BAYMART

A PROJECT REPORT

Submitted by

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DECLARATION

I undersigned hereby declare that the project report on **BAYMART**, submitted for partial fulfillment of the requirements for the award of degree of Master of Computer Applications of the APJ Abdul Kalam Technological University, Kerala is a bonafide work done by me under supervision of Dr. Fousia M Shamsudeen. This submission represents my ideas in my own words and where ideas or words of others have been included,I have adequately and accurately cited and referenced the original sources. I also declare that I have adhered to ethics of academic honesty and integrity and have not misrepresented or fabricated any data or idea or fact or source in our submission. I understand that any violation of the above will be a cause for disciplinary action by the institute and/or the University and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been obtained. This report has not previously served as the basis for the award of any degree, diploma, or similar title by any other University.

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CERTIFICATE

This is to certify that the report entitled **BAYMART** submitted by **SREELAYA VISHAL** (TKM21MCA-2037) to the APJ Abdul Kalam Technological University in partial fulfillment of the Masters degree in Computer Applications is a bonafide record of the project work carried out by her under our guidance and supervision. This report, in any form, has not been submitted to any other University or Institute for any reason.

Internal Supervisor | Head of the Department | External Examiner

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ABSTRACT

BAYMART With a wide range of agricultural products to choose from and a focus on the sale of Bayer's premium seeds, fertilisers, and pesticides, BayMart is a remarkable e-commerce platform. Customers can quickly browse, compare, and buy Bayer's renowned agricultural goods from the convenience of their homes or offices thanks to our user-friendly portal.

Our vast product catalogue at BayMart features a wide variety of seed kinds that are suitable for various crops, climatic settings, and growing circumstances. We offer a large variety of fertilisers designed to suit different nutritional needs and encourage strong, healthy plant development. Additionally, our platform provides a wide range of Bayer pesticides, offering efficient treatments for eradicating weeds, diseases, and pests.

BayMart offers thorough product descriptions, user evaluations, and ratings to help consumers make well-informed decisions. We give top consideration.

The innovative e-commerce portal BayMart acts as a one-stop shop for amateur and professional farmers looking for Bayer's top-notch seed, fertiliser, and pesticide options. Customers can quickly browse, compare, and buy a variety of high-quality items from Bayer, a reputable brand in the agriculture sector.

Our platform is made to offer a seamless buying experience, allowing customers to easily browse a wide variety of seed varieties suitable for various crops, climatic conditions, and growing circumstances. Additionally, BayMart provides a wide variety of fertilisers to meet various dietary requirements and encourage the best possible plant development and output. Customers can also discover a wide range of Bayer's insecticides, which offer efficient defence against pests, diseases, and weeds to protect crops.

Contents

List of Figures

Chapter 1

Introduction

The agricultural industry plays a vital role in sustaining our global food supply and supporting the livelihoods of millions of people. In this modern era, technology has transformed the way we approach farming and introduced innovative solutions to maximize crop yields and ensure sustainable practices. BayMart is an innovative e-commerce platform that aims to revolutionize the agricultural landscape by providing a convenient and comprehensive online marketplace for Bayer's premium seed, fertilizer, and pesticide products.

BayMart is a one-stop destination for agricultural enthusiasts, professionals, and farmers who are seeking reliable and high-quality agricultural inputs. As an authorized distributor of Bayer's renowned agricultural solutions, BayMart offers a diverse range of seed varieties, fertilizers, and pesticides to cater to the diverse needs of farmers across different crop types, climates, and growing conditions. With BayMart, customers can now access and purchase these products directly from the comfort of their homes or offices, saving time and effort.

The foundation of successful farming lies in selecting the right seeds, providing optimal nutrition through fertilizers, and safeguarding crops from pests, diseases, and weeds using effective pesticides. BayMart recognizes the importance of these factors and ensures that customers have access to Bayer's top-quality products. With a user-friendly interface and intuitive browsing options, customers can easily explore the extensive product catalog, compare different options, and make informed decisions based on detailed product descriptions, customer reviews, and ratings.

At BayMart, we prioritize customer satisfaction and strive to provide a seamless shopping experience. We understand the value of timely product delivery, and our efficient logistics network ensures that products reach customers in a prompt and reliable manner. Additionally, our commitment to sustainability aligns with Bayer's vision of responsible agricultural practices. We promote the use of Bayer's innovative solutions that minimize environmental impact and foster a healthier agricultural ecosystem.

In this era of digital transformation, BayMart stands at the forefront of revolutionizing the

way agricultural inputs are procured. By offering a comprehensive range of Bayer's seed, fertilizer, and pesticide products, coupled with exceptional customer service, BayMart aims to empower farmers, support sustainable farming practices, and contribute to the overall growth and success of the agricultural industry.

In the subsequent sections, we will delve deeper into the specific offerings of BayMart, highlighting the wide array of seed varieties, fertilizers, and pesticides available, and the benefits they bring to farmers. We will also showcase our commitment to customer satisfaction and sustainable agriculture, emphasizing how BayMart is poised to become the go-to e-commerce platform for all agricultural needs.

1.1 Existing System

Before the advent of BayMart, farmers and agricultural professionals faced various challenges when it came to procuring Bayer's seed, fertilizer, and pesticide products. The traditional method of purchasing agricultural inputs involved visiting physical stores, contacting local distributors, or relying on intermediaries. This process often proved time-consuming and inefficient, leading to delays in obtaining the necessary products for farming operations.

Farmers were limited in their choices as they had to rely on the availability of products in local stores or through limited distributors. This restricted their access to a diverse range of seed varieties, fertilizers, and pesticides tailored to their specific crop requirements and environmental conditions. Furthermore, the lack of comprehensive information about product specifications, performance, and customer reviews made it challenging for farmers to make informed decisions.

The traditional system also posed logistical challenges, especially for farmers located in remote areas or those with limited access to agricultural supply stores. Shipping and distribution processes were often slow and unreliable, leading to delays and potential disruptions in the timely delivery of essential agricultural inputs.

Moreover, the traditional system did not emphasize sustainability or environmental responsibility. Farmers had limited exposure to innovative and sustainable farming practices promoted by Bayer, as these were not readily accessible or readily available through traditional channels.

Overall, the existing system presented several drawbacks, including limited product availability, lack of comprehensive information, inefficiency in procurement processes, and inadequate support for sustainable farming practices. These challenges prompted the need for a modernized solution that would address these shortcomings and empower farmers with easy access to Bayer's agricultural products.

BayMart emerged as a game-changer in the agricultural industry by revolutionizing the way farmers procure seed, fertilizer, and pesticide products. Through its online platform, BayMart has eliminated many of the limitations and challenges associated with the traditional system. Farmers now have a streamlined and efficient means to explore, compare, and purchase a wide range of Bayer's agricultural solutions, all in one place.

1.2 Proposed System

The proposed system, BayMart, is an advanced e-commerce platform specifically designed to cater to the needs of farmers and agricultural professionals seeking Bayer's seed, fertilizer, and pesticide products. BayMart aims to revolutionize the way agricultural inputs are procured, offering a seamless and comprehensive online shopping experience with a range of innovative features.

1. Extensive Product Catalog: BayMart provides an extensive catalog of Bayer's seed varieties, fertilizers, and pesticides. Farmers can easily browse through a wide selection of products specifically tailored to different crop types, climates, and growing conditions. This ensures that farmers have access to the right agricultural inputs for their specific needs.

2. User-Friendly Interface: BayMart boasts a user-friendly interface that makes it easy for farmers to navigate and explore the available products. The platform's intuitive design allows for efficient browsing, filtering, and comparison of different products, enabling farmers to make informed decisions.

3. Detailed Product Information: Each product listed on BayMart comes with comprehensive descriptions, including specifications, usage instructions, and application recommendations. This detailed information empowers farmers to understand the product's features, benefits, and compatibility with their farming practices.

4. Customer Reviews and Ratings: BayMart incorporates a customer review and rating system, where farmers can share their experiences and insights on the products they have purchased. This valuable feedback assists other farmers in making well-informed decisions based on the real-world experiences of their peers.

5. Convenient Purchasing Process: BayMart simplifies the purchasing process, allowing farmers to add desired products to their cart, securely place orders, and make payments online. The platform supports multiple payment options, ensuring a hassle-free transaction process.

6. Prompt and Reliable Delivery: BayMart understands the importance of timely delivery in the agricultural sector. The platform works in collaboration with efficient logistics partners to ensure that products are delivered promptly to farmers' doorsteps. This minimizes delays and disruptions in farming operations.

7. Sustainable Farming Practices: BayMart promotes sustainable farming practices by offering Bayer's innovative solutions that contribute to environmental responsibility. Farmers

can access and utilize products that minimize the impact on the environment while maximizing crop productivity and yield.

8. Customer Support: BayMart provides dedicated customer support to address any queries or concerns that farmers may have regarding the products or the ordering process. Prompt assistance ensures a smooth and satisfactory shopping experience.

By introducing BayMart, the proposed system aims to overcome the limitations of the traditional system, offering farmers a convenient, efficient, and reliable means of procuring Bayer's seed, fertilizer, and pesticide products. With its user-friendly interface, extensive product range, detailed information, and commitment to sustainability, BayMart empowers farmers, supports their farming endeavors, and drives agricultural productivity and success.

1.3 Objectives

Project deliverable includes:

- Provide Convenient Access.
- Diversify Product Range.
- Enhance Information Availability.
- Promote Sustainability.
- Ensure Customer Satisfaction.
- Foster Knowledge Sharing.
- Streamline Procurement Processes.

1.4 Company Profile

Bayer CropScience serves farmers and consumers across the globe. The company's manufacturing site for drying and processing station is located in Hyderabad and breeding stations at Bengaluru and Udaipur, India. It also has an agrochemical production manufacturing site located at Himatnagar and Silvassa, India. The company markets its products in India, Germany and others.

1.4.1 Products

- **Seeds**

  Crop-specific seeds: Bayer provides a diverse range of seeds for various crops, including corn, soybeans, wheat, cotton, canola, rice, vegetables, and fruits. These seeds are developed through extensive research and breeding programs to ensure improved traits, disease resistance, and higher yields.

