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Vellore Institute of Technology
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Requirement Engineering and Management

SWE-2003

Review -I

Submitted to: - Dr. Krithika L B

Title: -	SMART FARM MANAGEMENT SYSTEM
Name: -	Register No.: -
Pranay Gorantla	21MIS0123
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INTRODUCTION:

A smart farm management system is a technological solution that integrates various smart farming technologies to automate farming operations, monitor crop growth and health, optimize resource use, and enhance crop yield and quality. The system collects and processes data from various sensors and devices installed in the farm and provides farmers with real-time insights and recommendations.








The smart farm management system then analyses data and provides farmers with actionable insights that help them make data-driven decisions about their farming practices.

One of the key benefits of a smart farm management system is that it enables farmers to optimize resource use and reduce waste. For example, the system can help farmers use water more efficiently by providing them with real-time information about soil moisture levels and weather patterns. This can help farmers avoid overwatering, which can lead to water waste and environmental damage. Similarly, the system can help farmers optimize fertilizer use by providing them with data about nutrient levels in the soil and the crop's current nutrient needs.

Another advantage of a smart farm management system is that it can help farmers reduce labour costs and increase productivity. By automating routine farming tasks such as irrigation, fertilization, and pest control, farmers can free up time and resources to focus on more complex and value-adding activities such as crop planning, marketing, and sales. Additionally, the system can help farmers identify and respond to issues such as pest infestations or nutrient deficiencies before they become serious problems, thereby reducing the risk of crop damage and loss.








A smart farm management system can also help farmers enhance crop quality and yield. By providing real-time insights into crop growth and health, the system can help farmers make data-driven decisions about when to harvest, how to optimize crop quality, and which crops are likely to perform best under specific environmental conditions. Additionally, the system can help farmers identify and respond to issues such as pest infestations or nutrient deficiencies before they become serious problems, thereby reducing the risk of crop damage and loss.

PROBLEM STATEMENTS:

-  Environmental impact: Traditional farming methods can have a significant impact on the environment, leading to soil degradation and loss of biodiversity.
-  Limited access to market information: Farmers may face difficulties in accessing information about market demand, prices, and competition, leading to inefficient pricing and sales strategies.
-  Lack of real-time data monitoring and analysis: Farmers need to monitor their crops, soil conditions, and water usage regularly to make informed decisions about their operations.
-  Inefficient use of resources: There is often a lack of proper planning and allocation of resources such as water, fertilizers, and labour.
-  Difficulties in decision-making: Farmers may face difficulties in making informed decisions about when to plant, harvest, and sell their crops due to the lack of data and analysis.
-  Inconsistent crop yields: The lack of data analysis and resource management can lead to inconsistent crop yields, resulting in economic losses for the farmers.
-  High costs of traditional farming methods: Conventional farming methods can be costly, and farmers may not have the resources to invest in new technologies and equipment.

RECOMMENDATIONS AND FUNCTIONALITIES OF NEW SYSTEM:

There are several recommendations and functionalities of smart farm management systems that can help farmers improve their farming practices and achieve better yields. Some of these include:

-  Real-time monitoring: Smart farm management systems should provide farmers with real-time monitoring of key parameters such as soil moisture, temperature, humidity, and crop growth. This enables farmers to make data-driven decisions about when to water, fertilize, and harvest their crops.
-  Data analytics: The system should be able to process and analyse the data collected from other sources to provide farmers with insights into crop growth, pests and diseases, nutrient deficiencies, and other critical parameters. This can help farmers optimize their farming practices and improve crop yields.
-  Automation: Smart farm management systems should automate routine tasks such as irrigation, fertilization, and pest control. This helps farmers save time and resources, reduce labour costs, and focus on more complex and value-adding activities.
-  Mobile access: The system should be accessible through a mobile application, enabling farmers to monitor their farms' performance on-the-go.
-  Resource optimization: Smart farm management systems should help farmers optimize their use of resources such as water, fertilizer, and energy. This helps farmers reduce waste, lower their costs, and minimize the environmental impact of their farming practices.
-  Crop forecasting: The system should be able to forecast crop yields and quality based on current and historical data. This can help farmers make informed decisions about when to harvest, how to optimize crop quality, and which crops are likely to perform best under specific environmental conditions.
-  Alerts and notifications: The system should provide farmers with alerts and notifications about critical events such as pest infestations or adverse weather conditions. This enables farmers to take proactive measures to protect their crops and prevent damage.

- Integration: Smart farm management systems should be able to integrate with other farming technologies such as precision agriculture tools, drones, and autonomous equipment. This helps farmers create a comprehensive digital farming ecosystem that optimizes all aspects of their farming operations.

Overall, smart farm management systems offer farmers a range of powerful functionalities and recommendations that can help them achieve better yields, optimize their resources, and create more sustainable and profitable farming practices. By leveraging the latest technologies, farmers can take a data-driven approach to farming that maximizes efficiency and minimizes risk.

FIVE STEPS IN PROBLEM ANALYSIS:

STEP 1: Gain agreement on the problem statements.

1.CONCURRENCY:

ELEMENT	DESCRIPTION
1.The problem of	Failure in crop yield
2.Affects	Farmers, Customers, shopkeepers
3. And Results in	farmer Dissatisfaction, Product Liability, and decreased profit for shopkeeper.
4. Benefits of a solution	The new system addresses the problem by providing: - <ul style="list-style-type: none"> • Higher Profitability • Prevents huge loss to farmer.

2.NETWORK ISSUE:

ELEMENT	DESCRIPTION
1.The problem of ... (Describe the Problem)	Network issues in Farm Management system
2.Affects... (Identify the Stakeholders)	Farmers, Field Manager, Equipment Operator
3. And Results in ... (Describe the Impact of this Problem)	Records of Plantation and harvesting of crops is affected, updating and retrieval of the data is affected.
4. Benefits of a solution	The new system addresses the problem by providing: - <ul style="list-style-type: none"> • Durability in the Band Width • Proper server maintenance

STEP 2: Understand the root causes.

