional methods. Many vendors can register on this portaland can sell their nursery products to a large marketplace.

XI. FUTURE SCOPE

The future scope of online nurseries is quite promising as more and more people are becoming interested in gardening and landscaping. Here are a few potential areas of growth for online nurseries:

1) Enhanced Customer Experience: With the advancement of technology, online nurseries can offer an enhanced customer experience by providing personalized recommendations, 3D virtual tours of gardens, and AI-powered chatbots to help customers with their gardening needs.
2) Eco-Friendly Products: As environmental concerns grow, online nurseries can differentiate themselves by offering eco-friendly products such as organic fertilizers, compost, and biodegradable pots.
3) Sustainability: Online nurseries can leverage technology to increase sustainability and reduce their carbon footprint. For example, using drones to monitor plant health, implementing efficient irrigationsystems, and using renewable energy sources.
4) Subscription-Based Services: Subscription-based services can be introduced where customers can receive regular deliveries of plants and gardening supplies, making it easier for them to maintain theirgardens.
5) Educational Content: Online nurseries can create and share educational content such as tutorials, webinars, and blog posts to educate customers on gardening techniques, plant care, and landscaping.
6) Collaborations: Online nurseries can collaborate with landscape architects, interior designers, and other experts in the field to offer customized solutions for customers.
7) Global Market Reach: Online nurseries can expand their market reach by offering international shipping and selling exotic plants that are not readily available locally.

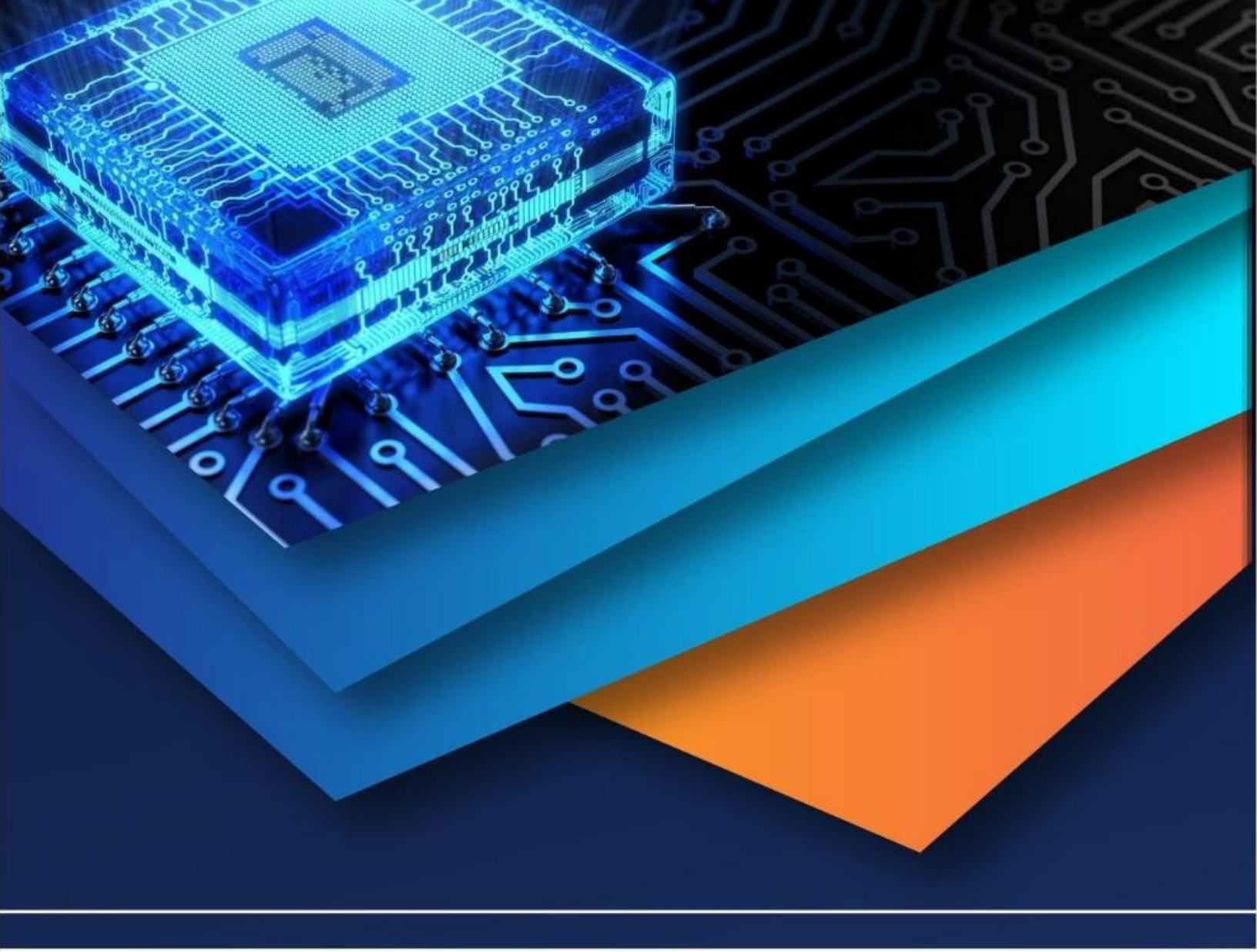
XII. ACKNOWLEDGEMENT

We acknowledge and express our profound sense of gratitude towards all the authors of research papers whose contribution in this field helped us to prepare our paper. We thank all those who have contributed towards preparation of the same. We thank the developers which helped in developing block diagrams, circuit diagramsand platforms.

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