- **Crop Protection Products**

  Herbicides: Bayer offers a comprehensive portfolio of herbicides designed to control and manage weeds effectively. These products target both broadleaf and grassy weeds,

providing farmers with options to protect their crops. Insecticides: Bayer's insecticides are formulated to combat a wide range of damaging insects, including chewing and sucking pests. These products help protect crops from insect-related yield losses and diseases. Fungicides: Bayer's fungicides provide effective disease control

- **Climate FieldView™**

  This app allows farmers to collect, store, and visualize field data, including planting, harvest, and yield information. It helps farmers make data-driven decisions, optimize inputs, and monitor field performance.

- **WeedScout**

  This app assists farmers in identifying and managing weeds effectively. It provides information on different weed species, their characteristics, and recommended herbicides for control.

1.4.2 Services

- **Crop Solutions and Consultancy**

  Bayer offers tailored crop solutions and consultancy services to help farmers maximize their yields and optimize crop performance. These services include crop management recommendations, agronomic advice, and customized solutions based on specific farming conditions.

- **Training and Educational Programs**

  Bayer conducts training programs and educational initiatives to equip farmers with the knowledge and skills necessary for modern farming practices. These programs cover a wide range of topics, including crop protection, sustainable agriculture, integrated pest management, and responsible use of agricultural inputs.

- **Digital Farming Solutions**

  Bayer leverages digital technologies and data-driven solutions to support farmers in making informed decisions. Digital farming tools, such as field monitoring systems, predictive analytics, and farm management software, help farmers optimize input usage, monitor crop health, and enhance overall farm productivity.

- **Disease and Pest Diagnostic Services**

  Bayer provides disease and pest diagnostic services to identify and diagnose crop diseases, pests, and weed-related issues. These services assist farmers in implementing appropriate control measures and selecting the most effective crop protection solutions.

- **Environmental Stewardship and Sustainability Programs**

  Bayer is committed to promoting environmental stewardship and sustainable agriculture. The company engages in sustainability initiatives, collaborates with stakeholders, and develops programs that focus on responsible use of agricultural inputs, biodiversity conservation, soil health, and water resource management.

Chapter 2

Literature Survey

Analysing academic materials pertinent to a given subject is the focus of a literature survey, sometimes referred to as a literature review. It offers a thorough analysis of the status of the topic by looking at the literature, allowing you to spot pertinent ideas, methods, and gaps in the body of knowledge. The evaluation of the pertinent literature is the primary concern when performing a literature review from an audit viewpoint. This procedure comprises material published in a certain subject of study as well as occasionally information published within a particular time range. The literature review is a crucial research technique and is usually used as a jumping-off point for exploring a certain topic area. A literature review can highlight areas where more study is required, as well as essential theories and concepts, as well as knowledge gaps in the field. A literature study can offer a more thorough grasp of a particular topic or issue by examining a number of sources. Because it shows that the author is knowledgeable on the most recent studies and arguments in the subject, a well-written literature review may also increase the author's authority and credibility. A meta-analysis, which entails examining the results of several studies to detect common patterns or trends, may occasionally be included in a literature review.

2.1 Purpose of the Literature Review

1. An overview and analysis of the body of knowledge on a given subject are provided in a literature review.

2. It aims to identify key theories, concepts, and findings, as well as to evaluate the strengths and weaknesses of previous studies.

3. A survey of the available literature can assist in identifying knowledge gaps and highlighting areas that require more study.

4. By examining multiple sources, a literature review can provide a more comprehensive

understanding of a particular topic or issue.

5. Additionally, a well-written literature review can help to establish the credibility and authority of the author, as it demonstrates their familiarity with the current research and debates in the field.

6. A literature review can be a standalone piece or part of a larger research project such as a thesis, dissertation, or research paper.

2.2 Related Works

2.2.1 E-Commerce

E-commerce, also known as electronic commerce or internet commerce, refers to the exchange of money and data for the purpose of business operations through the internet. The term "ecommerce" is commonly used to refer to the online sale of tangible goods, but it may also refer to any type of commercial transaction made possible via the internet. It is nowadays one of the most important components of the internet. Electronic commerce is the process of conducting business using computer networks. An individual sitting in front of a computer may use all of the Internet's resources to purchase or sell things. E-commerce, which began in the early 1990s, has made enormous strides in the world of computers. B2B e-commerce is used to increase the usage of ecommerce in developing nations by enhancing access to global markets for enterprises in developing countries. Regardless of the rapid growth of technology, e-commerce has reached its apex. This article proposes a novel application concept. It describes the public's needs for M-Commerce, as well as the analysis and literacy survey of essential components of mobile devices that use such apps. The design and security of the application are both carefully studied. This study examines the characteristics and possibilities of a mobile E-app for selling and purchasing fresh vegetables. The outcomes demonstrate how the application has impacted the public, employment, and long-term growth.[1]. Social e-commerce, as a new concept of e-commerce, uses social media as a new prevalent platform for online shopping. Users are now able to view, add to cart, and buy products within a single social media app. In this paper, we address the problem of cross-platform recommendation for social ecommerce, i.e., recommending products to users when they are shopping through social media. To the best of our knowledge, this is a new and important problem for

all e-commerce companies (e.g., Amazon, Alibaba), but it has never been studied before. Existing cross-platform and social-related recommendation methods cannot be applied directly to this problem since they do not co-consider the social information and the cross-platform characteristics together. To study this problem, we collect two real-world datasets from social e-commerce services. We first investigate the heterogeneous shopping behaviors between traditional e-commerce app and social media. Based on these observations from data, we propose CROSS (Cross-platform Recommendation for Online Shopping in Social Media), a recommendation framework utilizing not only user-item interaction data on both platforms, but also social relation data on social media. The framework is general, and we propose two variants, CROSS-MF and CROSS-NCF. Extensive experiments on two real-world social e-commerce datasets demonstrate that our proposed CROSS significantly outperforms existing state-of-the-art methods. Social e-commerce is a new concept of e-commerce that uses social media as a platform for online shopping. Cross-platform recommendation is the problem of recommending products to users when they are shopping through social media. Existing cross-platform and social-related recommendation methods cannot be applied directly to this problem since they do not co-consider the social information and the cross-platform characteristics together. We propose CROSS, a recommendation framework that utilizes both user-item interaction data on both platforms and social relation data on social media. We conduct extensive experiments on two real-world social e-commerce datasets and show that CROSS significantly outperforms existing state-of-the-art methods.[2]. Currently, booking airline tickets through online platforms is more popular than buying from travel agents, especially for Indonesian Gen Z, who were born and grew up with technology. However, research on the adoption of online platforms has been conducted separately for e-commerce and airline applications. This study aims to analyze both. This study found that UTAUT 2 is a successful model for analyzing consumer adoption behavior. The results showed that the adoption value for e-commerce was higher than airline applications, at 4.38 and 1.62, respectively. However, all respondents had used both types of platforms, albeit with different frequencies. The descriptive analysis of each instrument showed that the "Price Value" factor is the most prominent for airline applications, and the "Habit" factor is the most powerful for e-commerce. These results can be used by stakeholders to improve the quality of their services. UTAUT 2 is a successful model for analyzing consumer adoption behavior. UTAUT 2 is a theory of acceptance and use of technology that was developed in 2009. It is a comprehensive model

that takes into account a variety of factors that influence consumer adoption of technology, including performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioral intention. The results of this study support the validity of UTAUT 2 as a model for understanding consumer adoption of online platforms. The adoption value for e-commerce was higher than airline applications. This finding suggests that consumers are more likely to adopt e-commerce platforms than airline applications. There are a number of possible explanations for this finding. One possibility is that e-commerce platforms offer a wider range of products and services than airline applications. Another possibility is that ecommerce platforms are easier to use than airline applications. Finally, it is also possible that consumers are more familiar with e-commerce platforms than airline applications. All respondents had used both types of platforms, albeit with different frequencies. This finding suggests that consumers are using both online platforms and travel agents to book airline tickets. This is likely due to the fact that each type of platform has its own advantages and disadvantages. For example, online platforms may offer lower prices, while travel agents may offer more personalized service. The "Price Value" factor is the most prominent for airline applications. This finding suggests that price is a key factor in consumers' decision to use airline applications. This is likely due to the fact that airline tickets can be expensive. Consumers may be more likely to use an airline application if it offers lower prices. The "Habit" factor is the most powerful for e-commerce. This finding suggests that habit is a key factor in consumers' decision to use e-commerce platforms. This is likely due to the fact that ecommerce platforms are often used for everyday purchases. Consumers may be more likely to use an e-commerce platform if they are already familiar with it and if they have a positive experience using it.[3].

2.2.2 Mobile e-Commerce Technology

With the evolution of mobile networks from 2.5G to 3G, the development of e-commerce to mobile e-commerce has contributed to the fact that mobile e-commerce will be an important part of future mobile applications. This paper introduces in detail the advantages and disadvantages of core technologies that have appeared in recent years that support the development of mobile ecommerce, and analyzes the mobile e-commerce system based on the J2ME development platform, which provides Internet Protocol support such as HTTP and TCP and ensures that communication terminals can steadily and reliably access all information on the Internet. Further studies will focus on the security problems that generally exist in

the mobile e-commerce system and the solutions to these problems. Mobile e-commerce is becoming increasingly important as mobile networks evolve. There are a number of core technologies that support the development of mobile e-commerce. The J2ME development platform is a popular choice for developing mobile e-commerce applications. Mobile e-commerce systems face a number of security challenges. Further research is needed to address these security challenges.[4]. Due to the rapid increase of mobile users and the in-depth development of mobile communication technology, mobile e-commerce has developed rapidly. A hundred billion industry ecosystem is becoming visible. It is one of the hottest applications for transactions in today's retail industry. In this paper, we mainly describe some important issues in the mobile commerce ecosystem. First, we explain what is mobile e-commerce ecosystem, then analyze its participants, elaborate on the hierarchical relationship beyond the participants, and finally analyze the growth model of mobile ecommerce from the perspective of the ecological angle that launches its evolution path. The purpose is to understand how mobile e-commerce evolves. Mobile e-commerce is a rapidly growing industry. Mobile e-commerce has a significant impact on the retail industry. The mobile e-commerce ecosystem is complex and has many participants. The growth of mobile e-commerce is driven by a number of factors, including the increasing number of mobile users and the development of mobile communication technology. The future of mobile e-commerce is promising and has the potential to revolutionize the retail industry.[5].