- ✚ Root cause analysis is the process of discovering the root causes of problems to identify appropriate solutions. Root cause analysis assumes that it is much more effective to systematically prevent and solve for underlying issues.
- ✚ It is Systematic way of Uncovering the root/ underlying cause of an identified problem or a symptom of problem.
- ✚ Identifying the Reason behind the problem

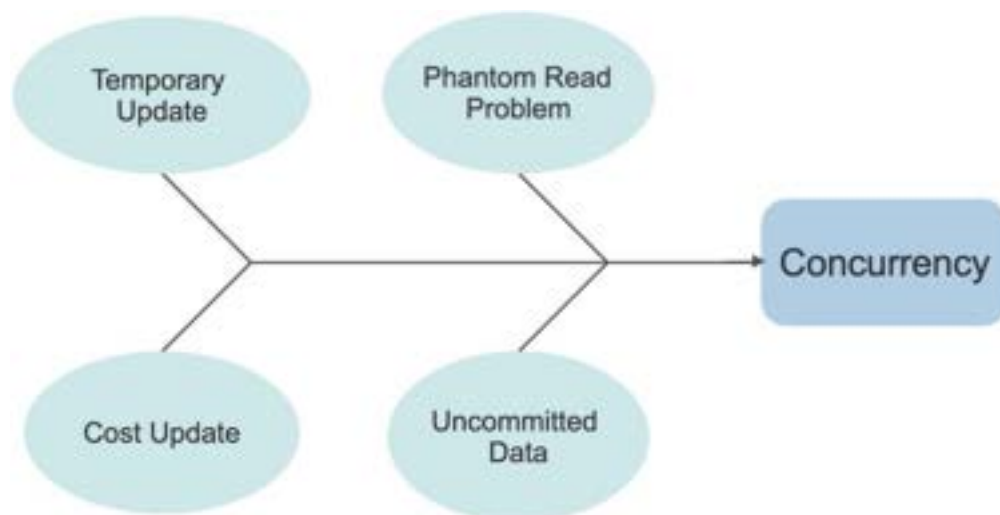
Technique Involve:

- Fish Bone Diagram

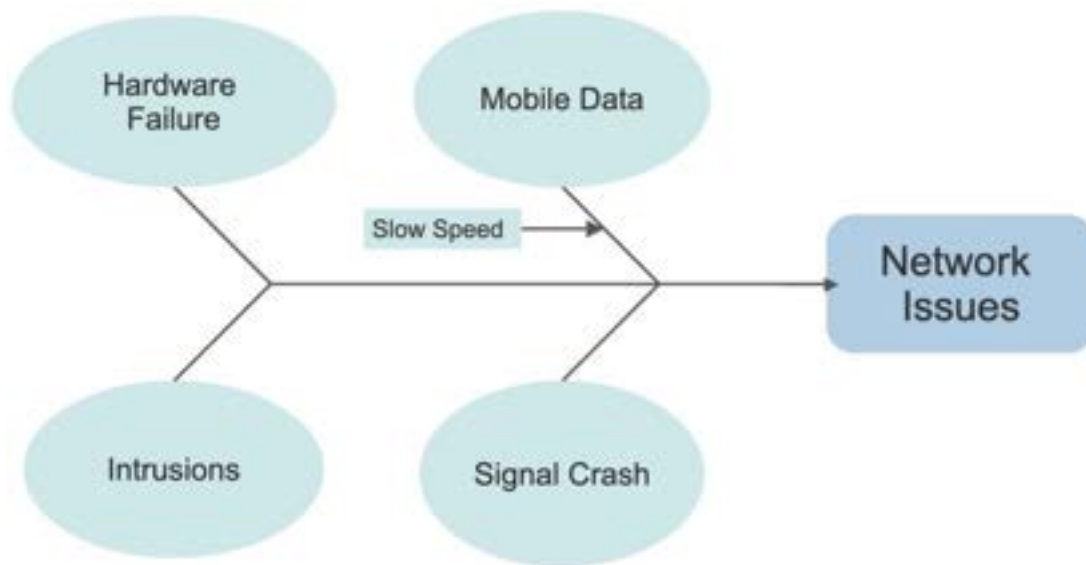
Fish Bone Diagram:

- A fishbone diagram is a visualization tool for categorizing the potential causes of a problem. This tool is used to identify a problem's root causes.
- The problem or effect is displayed at the head or mouth of the fish.

1. Concurrency Problem:



2. Network Issue:



STEP 3: Identify stake holders and users.

Anyone who could be materially affected by the implementation of a new system or application

Types of Stakeholders:

- Decision makers.
- Potential users.
- Other interested parties.

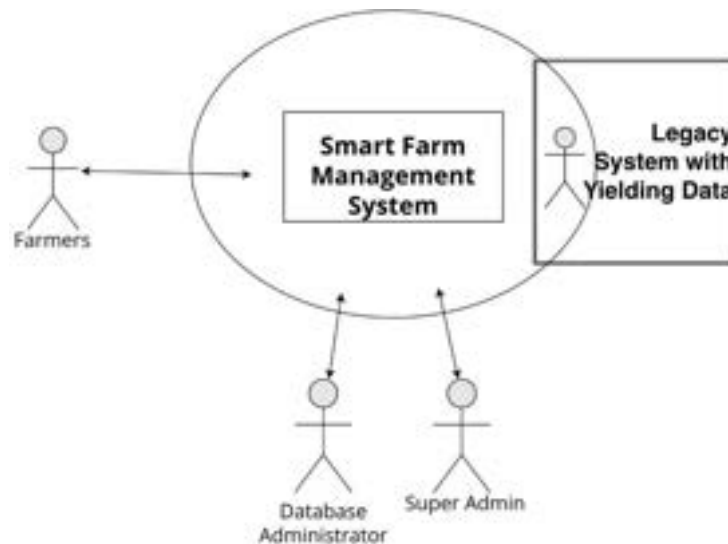
Stateholders and Users:

- Farmers
- Database Administrator
- Super Admin

STEP 4: Define Solution system boundary.

- ✚ Understand the problem.
- ✚ Consider a potential solution for the given problem.
- ✚ Find the boundaries of solution system.

System Boundary Diagram:



STEP 5: Identify the constraint to be imposed on the solution.

A constraint is a restriction on the degree of freedom we have in providing a solution.