2.2.3 Rest Api

A REST API (Representational State Transfer API) is an application programming interface (API) that conforms to the constraints of the REST architectural style. REST stands for representational state transfer and was created by computer scientist Roy Fielding. REST APIs are used to expose functionality of a software application or web service to other software applications. They are typically used to transfer data between clients and servers. REST APIs are based on the following principles which are resources, Everything in a REST API is a resource. A resource can be a physical object, such as a customer or an order, or it can be an abstract concept, such as a transaction or a report. URIs, Each resource is identified by a unique URI (Uniform Resource Identifier). URIs are used to access resources in a REST API. HTTP verbs,REST APIs use HTTP verbs to define the actions that can be performed on resources. The most common HTTP verbs are GET, POST, PUT, and DELETE. Hypermedia,

REST APIs use hypermedia to allow clients to navigate between resources. Hypermedia is typically provided in the form of links in the response body. The DREST architectural style has become a popular choice for distributed resources, such as the northbound API of software-defined networking (SDN). However, as services often change and update frequently, the corresponding REST APIs need to change and update accordingly. This can be a challenge, as it can break clients that are expecting a specific API structure. To address this issue, this paper proposes a new approach to designing REST APIs that are more flexible and extensible. The proposed approach uses a Petri-Net-based framework called REST Chart to describe the structure of the API. REST Chart makes it easy to add new resources and relationships to the API without breaking existing clients. The proposed approach also includes a client-side differential cache mechanism to reduce the overhead of hypertext-driven navigation. The cache mechanism stores a copy of the API structure on the client, which can be used to quickly look up resources and relationships. This reduces the number of requests that need to be made to the server, which can improve performance. The proposed approach has been evaluated in a number of SDN applications. The results show that the proposed approach can reduce the overhead of hypertext-driven navigation by up to 66 percentage, while still maintaining the desired flexibility and extensibility of the REST API. Flexibility: REST Chart makes it easy to add new resources and relationships to the API without breaking existing clients. Extensibility: REST Chart is a general-purpose framework that can be used to design REST APIs for a wide variety of distributed resources. Performance: The client-side differential cache mechanism can reduce the overhead of hypertextdriven navigation by up to 66 percentage.[6].

2.2.4 RestAPI Authentication

REST API authentication is the process of verifying the identity of a user or client before granting access to an API. Authentication is typically done by requiring the user to provide some form of credentials, such as a username and password,token. There are a variety of authentication methods that can be used with REST APIs. Some of the most common methods include:Basic authentication,Basic authentication is the simplest form of authentication. It requires the user to provide a username and password in the HTTP request header. API keys, API keys are a more secure form of authentication than basic authentication. They are typically generated by the API provider and assigned to each user or client. API keys are used to identify the user or client in the HTTP request header. OAuth, OAuth is a popular authorization

framework that can be used to grant access to REST APIs. OAuth allows users to grant access to an API without having to share their username and password. Mobile applications that use a client-server system need an Application Programming Interface (API) to communicate with each other. Security is important for communication over a network, and encryption methods can be used to provide security. Message Digest 5 (MD5) and Secure Hashing Algorithm 1 (SHA1) are two encryption algorithms that are often used in this case. This study aims to compare the performance of these two algorithms. The Wireshark application was used to retrieve authentication data. The authentication data was then encrypted and tested using the Hashcat tools' brute force attack. The time it took for the REST API Authentication process to complete was also measured for each algorithm using the Postman application. The SHA1 encryption algorithm has the advantage of being stronger, but it takes longer to encrypt data than the MD5 algorithm. However, the difference in encryption time is only 37.1 milliseconds, so SHA1 is still considered a viable option for implementing security systems and REST API authentication in mobile applications. MD5 is faster than SHA1, but SHA1 is more secure. The difference in encryption time between MD5 and SHA1 is only 37.1 milliseconds. SHA1 is still considered a viable option for implementing security systems and REST API authentication in mobile applications.[7].

2.2.5 Springboot

Spring Boot is a popular Java framework for building web and enterprise applications. It makes it easy to create and deploy stand-alone, production-grade Spring applications with very little Spring configuration. Spring Boot also offers simpler dependency management and a range of additional features that are common across many projects. This paper discusses how the Atmospheric Radiation Measurement (ARM) Data Center (ADC) at Oak Ridge National Laboratory is using Spring Boot to create a SOA-based REST service API. This API bridges the gap between frontend user interfaces and backend databases. Using this API, ARM scientists are now able to submit reports via a user form or a command line interface. This captures the same data quality or other important information about ARM data. The paper begins by providing an overview of Spring Boot and SOA. It then discusses how ARM is using Spring Boot to create a REST service API. The paper concludes by discussing the benefits of using Spring Boot for SOA development. Here are some of the key benefits of using Spring Boot for SOA development: Ease of use: Spring Boot makes it easy to create and deploy

SOA applications with very little Spring configuration. Flexibility: Spring Boot is a flexible framework that can be used to create a wide variety of SOA applications. Scalability: Spring Boot is a scalable framework that can be used to create SOA applications that can handle a large number of requests. Security: Spring Boot provides a number of security features that can be used to protect SOA applications from unauthorized access. Overall, Spring Boot is a powerful and versatile framework that can be used to create SOA applications that are easy to use, flexible, scalable, and secure.[8]. The Bureau of Retired Veteran Cadres (BRVC) is a government agency that serves and manages retired veteran cadres. The BRVC faces challenges such as complex management processes and low efficiency in work execution. The application of Internet technology to the BRVC can effectively solve these challenges. This paper proposes to use the SpringBoot framework to develop a customized information system for the BRVC. The system will be based on the microservice architecture and will use Mybits, Redis, and other technologies. The system will effectively solve the problem of the difficulty of refined management of BRVC information. It will also meet the requirements of multi-terminal access, frontend separation, multi-function, low coupling, high cohesion, and easy scalability. The proposed system will have a number of benefits, including:Increased efficiency: The system will automate many of the BRVC's manual processes, which will free up staff to focus on more strategic tasks. Improved accuracy: The system will reduce the risk of errors by automating data entry and validation. Improved transparency: The system will provide real-time data access to BRVC staff, which will help them to make better decisions. Improved customer service: The system will make it easier for retired veteran cadres to access services and information. The proposed system is a valuable tool that will help the BRVC to improve its efficiency, accuracy, transparency, and customer service. The system will be developed using the SpringBoot framework, which is a popular framework for developing Java-based microservices. The system will use Mybits, a popular NoSQL database, to store data. The system will use Redis, a popular in-memory data store, to cache data. The system will be designed to be scalable, so that it can be easily adapted to meet the changing needs of the BRVC.[9].

2.2.6 Java

Java is a general-purpose, class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible. It is a compiled language and

not an interpreted language. Java applications are typically compiled to bytecode that can run on any Java Virtual Machine (JVM) regardless of the underlying computer architecture. The syntax of Java is similar to C and C++, but has fewer low-level facilities than either of them. Java was originally developed by James Gosling at Sun Microsystems. It was released in May 1995 as a core component of Sun Microsystems' Java platform. Java is one of the most popular programming languages in the world. It is used to develop a wide variety of applications, including web applications, mobile applications, desktop applications, and enterprise applications.Optimizing the performance of Java programs is an important task for developers. By minimizing the time and space complexity of a program, developers can improve the performance of their applications. There are a number of techniques that can be used to optimize the performance of Java programs. Some of these techniques include: Using efficient algorithms and data structures Avoiding unnecessary object creation Reducing the number of method calls Using caching Optimizing the garbage collector The proposed model in the paper is a tool that can help developers to optimize the performance of their Java programs. The tool provides a number of features that can help developers to identify and fix performance bottlenecks. The paper also presents the results of an experiment that was conducted to evaluate the effectiveness of the proposed model. The experiment showed that the model was able to significantly improve the performance of the Java programs that were tested. The proposed model is a valuable tool that can help developers to optimize the performance of their Java programs. The tool is easy to use and can be used to improve the performance of a wide variety of Java programs. The model is a Java application that can be used to analyze Java programs. The model provides a number of features that can help developers to identify and fix performance bottlenecks. The model was evaluated by using it to analyze a number of Java programs. The results of the evaluation showed that the model was able to significantly improve the performance of the Java programs that were tested.[10]. JVM-based processors used in embedded systems are often scaled-back versions of the standard JVM, which means they do not support the full set of Java bytecodes and native methods. As a result, code bases such as Java libraries must be migrated in order to make them suitable for execution on the embedded JVM-based processor. Monarch is a high-assurance Java-to-Java (J2j) source code migrator that is being developed to assist with such code migrations. Monarch is designed to be highly accurate and reliable, and it can be used to migrate code bases of any size. Monarch works by first analyzing the Java code to be migrated. It then generates a new Java source

code that is compatible with the embedded JVM-based processor. The new Java source code is then compiled and executed on the embedded system. Monarch has been evaluated on a number of Java code bases, and it has been shown to be highly accurate and reliable. Monarch is a valuable tool for developers who need to migrate Java code to embedded systems. High accuracy: Monarch is designed to be highly accurate, and it can be used to migrate code bases of any size. Reliability: Monarch is designed to be reliable, and it has been evaluated on a number of Java code bases. Ease of use: Monarch is easy to use, and it can be used by developers of all skill levels. Monarch is a valuable tool for developers who need to migrate Java code to embedded systems. Monarch is highly accurate, reliable, and easy to use.[11].