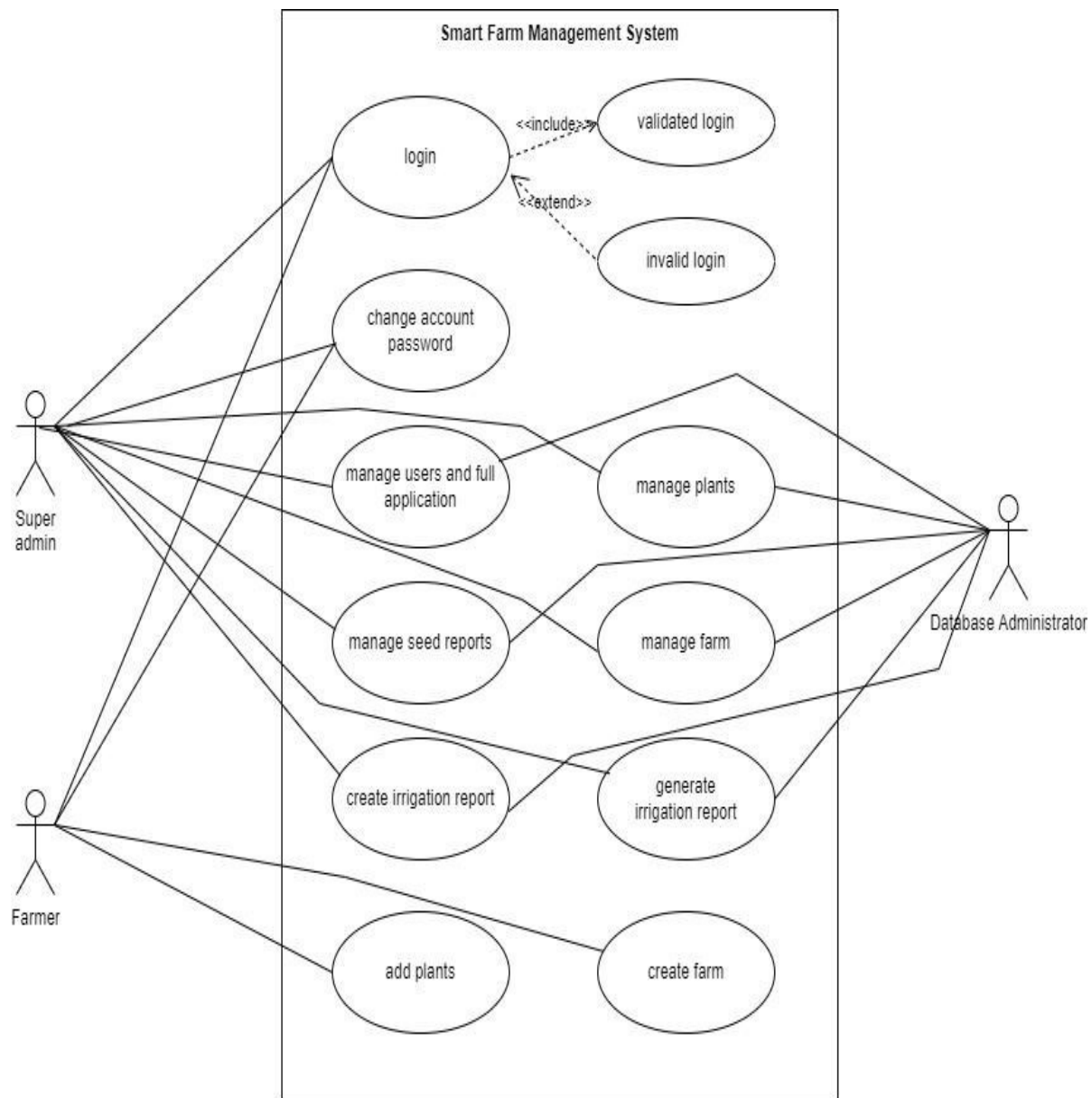
SOURCE	CONSTRAINT	RATIONAL
1. Technology mandate	Atomicity, Concurrency and International Cards	The software is built with concurrency control for a user-friendly interface with efficient atomicity (either Transactions takes place completely or cancelled) process with additional feature of accepting International Cards
2. Schedule and resources	The schedule that is the launch date and the required resources for the system is prepared	The schedule is maintained and the work done is frequently updated to the stakeholders and the required resource is mentioned earlier.

3. Environment

There are some protected and legal software which is used in the system for the security purpose.

The system is fully secured and protected and the data is protected in the system.

Use Case Diagram:





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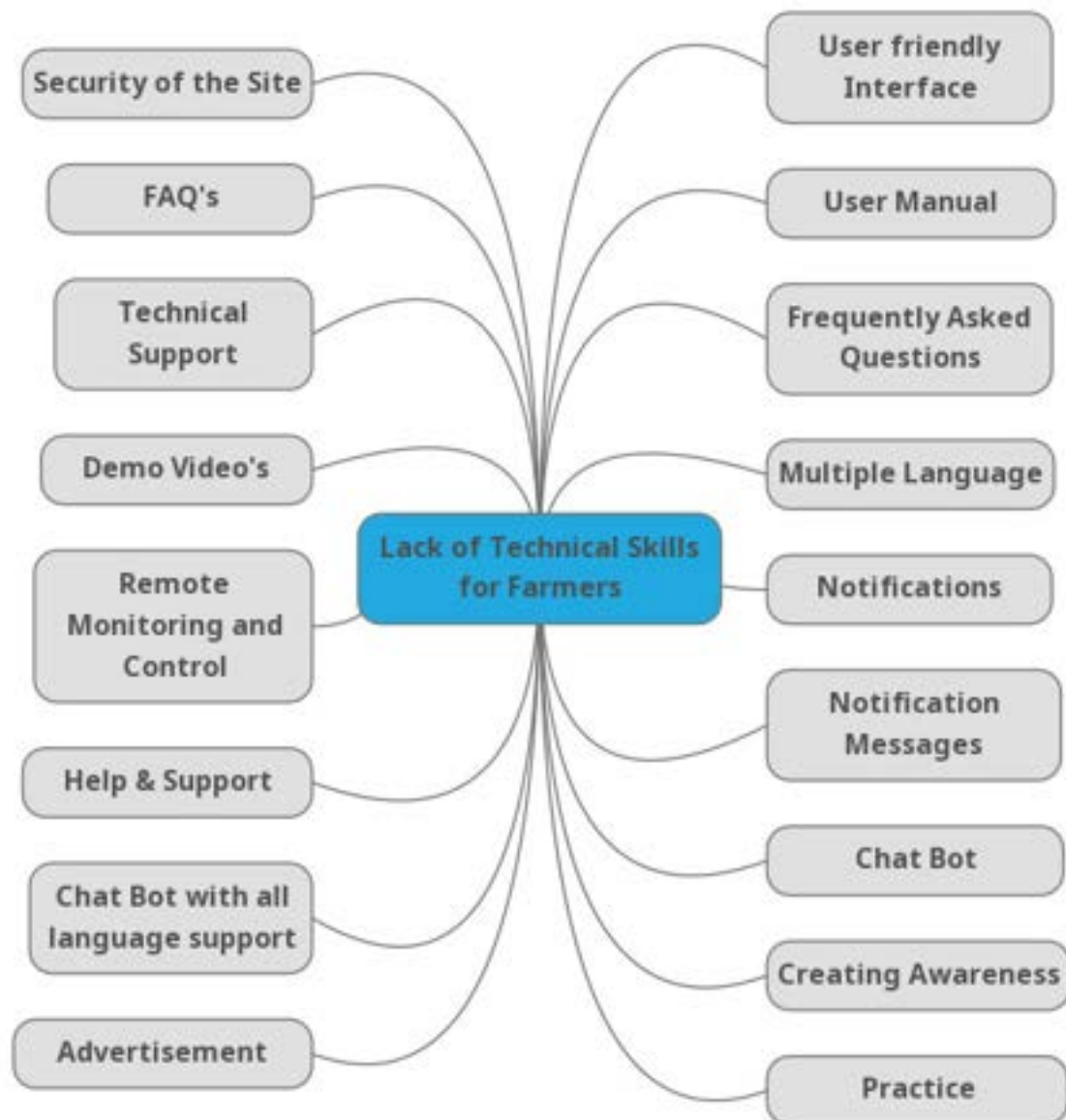
BRAINSTORMING

Founded Business Issue:

Many farmers may not have the technical skills or knowledge required to install and operate Smart Farming Management Systems, which could limit their ability to adopt the technology and fully realize its potential benefits.

The Ideas generated for the Issue: -

1. User friendly interface
2. Security of the site
3. User Manual
4. FAQ's
5. Technical Support
6. Demo video's
7. Multiple Language Support
8. Frequently Asked Questions
9. Notifications
10. Remote Monitoring and Control
11. Notification Message
12. Help & Support
13. Practice of UI
14. Advertising & Creating awareness on how to use.
15. AI Chatbot with multiple language support.