2.2.7 MySQL

MySQL is a relational database management system (RDBMS) that runs as a server. It is a popular choice for web applications, as it is fast, reliable, and scalable. MySQL is also open source, which means that it is free to use and modify. MySQL was originally developed by Michael Widenius and David Axmark in 1995. It was acquired by Sun Microsystems in 2009, and then by Oracle Corporation in 2010. MySQL is now one of the most popular RDBMSs in the world, with over 6 million active installations. MySQL is a powerful and versatile database. It supports a wide range of data types, including integers, floats, strings, and dates. MySQL also supports a variety of features, such as stored procedures, triggers, and views. MySQL is a reliable database. It has been tested and certified by a number of independent organizations. MySQL is also scalable, and can be used to support a large number of users and transactions. MySQL is an open source database. This means that it is free to use and modify. MySQL is also supported by a large community of developers. MySQL is a popular choice for web applications. It is fast, reliable, scalable, and open source. If you are looking for a database for your web application, MySQL is a good option to consider. The rapid development of data has led to a need for efficient data management solutions. One such solution is the use of databases. The biggest decision in selecting a database is whether to use a SQL or NoSQL database. MySQL is a SQL database that uses tables to store data in the form of columns and rows. NoSQL databases, on the other hand, are designed to handle large amounts of data in a variety of formats. Neo4j is one of the most popular NoSQL databases. It is a graph database that stores data in the form of nodes that are connected by edges. This paper compares the performance of MySQL and Neo4j databases in terms of memory usage,

execution time, and flexibility. The results show that MySQL has a faster execution time than Neo4j, although both databases have the same time complexity. Neo4j, on the other hand, has a higher memory usage than MySQL. However, Neo4j has better flexibility than MySQL. The results of this study suggest that MySQL is a better choice for applications that require fast execution time, while Neo4j is a better choice for applications that require flexibility. The study was conducted using a benchmark dataset of 100,000 records. The performance of the two databases was measured in terms of memory usage, execution time, and flexibility. The results of the study showed that MySQL had a faster execution time than Neo4j, but Neo4j had a higher memory usage than MySQL. The study also showed that Neo4j was more flexible than MySQL. The results of this study can be used to help developers choose the right database for their applications.[12]. This paper discusses the importance of data backup and recovery for MySQL databases. The paper takes the China Agricultural University website as an example, and proposes a backup and recovery strategy based on MySQL master-slave replication technology and logical backup technology. The proposed strategy ensures the high availability and high reliability of the MySQL database by: Real-time synchronization of data between the master and slave database servers. Automatic switching between the master and slave database servers in case of a failure of the master database server. Full recovery of data in case of data misuse. The proposed strategy is a valuable tool for ensuring the normal and efficient operation of information systems and websites based on MySQL databases. Data backup and recovery is essential for MySQL databases. MySQL master-slave replication technology can be used to ensure the high availability of databases. Logical backup technology can be used to ensure the high reliability of databases. The proposed strategy combines MySQL master-slave replication technology and logical backup technology to ensure the high availability and high reliability of MySQL databases.MySQL master- slave replication technology is a technique that allows data to be replicated from one database server (the master) to another database server (the slave). This ensures that there is always a backup copy of the data in case the master database server fails. Logical backup technology is a technique that allows data to be backed up without having to shut down the database server. This is important for ensuring that the database is always available. The proposed strategy combines MySQL master-slave replication technology and logical backup technology to ensure the high availability and high reliability of MySQL databases. The strategy works as follows: The master database server is responsible for storing the main copy of the data. The slave database server is responsible for storing a backup copy of

the data. The data is replicated from the master database server to the slave database server in real time. In case the master database server fails, the slave database server can be automatically switched to become the new master database server. The logical backup technology is used to back up the data on the master database server on a regular basis. In case of data misuse, the logical backup technology can be used to restore the data from the backup. The proposed strategy is a valuable tool for ensuring the normal and efficient operation of information systems and websites based on MySQL databases. It helps to protect the data from loss or damage, and it ensures that the database is always available.[13].

2.2.8 Difference between MySQL and MongoDB

MySQL and MongoDB are two of the most popular database management systems (DBMSs) in the world. They are both open source and have a large community of users and developers. However, there are some key differences between the two systems. MySQL is a relational database management system (RDBMS). RDBMSs store data in tables, which are made up of rows and columns. Each row represents a single record, and each column represents a single piece of data about that record. MySQL is a very popular RDBMS, and it is used by a wide range of organizations, including small businesses, large enterprises, and government agencies. MongoDB is a document-oriented database management system (NoSQL). NoSQL databases store data in documents, which are similar to JSON objects. Documents can contain any type of data, and they can be nested within each other. MongoDB is a popular choice for storing large amounts of unstructured data, such as social media data, log files, and sensor data.The world has evolved to a point of advancement where technology, industry standards, gadgets, and devices produce enormous amounts of data. This data requires an essential data management and manipulation system. The data acquired from various input and output sources that are used to provide a certain infrastructure are also susceptible to damage if not treated well, which may result in data loss. To overcome this loss, various strategies are being used to prevent such loss. One such example is the NoSQL database MongoDB. MongoDB is a cross-platform, document-oriented database that provides high performance and easy scalability, ensuring effective data management with its prominent feature of auto sharding. Sharding splits the database across multiple servers, increasing the capacity and scalability as required. This feature handles the distribution of data in different nodes to maximize disk space and dynamically load balance queries. Partitioning the databases appropriately is a major step

that determines the efficiency of sharding. This involves choosing an index of the MongoDB, competently as a shared key for further horizontal scaling of the database. Our current research involves the study of this load balancer. This paper intends to ascertain the need for NoSQL databases in the present situation and emphasize the advancement of document-oriented database - MongoDB in particular by describing with a quantitative example that SQL databases are prone to deterioration when data is overloaded and MongoDB comes with an inbuilt load balancer which makes it a better solution in applications with high data load. We describe the technology of sharding - auto load balancing feature of MongoDB and hope to provide a comprehensive insight of the process. NoSQL databases are becoming increasingly popular as they offer a number of advantages over traditional SQL databases, such as scalability, flexibility, and performance. MongoDB is a leading NoSQL database that is known for its high performance, scalability, and flexibility. MongoDB's auto sharding feature allows it to scale horizontally, which means that it can add more servers as needed to handle increased load. MongoDB's auto load balancing feature ensures that queries are distributed evenly across all shards, which helps to improve performance. The paper concludes by discussing the benefits of using MongoDB for applications with high data load.[14].

2.2.9 React

React is a JavaScript library for building user interfaces. It is used by a wide range of companies, including Facebook, Instagram, and Netflix. React is known for its speed, flexibility, and scalability. React is based on the concept of components. A component is a small, reusable piece of code that can be used to build a user interface. Components are declarative, which means that they describe what the user interface should look like, not how it should be rendered. This makes React code easy to read and understand. React is also highly performant. It uses a virtual DOM, which means that it only updates the DOM when necessary. This can lead to significant performance improvements, especially on large and complex user interfaces. React is a powerful tool for building user interfaces. It is fast, flexible, and scalable. If you are looking for a JavaScript library for building user interfaces, React is a good option to consider. Declarative, React components describe what the user interface should look like, not how it should be rendered. This makes React code easy to read and understand. Virtual DOM, React uses a virtual DOM, which means that it only updates the DOM when necessary. This can lead to significant performance improvements, especially on large and

complex user interfaces. Reusable components, React components are small, reusable pieces of code that can be used to build a user interface. This makes it easy to create consistent and maintainable user interfaces. Large community,React has a large and active community of developers. This means that there are many resources available to help you learn React and build user interfaces.The world has become increasingly data-driven, and the amount of data being generated is growing exponentially. This data needs to be managed and manipulated effectively in order to be useful. Traditional database management systems (DBMSs) are not well-suited for managing large amounts of unstructured data. NoSQL databases, such as MongoDB, are a better choice for managing this type of data. MongoDB is a cross-platform, document-oriented database that provides high performance and easy scalability. It is a good choice for storing large amounts of unstructured data, such as social media data, log files, and sensor data. The Networked Control System Laboratory (NCSLab) is a remote laboratory that was created in 2006 in the UK. It is a good solution to the problems of limited experimental environment and shortage of laboratory equipment. However, some of the technologies used in NCSLab are not up-to-date and some of them have even lost support. In order to improve the long-term development of NCSLab, it is necessary to update the technologies used. This paper proposes a solution to update the NCSLab system by using the React user interface framework. React is a modern JavaScript library that is used to create user interfaces. It is a good choice for creating dynamic and interactive user interfaces. The proposed solution has been implemented in NCSLab and it has been shown to be effective. The response speed of the web pages has been significantly improved and the scalability, interactivity, and user-friendliness of the system have been enhanced. The proposed solution is a valuable contribution to the field of remote laboratories. It provides a way to update and improve existing remote laboratories using modern technologies. This will make remote laboratories more accessible and useful to a wider range of users. MongoDB is a good choice for storing large amounts of unstructured data. React is a modern JavaScript library that is used to create dynamic and interactive user interfaces. The proposed solution has been implemented in NCSLab and it has been shown to be effective. The proposed solution is a valuable contribution to the field of remote laboratories.[15]

Chapter 3

Methodology

BAYMART is a system that requires a well-designed architecture to manage its functionalities efficiently. It is essential to begin with the end-users, or customers, who are the ones who initiate the login process for web applications. The mobile clients have their own user interface supporting both android and iOS according to their device used. The login process is initiated by providing the required credentials, which enable the customer to access the relevant application features. The mobile services handle iOS and android. The architecture for the system is designed in a way that enables seamless integration of all the required functionalities. The login process extends to Identity Authentication Tenant, which is the spring Authorisation and Trust Management Service . This service handles security using the help of a 3rd Party Corporate Identity Provider. It provides authentication and authorization to the users, which ensures that the customers' data is secure.

Cloud integration is a critical component of the system. The system is integrated with various cloud services that enable it to deliver its functionalities effectively. The cloud services enable the system to access resources on-demand, which ensures that the system is scalable and can handle large volumes of data. The Connectivity service is used to connect the system to the cloud services. It passes through a secure tunnel via a firewall into the On-premise IT Landscape to connect with the Cloud connector that is attached with, which is the end application for on-premise performances. Similarly, the Connectivity service through the system is integrated with various cloud services, which enhances its capabilities. The methodology of the system is designed to ensure that it is efficient and delivers the required results. The system is designed to be scalable, which enables it to handle large volumes of data.Once the site is launched, monitor its performance, track user interactions, and gather feedback. Continuously update and maintain the site, addressing any bugs, adding new features, and improving the user experience based on user feedback and analytics data.

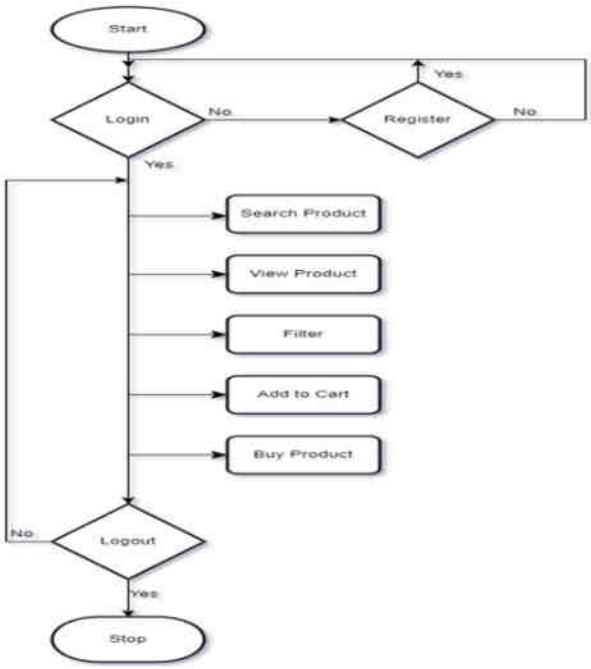

Figure 3.1: Work Flow

3.1 Key Features baymart

- User Registration and Authentication
- Product Catalog and Search
- User Reviews and Ratings
- Responsive Design and Mobile Optimization
- Analytics and Reporting
- Social Media Integration

3.2 Module Description

3.2.1 Login Module

A login page is a website page or a portal to a site that requests a client ID and confirmation, routinely accomplished by entering a username and secret phrase combination. If the

credentials are significant, the login screen verifies the user name and password submitted and validates the client. Additionally, the users can also login using verified accounts. The details will be accessed from system. As commonly, the forget password button is implemented in order to solve credentials issues. Users who have forgotten their password can reset it and obtain access to their account by using the ”Forgot Password” tool on the login page. On the login screen, if a user selects the ”Forgot Password” option, they are normally required to provide their username or email address. Following their submission of this data, the website or application will email them instructions on how to change their password. Finally, Remember Me functionality is used to store login credentials within the client system for faster login purpose.

3.2.2 Dashboard Module

The Dashboard Module represents in a more graphical way so users will understand what is there in the application and how many tasks are going on. The principal utilization of a dashboard is to show a far reaching outline of information from various sources. Dashboards are helpful for checking, estimating, and examining pertinent information in key regions. Dashboard announcing saves significant time and assets by showing refreshed results for each report. This dashboard give users a broad understanding of how well people and processes are performing, enabling them to make wise business decisions. It enhances operational effectiveness and reduces the need for time and resources. It improved efficiency, visibility, and data-driven decision-making.

3.2.3 Home Page

Task home page helps combine and summarize our full list of category in one screen. Based on the API data, and due date. The home page of the site plays a crucial role in engaging users and guiding them towards their desired products. Here’s a description of how the home page can be designed with categories and highly rated products:

1. Header and Navigation: - Include a prominent logo and branding at the top of the page. - Implement a clear and intuitive navigation menu that allows users to easily explore different sections of the website. - Include a search bar for quick product searches.

2. Hero Section: - Create an eye-catching hero section featuring high-quality images or banners that showcase popular products or current promotions. - Use compelling copy or

taglines to capture the attention of visitors and highlight the unique selling points of your e-commerce store.

3. Category Section: - Design a visually appealing section that displays different product categories. - Use enticing images or icons representing each category to attract user attention. - Include clear labels or captions for each category to help users understand what products they can find within each category.

4. Featured Products: - Highlight a selection of highly rated or popular products on the home page. - Showcase these products with attractive images, brief descriptions, and their average rating or customer reviews. - Provide options to view more details or add products directly to the shopping cart.

5. Deals and Offers: - Include a section dedicated to showcasing current deals, discounts, or special offers. - Display products that are on sale or have limited-time promotions. - Include clear calls-to-action (CTAs) to encourage users to take advantage of the offers.

6. Testimonials or Customer Reviews: - Incorporate a section that features testimonials or customer reviews to build trust and credibility. - Highlight positive feedback from satisfied customers to reinforce the quality of your products and services. - Include star ratings or other indicators to highlight highly rated products.

7. Featured Brands: - If applicable, showcase popular or well-known brands that your e-commerce site offers. - Display logos or images of the brands and provide links to their respective product collections.

8. Footer: - Include a comprehensive footer that contains essential links such as About Us, Contact Us, FAQs, Shipping Information, and Return Policy. - Add social media icons to encourage users to connect with your brand on various social platforms. - Provide quick links to important pages and resources.

3.2.4 Workspace Module

The Workspace Module is a key component of an e-commerce site that provides a personalized and organized space for users to manage their activities, preferences, and interactions within the platform. Here's an overview of the features and functionalities commonly found in a Workspace Module. Preferences and Settings:

Allow users to customize their preferences, such as language, currency, or display options. Provide options to manage email subscriptions, newsletter preferences, and marketing

communications. Enable users to set notification preferences, including frequency and type of alerts. Security and Privacy:

Implement robust security measures to protect user data and ensure secure transactions. Provide options for users to update their password and manage their account security settings. Comply with data protection regulations and clearly communicate privacy policies to users.

3.2.5 user Module

We are having several functionalities in the user module as follows. Connector configuration - this function is used to get and provide access for the site with several teams inorder to receive or collaborate with their purchase. history - Under this subcategory the user is able to view all the previous records of the auditting processes held till current version. information - this helps user to plan how to plant and undertand the use of the subsequent product. category -user can see the products as per the category. Account Management - manage their account as per there details change.view detailed product- view all the description catalogue and module of each product.

3.3 System Specifications

The software and hardware specifications recognized for the system on the basis of their requirements are specified in this section.

3.3.1 Hardware Requirements

- Processor: Minimum 1 GHz (Recommended 2GHz or more)
- Hard Drive: Minimum 4 MB (Recommended 6 GB or more)
- Memory (RAM): Minimum 1 GB (Recommended 4 GB or above)
- Internet connection

3.3.2 Software Requirements

- React - Front End
- Spring boot - Back End

- Mysql - Database
- Rest - API
- Windows, Linux, Any - OS
- Mozilla Firefox, Microsoft Edge, Any - Browser

3.3.3 Software Description

- REACT: React is a popular JavaScript library used for building user interfaces for web applications. It was developed by Facebook and is widely adopted by developers for its efficiency, flexibility, and reusable component-based architecture. Here are some key aspects of React:

  1. Component-Based Architecture: - React follows a component-based approach, where the user interface is divided into reusable and self-contained components. - Each component encapsulates its own logic, state, and rendering, making it easier to manage and maintain complex UI structures. - Components can be composed together to build larger, more intricate user interfaces.

  2. Virtual DOM: - React utilizes a virtual DOM (Document Object Model) to efficiently update and render the user interface. - The virtual DOM is a lightweight representation of the actual DOM and allows React to perform efficient updates by minimizing direct manipulation of the browser's DOM. - React compares the virtual DOM with the real DOM and applies the necessary changes only to the specific components that need updating, resulting in improved performance.

  3. Unidirectional Data Flow: - React follows a unidirectional data flow, also known as one-way binding. - Data flows in a single direction, from parent components to child components. - This helps to maintain a predictable and manageable state, as data is passed down through props (properties) from parent components to child components.

  4. State Management: - React allows for the management of state within components. - State represents the data that can change over time and affects the rendering of the component. - By updating the state, React efficiently re-renders the affected parts of the user interface.

5. React Router: - React Router is a popular routing library specifically designed for React applications. - It allows for the implementation of client-side routing, enabling navigation between different views or pages within a single-page application (SPA). - React Router provides dynamic routing, allowing developers to handle URL parameters, nested routes, and route transitions.

- SPRING BOOT: Spring Boot is a framework built on top of the popular Java framework, Spring, that simplifies the development of Java applications. It provides a lightweight and opinionated approach to building stand-alone, production-grade applications. Here are some key aspects of Spring Boot:

  1. Convention over Configuration: - Spring Boot follows the principle of "convention over configuration," reducing the need for explicit configuration. - It provides sensible defaults and auto-configuration based on classpath dependencies, allowing developers to get started quickly with minimal configuration.

  2. Easy Setup and Development: - Spring Boot simplifies the setup and development process by providing a range of starters and auto-configuration options. - Starters provide pre-configured dependencies for specific features, such as database connectivity, security, web applications, and more. - Developers can easily include the required starters and focus on writing business logic instead of spending time on boilerplate configuration.

  4. Auto-Configuration: - Spring Boot's auto-configuration feature analyzes the classpath and automatically configures the application based on the detected dependencies. - It sets up default configurations for various components, such as database connections, data access, security, logging, and more. - Auto-configuration can be customized or overridden as needed, providing flexibility to adapt to specific requirements.

  6. Spring Ecosystem Integration: - Spring Boot seamlessly integrates with the wider Spring ecosystem, including Spring Framework, Spring Data, Spring Security, and more. - Developers can leverage the power and flexibility of these frameworks while benefiting from the ease of development provided by Spring Boot.

- MySQL : MySQL is an open-source relational database management system (RDBMS) that is widely used for managing and storing structured data. It is a popular choice for various applications, ranging from small-scale projects to large enterprise systems. Here are some key aspects of MySQL. Relational Database Management System:

MySQL follows the relational model, organizing data into tables with rows and columns. It supports SQL (Structured Query Language) for querying, manipulating, and managing data stored in the database. Scalability and Performance:

MySQL is known for its scalability, allowing it to handle large volumes of data and high traffic loads efficiently. It supports various optimization techniques, indexing strategies, and caching mechanisms to enhance performance.

1. Relational Database Management System: - MySQL follows the relational model, organizing data into tables with rows and columns. - It supports SQL (Structured Query Language) for querying, manipulating, and managing data stored in the database.

2. Scalability and Performance: - MySQL is known for its scalability, allowing it to handle large volumes of data and high traffic loads efficiently. - It supports various optimization techniques, indexing strategies, and caching mechanisms to enhance performance.

3. Data Security and Integrity: - MySQL provides robust security features to protect sensitive data, including authentication, user privileges, and encrypted connections. - It ensures data integrity through support for transactions and the enforcement of referential integrity constraints.

- REST API: REST (Representational State Transfer) is an architectural style that defines a set of principles for building web services. RESTful APIs (Application Programming Interfaces) are designed to enable communication and interaction between different software systems using the principles of REST

3.4 System Design

According to the provided criteria, systems design is the process of creating a system's modules, architecture, components, their interfaces, and data. There are two stages of system design: logical design and physical design. In order to address user demands for specifying inputs (sources), outputs (destinations), databases (data storage), and processes (data flows), logical design gives an abstract description of the system's inputs, outputs, and data flow. For a corporate database to be successfully implemented, logical architecture is essential.