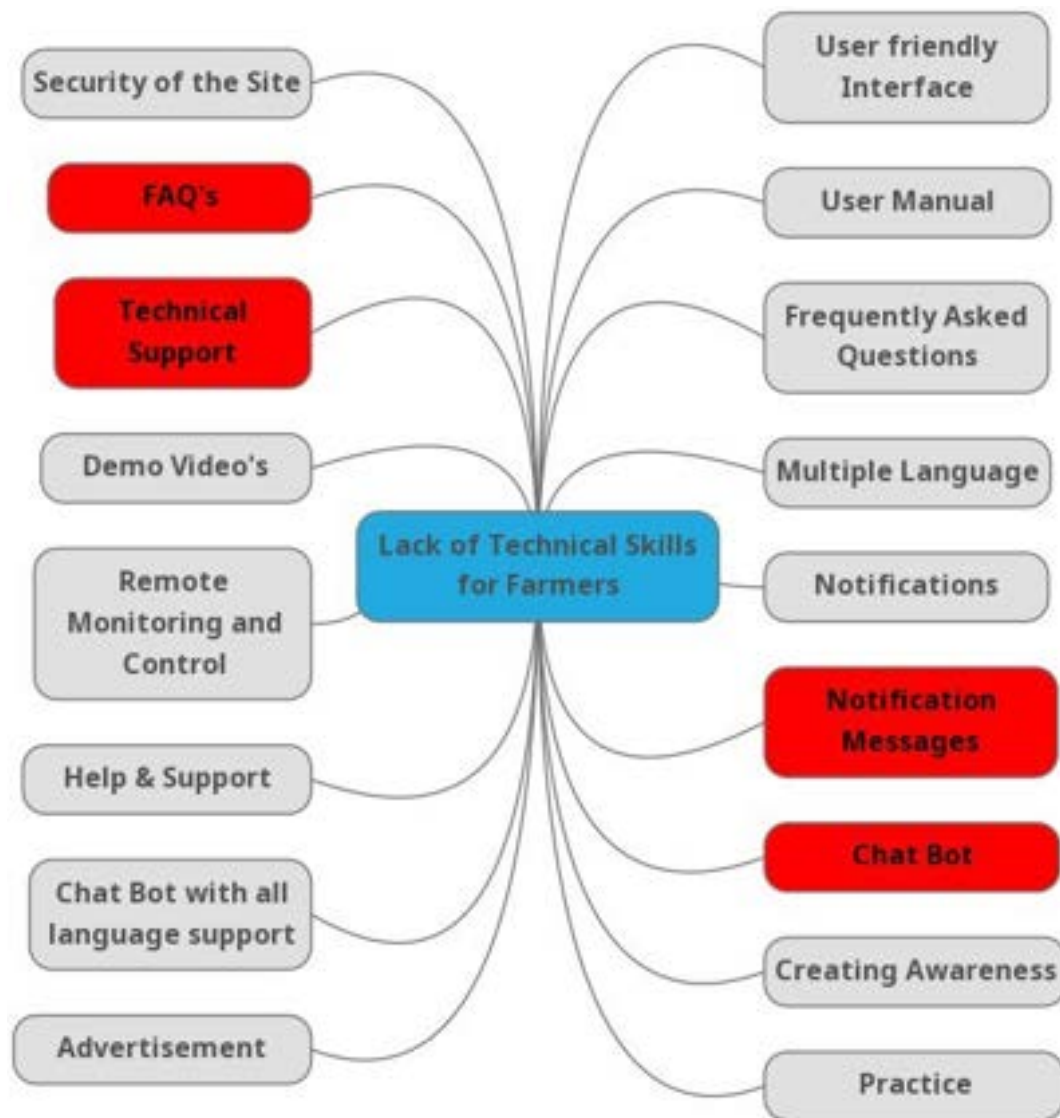


The Idea Reduction: -

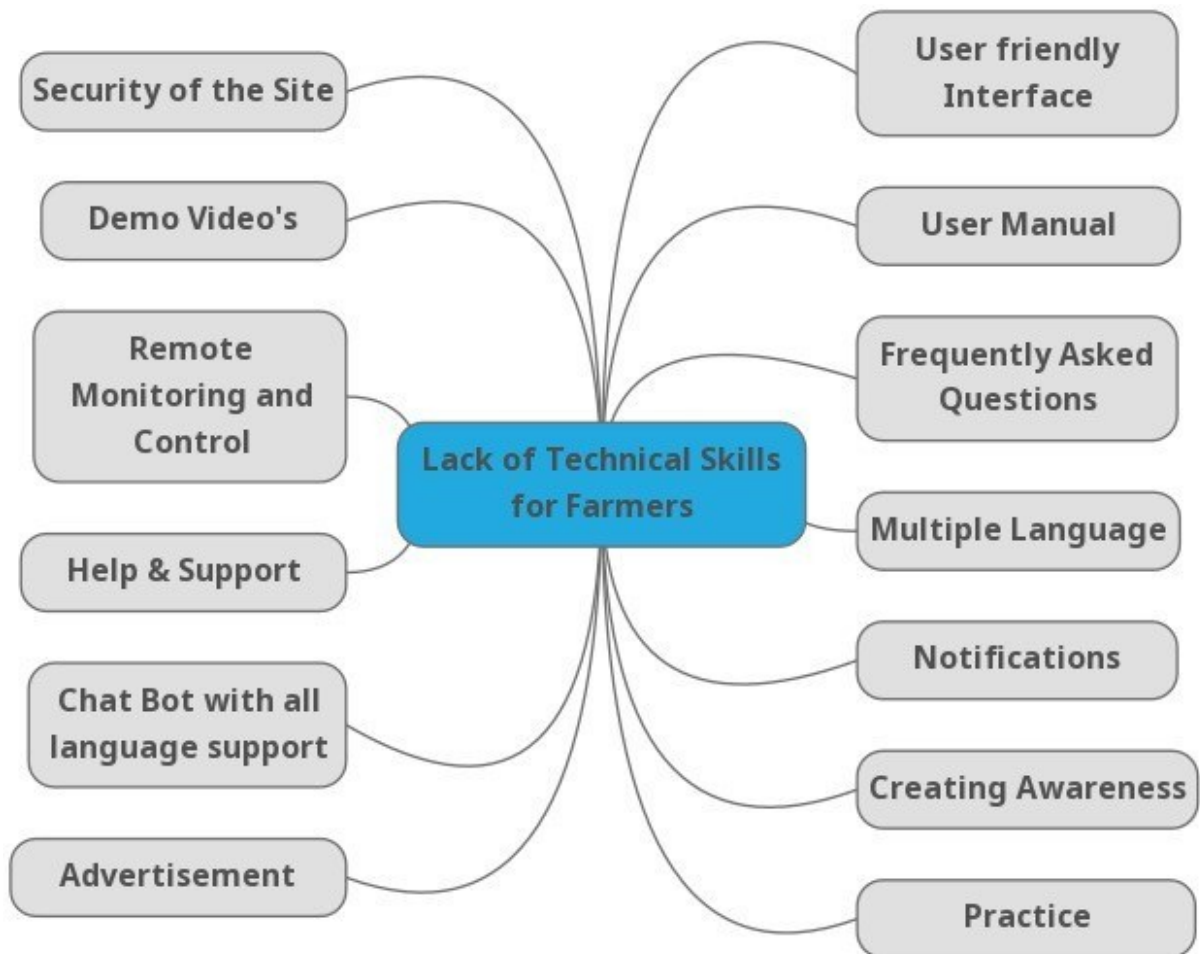
In this phase the redundant ideas and the unwanted ideas, and the unworthy ideas will be removed.