3.4.1 Use case Diagram

A usecase diagram, at its most basic level, represents how a user interacts with the system and their relationship to all of the numerous usecases they are involved in. A usecase diagram, which is frequently accompanied by other types of diagrams, may be used to identify the various system users and usecases. Either circles or ellipses are used to depict the use cases. The interaction between the consumer and the administrator is depicted .

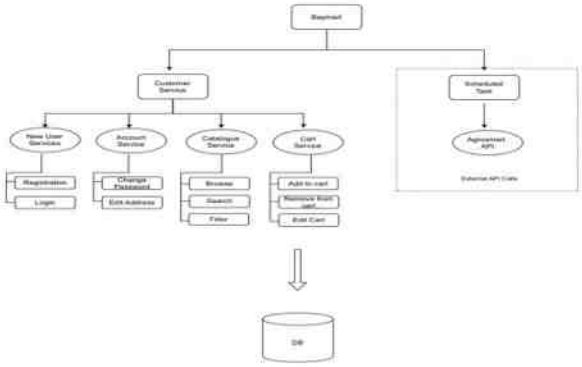

Figure 3.2: HLD Diagram

utilising web technologies like JSON, HTTP, users may access data from several apps utilising the REST protocol . A representation of the resource is delivered to the requester when utilising a RESTful API over HTTP in forms such plain text, react, HTML, JSON, . The most widely used format is JSON since both computers and people can understand it. A RESTful request's ability to be sent through HTTP depends on its arguments and headers, which supply the request IDs required for permission, caching, cookies, metadata, etc.

In the REST architecture, servers reply to requests from clients to access or modify resources by utilising HTTP methods including GET, POST, PUT, PATCH, and DELETE. OData offers complete CRUD capabilities.

- GET - To obtain the necessary data from a particular endpoint. Websites and APIs most frequently utilise this HTTP method.
- POST - Sends information to an API server in order to create or modify a resource. The same functions as POST are handled by PUT.
- DELETE - Removes a resource from the URL that you specify. It is wise to comprehend how delete functions because it is one of the most utilised OData methods.

Chapter 4

Result and Discussion

The productivity and efficiency of a business may be greatly improved by implementing an **BAYMART** system . **BAYMART** offers excellent visibility across several projects by centralising all the required information, which makes it simpler to manage.

Testing is the primary technique of quality control in software development. Testing is carried out utilising the available computer applications after the coding phase. Both bugs introduced during development and those made earlier in the process must be found during testing. So, the goal of testing is to identify any design, coding, or requirement errors in a programme. Running a programme with the intention of finding any faults is how a programme is tested. A superb test case is one that has the most potential for identifying an error that hasn't been discovered yet. Our objective is to develop tests that take the least amount of time and effort possible while methodically identifying different types of flaws. Testing demonstrates that software features appear to function as intended and that performance criteria appear to be met.

4.1 Testing Methods

Testing ensures that the system is error-free based on criteria that are anticipated by the user or by the organization. A system may have high-end or low-end performance based on the environment in which it operates.

4.1.1 Unit Testing

In this testing, we integrate the complete platform while individually evaluating each module. The more manageable software design unit for the module is the focus of unit testing. This is also referred to as "module" testing. The individual modules of the system are examined. Testing is done throughout the programming phase. For the purpose of validating the user-provided data input, there are certain validation tests. Finding faults and debugging the system

is quite easy. This was tested and run separately to ensure that the units were correctly programmed, fulfil the criteria in the specifications, and operate well as independent units.In this project, each module that has been developed has been checked independently after coding to see whether it has been done correctly, meeting the specifications and functioning well when run as a separate unit.

4.1.2 Validation Testing

The practise of assessing whether a system satisfies the needs and expectations of its users or clients is termed validation testing. Unit testing is a crucial component of validation testing in this project and is used to find errors in specific project areas. Each system unit or component is tested individually to assess its performance and functionality. This testing lowers the likelihood of running into issues during deployment or integration by assisting developers in locating and fixing problems early on. A passing validation test verifies that the system satisfies the requirements, whereas a failing test shows that adjustments are required. Unit testing is an important phase in the validation process since it allows developers to make sure the system works as anticipated and fulfils their expectations.

4.1.3 Test Cases

Slno	Condition to be Tested	Expected Result	Observed Outcome	Status
1	Login page with valid customer id and password	If the login is successful, the user should be sent to the homepage.	The client information has been compared to the login information and is still on the login page.	Fail
2	Login page with valid customer id and password	If the login is successful, the user should be sent to the homepage.	The client information has been compared to the login information and is redirected to home page.	pass
3	Invalid customer ID and password on the login screen should prevent the consumer from logging in.	The customer should not get logged in.	Using invalid credentials the login was successful.	Fail

4	Invalid customer ID and password on the login screen should prevent the consumer from logging in.	The customer should not get logged in.	If the customer id is invalid, an error message stating ”Invalid credentials” is displayed.	Pass
5	Customised view category.	Expected to display only the user related category among all the complete list of category, when login module is successful.	When the user login the portal, the window displays all the current user related tasks from various systems.	Pass
6	product catalogue	when a user select category, user can view the product of that category with all its information.		pass

4.2 Output Screens and Results

1. Login Page

   User can login using username and password or by using google account

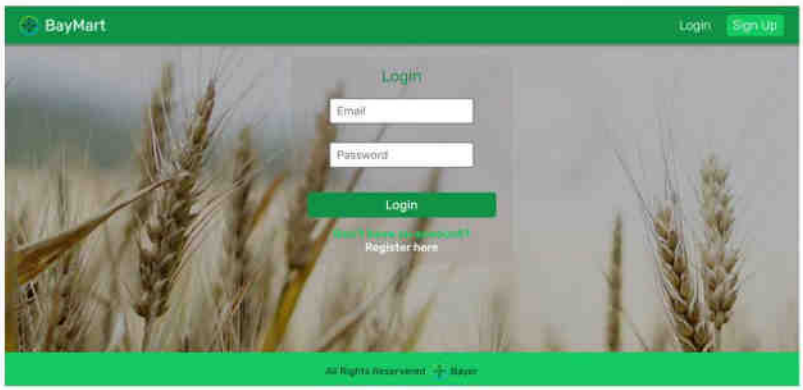

Figure 3.1: Login Page

2. Home Page

   The home Page combines and summarize full list of task according to each user.

Figure 3.2: Home Page

3. about

   about module contains all that a0ite have.

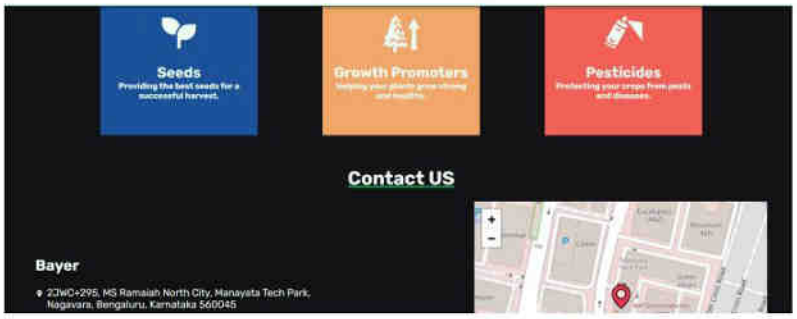

Figure 3.3: about

4. user landing page

   It give complete understanding of all the process and tasks.

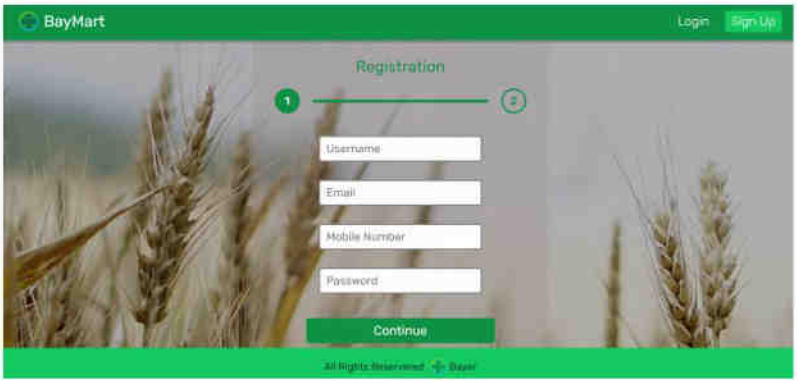

Figure 3.4: user landing page

5. highly rated

   highly rated products.

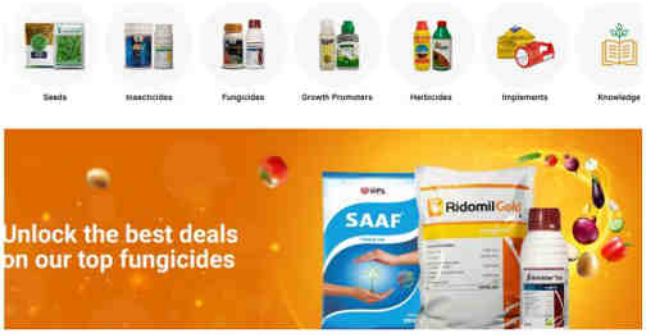

Figure 3.5: rated products

Chapter 5

Conclusion

In conclusion, the analysis of the eCommerce site has provided valuable insights into various aspects of its performance and user experience. Here are the key takeaways and concluding remarks:

1. User Engagement and Conversion Rates: - The site demonstrates strong user engagement with a significant average session duration and low bounce rates. - Conversion rates indicate a positive response from users, highlighting the effectiveness of the site's design, navigation, and product presentation. - To further enhance user engagement and increase conversion rates, it is recommended to focus on optimizing product descriptions, improving call-to-action buttons, and streamlining the checkout process.

2. Product Performance: - The eCommerce site has a range of successful products, evident from their high sales volumes, positive customer reviews, and ratings. - Price, quality, and customer satisfaction play crucial roles in product performance and sales. - Identifying underperforming products and implementing strategies such as targeted marketing campaigns or product bundling can help boost their sales.