The ideas that were removed: -

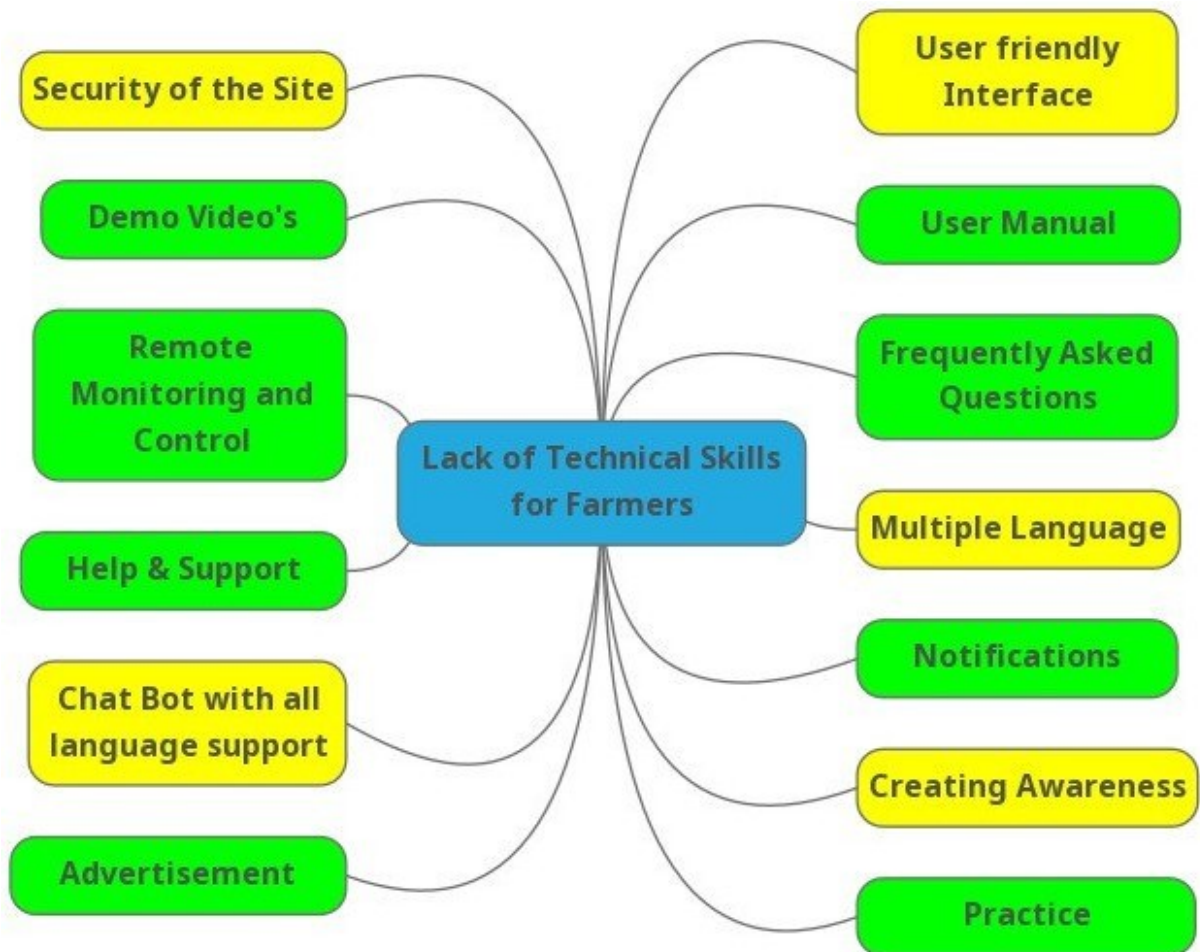
1. FAQ's.
2. Technical Support
3. Notification Messages.
4. Chatbot



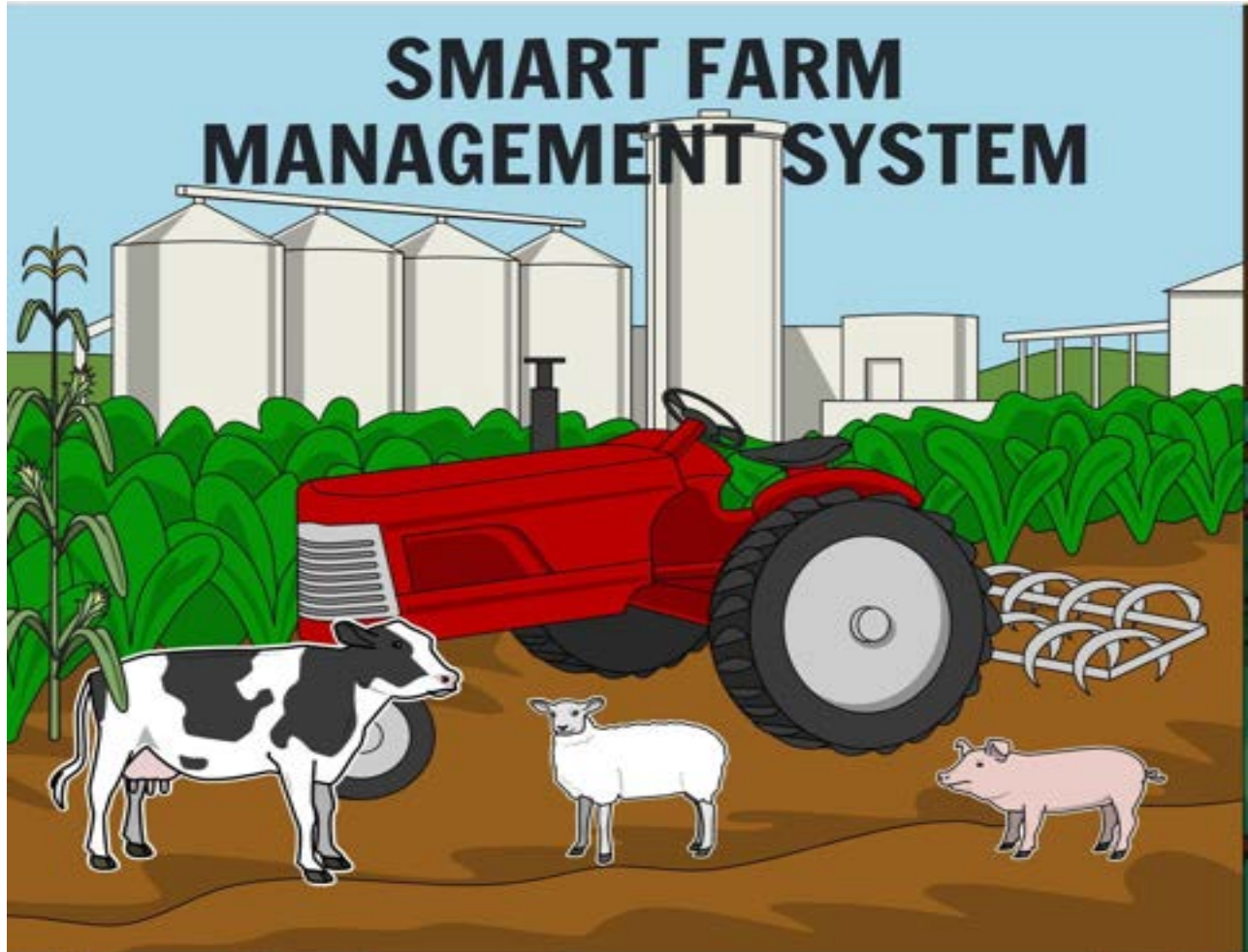
Mind Map after Brainstorming:



- Easy Ideas are marked in Green
- Hard Ideas are marked in Yellow



STORY BOARDING



SCENE 1:



SCENE 2:



SCENE 3:



SCENE 4:



SCENE 5:



SCENE 6:



SCENE 7:



SCENE 8:



SCENE 9:



SCENE 10:



SCENE 11:



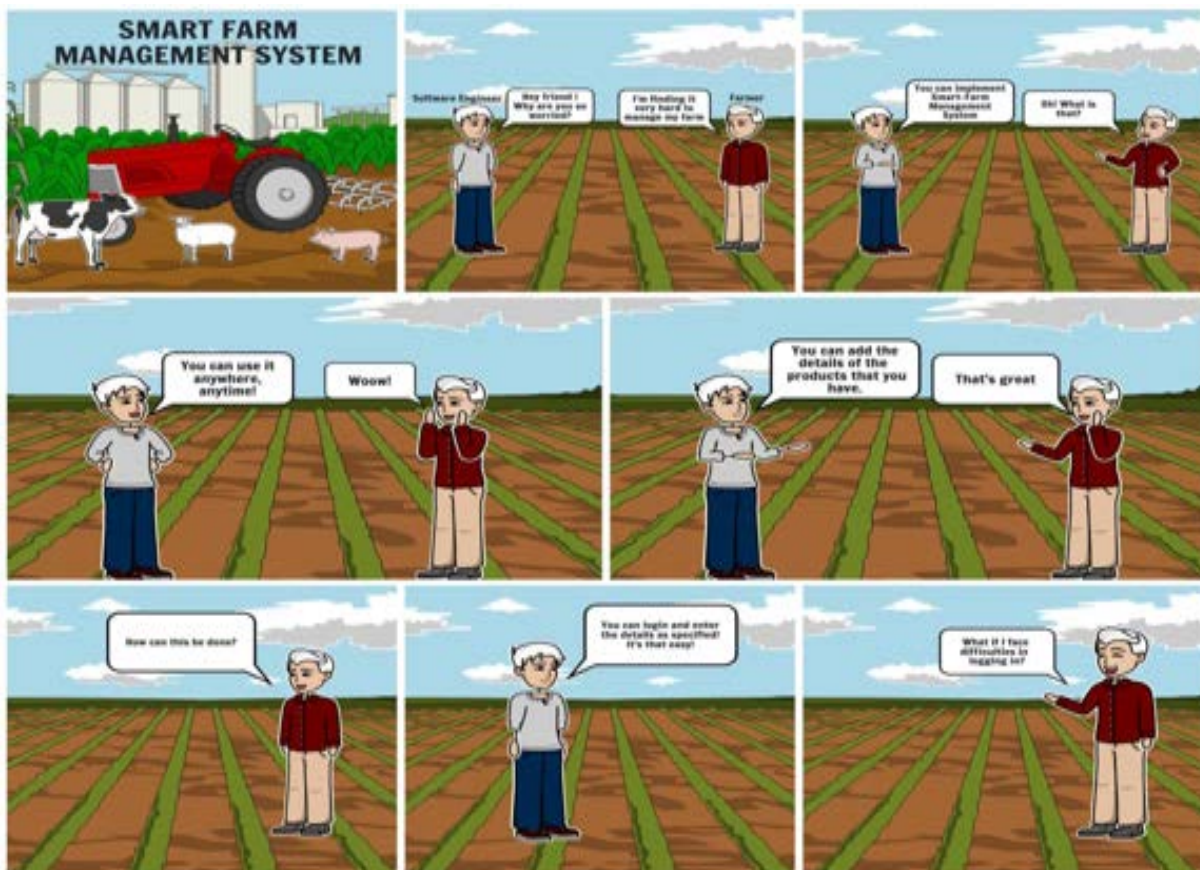
SCENE 12:



SCENE 13:



FINAL STORYBOARD:







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REQUIREMENT ENGINEERING TOOL

The selected requirement tool for the project is the Case Complete Professional 15 version.

Description Of the Tool: -

The Case Complete Professional 15 software is a requirement engineering and management tool. This tool is used by the business analysts and the software developers for creating and managing the Use Cases and the Requirements of the Software. The Case Complete software application provides the ability to edit the text format of the Use Case and the requirements in a guided environment and this creates a various ability in terms of diagrams including the Use Case Diagrams, Flow Chart Diagrams, wireframes of the graphical user interfaces.

This tool helps business of all sizes generate documents, use cases, user stories and much more using the in-built templates and format.

Case Study of the Requirement Tool: -

Introduction: -

In software development, requirements analysis is a crucial phase, where the requirements are collected, analyzed, and documented. It involves identifying stakeholders' needs, understanding the problem domain, and defining the features of the system. This process ensures that the final product meets the users' expectations, and it is delivered within the specified timeline and budget. In this case study, we will discuss Case Complete Professional 15, a requirement analysis tool that streamlines the requirements gathering and documentation process.

Background: -

Case Complete Professional 15 is a comprehensive requirement management tool developed by Serlio Software. It enables project managers, business analysts, and software developers to capture, organize, and analyze the requirements of a software system. The tool provides a simple and intuitive interface that enables users to create and manage requirements, use cases, test cases, and other artifacts related to software development.

Challenge: -

The main challenge faced by software development teams is to ensure that the requirements are accurate, complete, and unambiguous. Inaccurate or incomplete requirements can lead to project delays, cost overruns, and unsatisfied users. It can also increase the risk of software failure and decrease the overall quality of the product. Moreover, documenting and managing requirements manually can be time-consuming, error-prone, and tedious.

Solution: -

Case Complete Professional 15 provides a comprehensive solution to these challenges. The tool enables users to define requirements, track changes, and collaborate with team members in real-time. It also provides advanced reporting features that help project managers and stakeholders to monitor project progress and identify potential risks. The tool's intuitive interface enables users to capture and manage requirements effortlessly, reducing the time and effort required for documentation.