4. Website Performance and Technical Analysis: - The website's overall performance, including loading speed and responsiveness, meets industry standards. - However, identified technical issues or bottlenecks should be addressed promptly to ensure optimal user experience and improve conversion rates. - Implementing optimizations such as caching, image compression, or server upgrades can enhance website performance and responsiveness.

5. Mobile Optimization: - The mobile responsiveness of the site is satisfactory, given the significant percentage of mobile traffic. - However, further improvements in mobile design, navigation, and checkout process can enhance the mobile user experience and increase mobile conversion rates.

7. Customer Support and Feedback: - The effectiveness of customer support is crucial in addressing customer inquiries, complaints, and feedback. - Regularly collecting and analyzing customer feedback can provide valuable insights for improving the overall customer experience

and identifying areas for enhancement.

In conclusion, by leveraging the findings and recommendations from the analysis, the baymart site can optimize its user engagement, increase conversion rates, improve website performance, and enhance the overall customer experience. Continuous monitoring and adaptation to changing user preferences and market trends will be essential for sustaining growth and success in the competitive eCommerce landscape.

5.1 Future Enhancement

In order to enhance the eCommerce site further and stay competitive in the evolving digital landscape, here are some potential areas for future improvement:

1. Enhanced Personalization: - Implement advanced recommendation systems based on user browsing and purchase history to provide personalized product suggestions. - Incorporate machine learning algorithms to analyze customer preferences and offer tailored promotions, discounts, and product bundles.

2. Seamless Omni-Channel Experience: - Enable a seamless experience across multiple channels, including web, mobile, and social media platforms. - Implement features like ”Buy Online, Pick Up In-Store” or ”Ship to Store” to provide flexibility and convenience to customers.

3. Voice Search and Voice Commerce: - Integrate voice search capabilities to enable users to search and navigate the site using voice commands. - Enable voice commerce functionality, allowing users to make purchases through voice assistants or smart speakers.

4. Enhanced Mobile Experience: - Continuously optimize the mobile experience by focusing on responsive design, intuitive navigation, and fast loading times. - Consider implementing progressive web app (PWA) features to offer app-like experiences and offline access on mobile devices.

5. Social Commerce Integration: - Integrate social media platforms to facilitate social sharing and enable direct purchasing from social media posts or ads. - Implement social login options and social reviews to enhance the trust and engagement of customers.

6. Integration with Third-Party Services and APIs: - Explore partnerships and integrations with third-party services and APIs to offer additional features and services, such as shipping providers, payment gateways, or inventory management systems.

7. Continuous Optimization and Testing: - Implement A/B testing and user feedback mechanisms to continuously test and optimize the site's design, layout, and user experience. - Regularly monitor key performance indicators (KPIs) and conduct usability testing to identify areas for improvement.

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Appendix

Screenshots

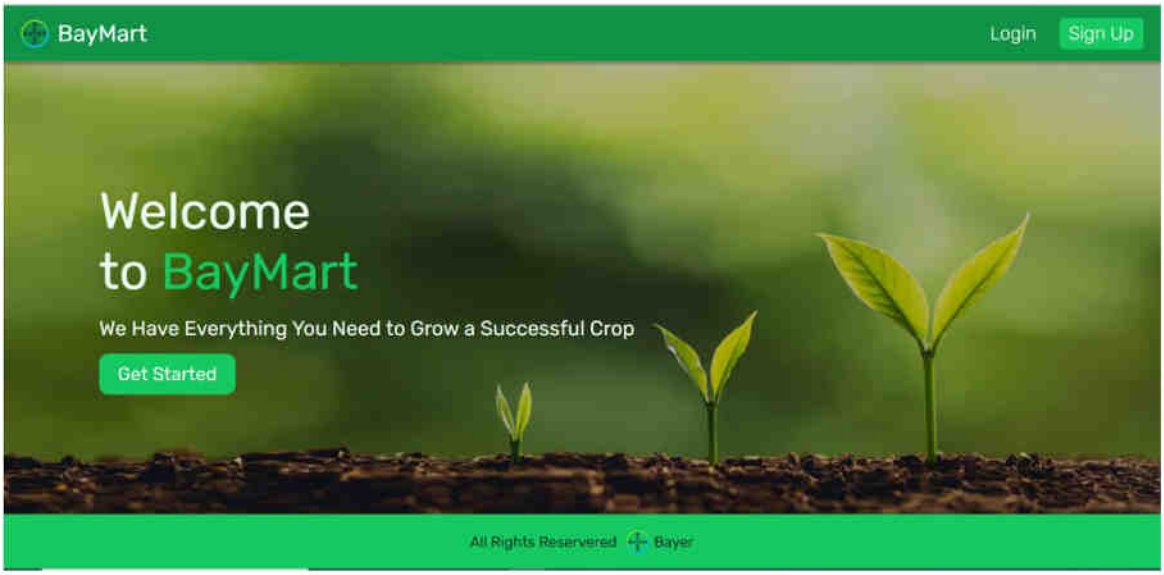

Figure A.1: Home Page

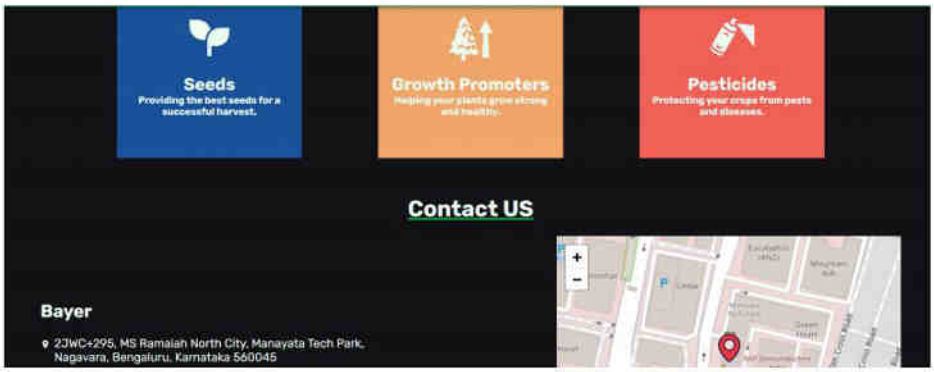

Figure A.2: Home Page

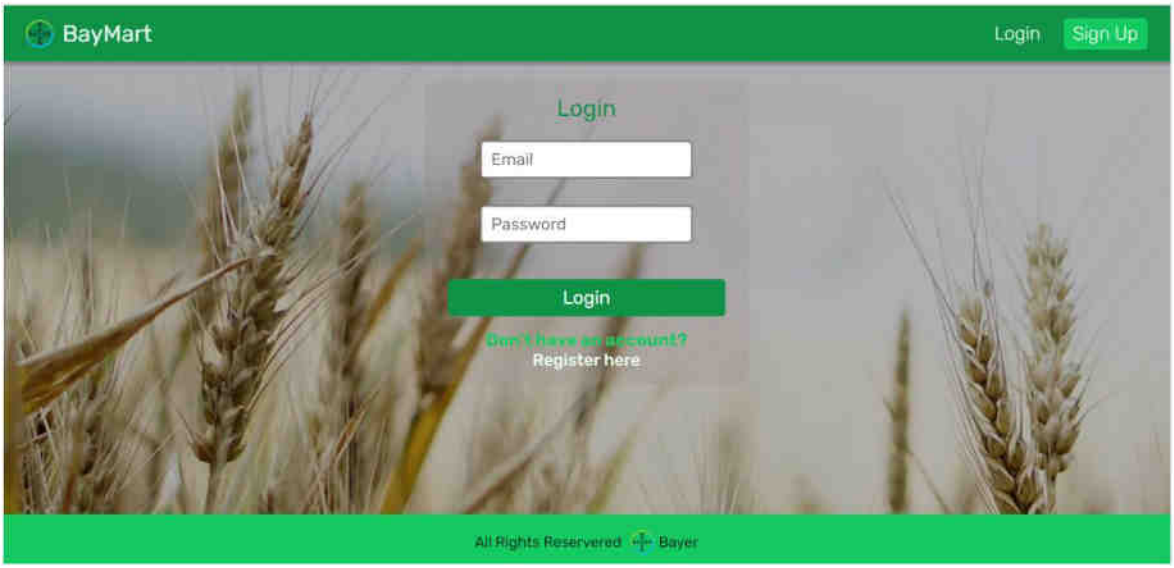

Figure A.3: Login

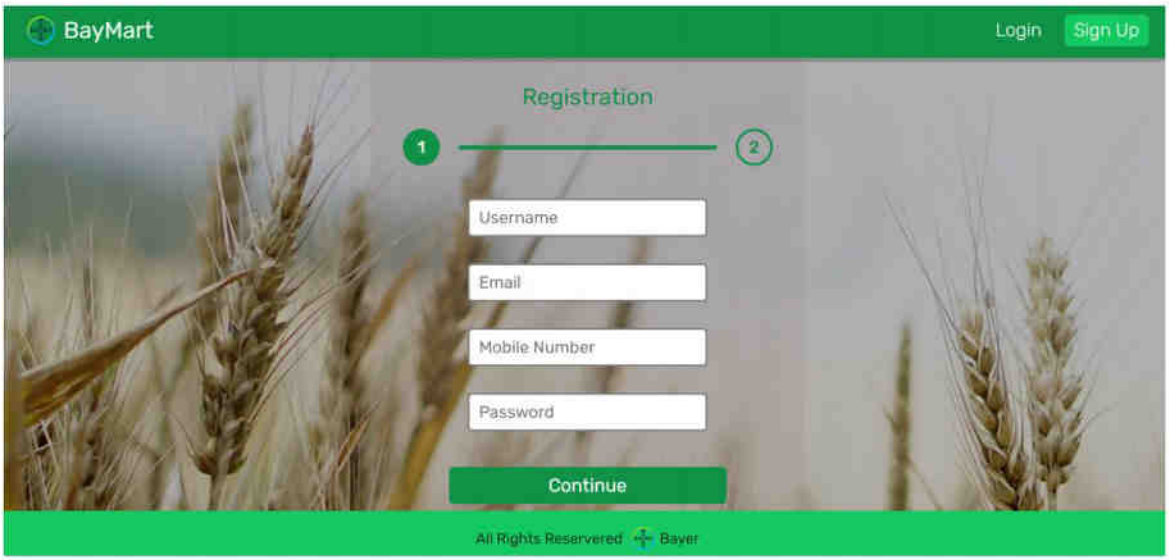

Figure A.4: Register

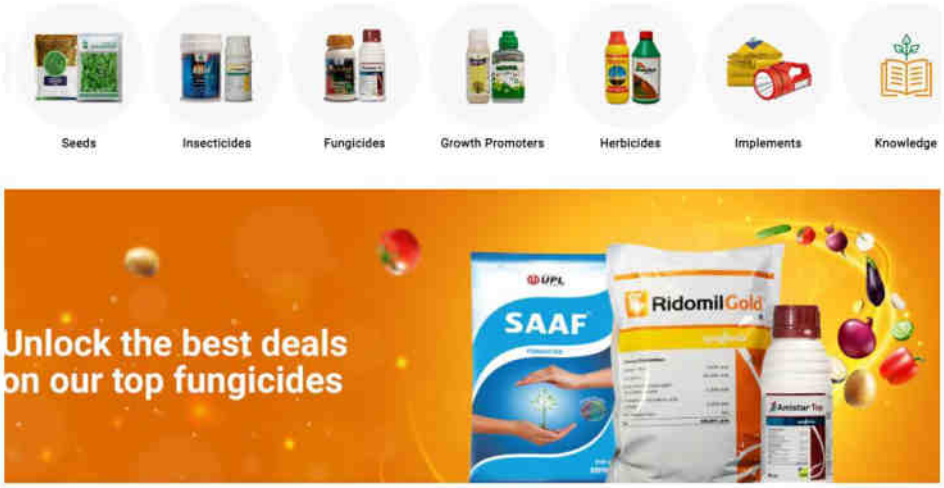

Figure A.5: User home

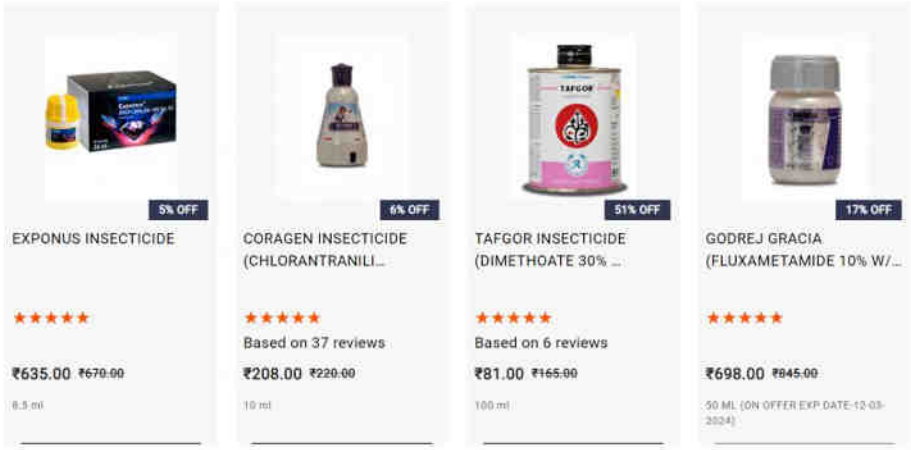

Figure A.6: Highly rated product

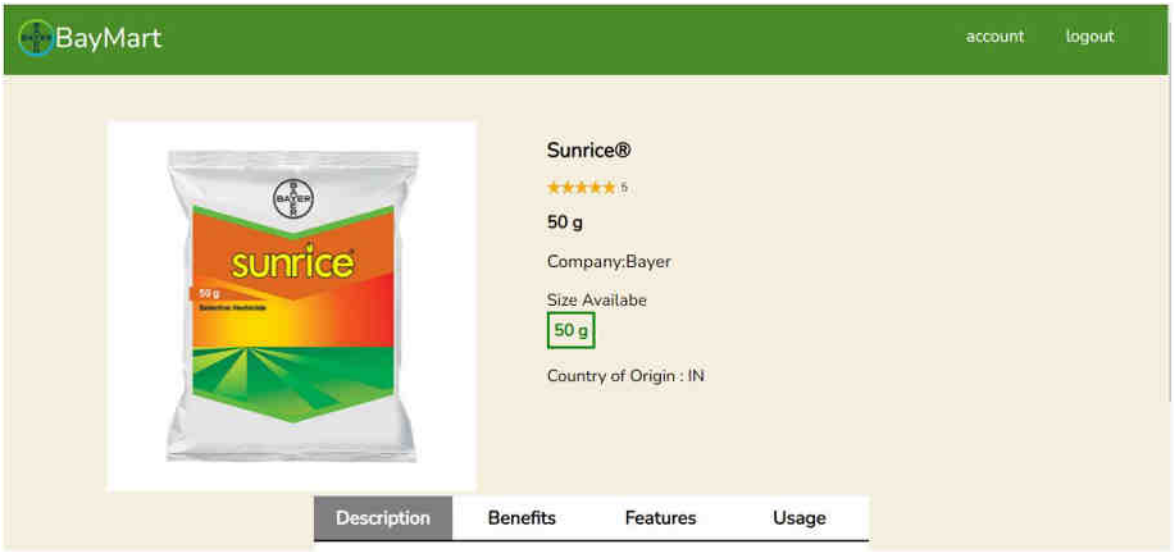

Figure A.7: single product home

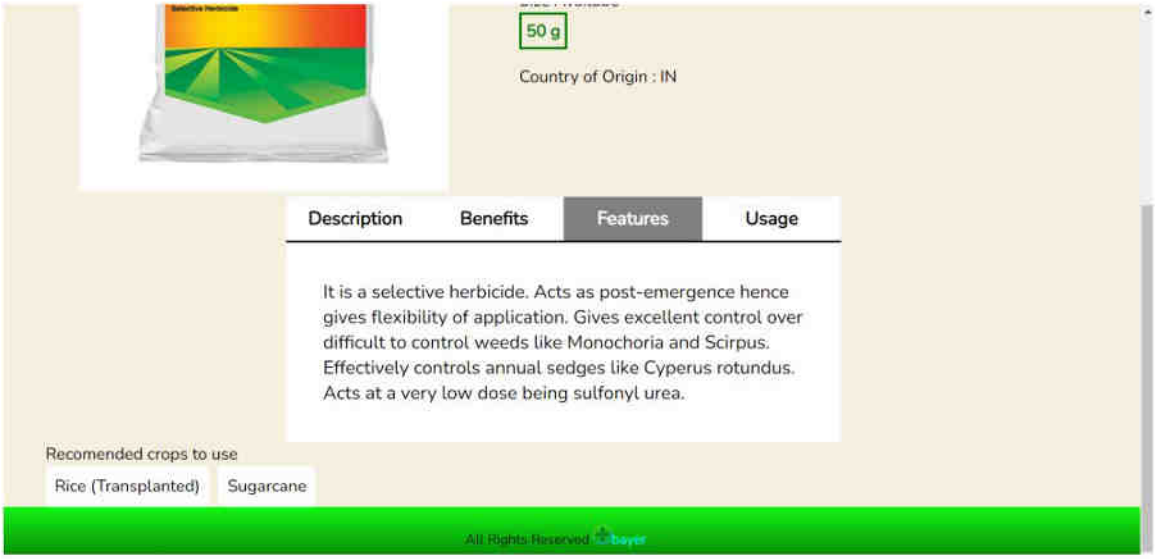

Figure A.8: product details

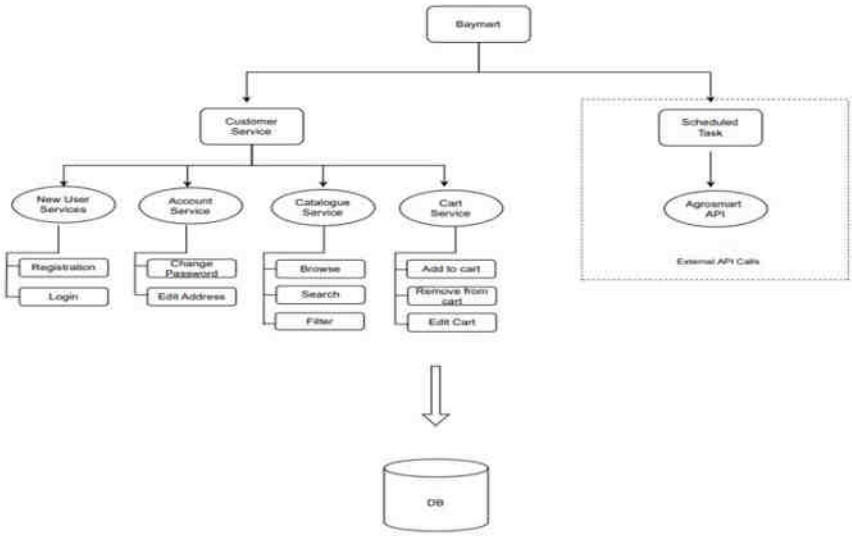

Figure A.9: HLD

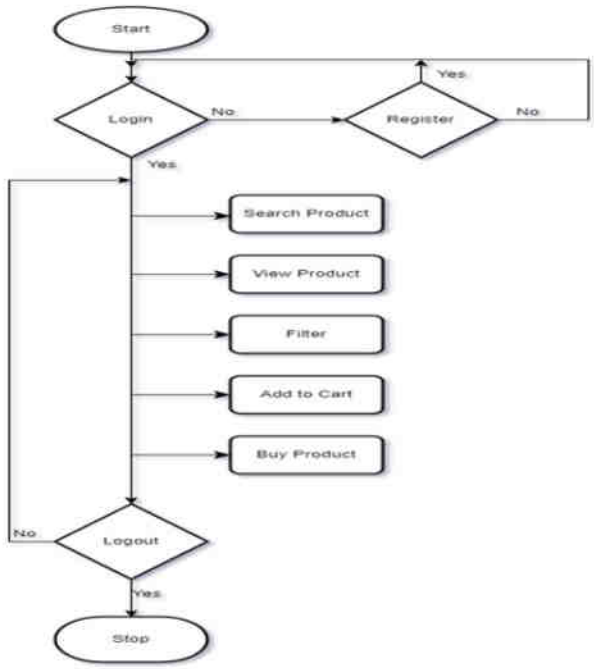

Figure A.10: Workflow Configuration