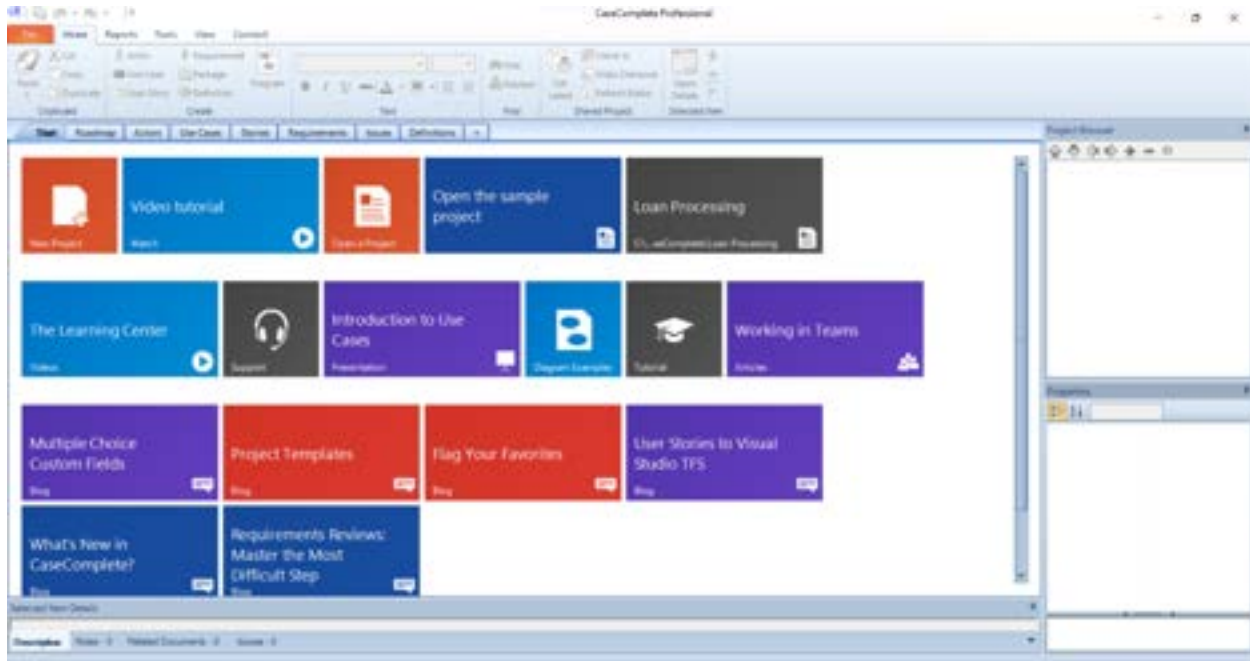
Benefits: -

Case Complete Professional 15 provides numerous benefits to software development teams. Firstly, it ensures that the requirements are accurate, complete, and unambiguous, reducing the risk of project failure. Secondly, it streamlines the requirements gathering and documentation process, saving time and effort. Thirdly, it improves collaboration among team members, enabling real-time feedback and updates. Fourthly, it provides advanced reporting features that help project managers to monitor progress and identify risks.

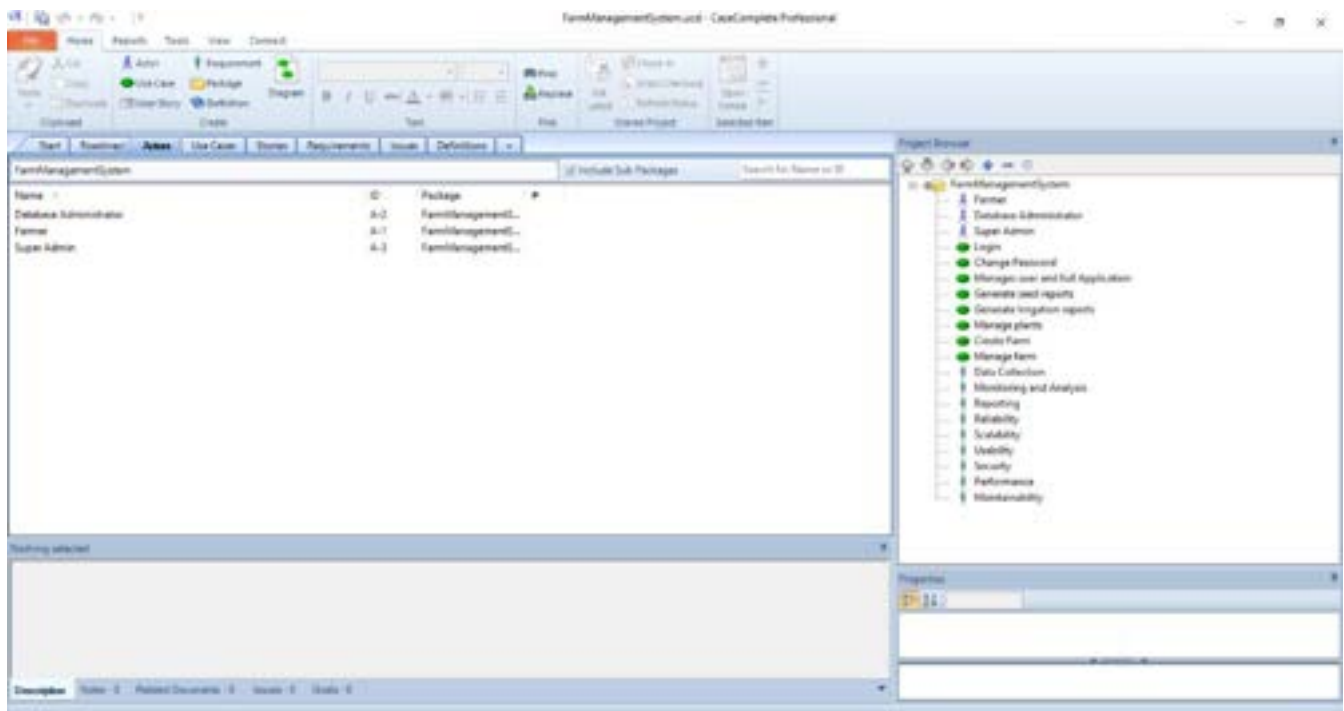
Conclusion: -

In conclusion, Case Complete Professional 15 is a powerful requirement management tool that provides a comprehensive solution to software development teams. Its intuitive interface, advanced features, and real-time collaboration capabilities make it an excellent choice for project managers, business analysts, and software developers. By using Case Complete Professional 15, teams can streamline the requirements analysis process, reduce errors, and deliver high-quality software within the specified timeline and budget.

Screenshots: -



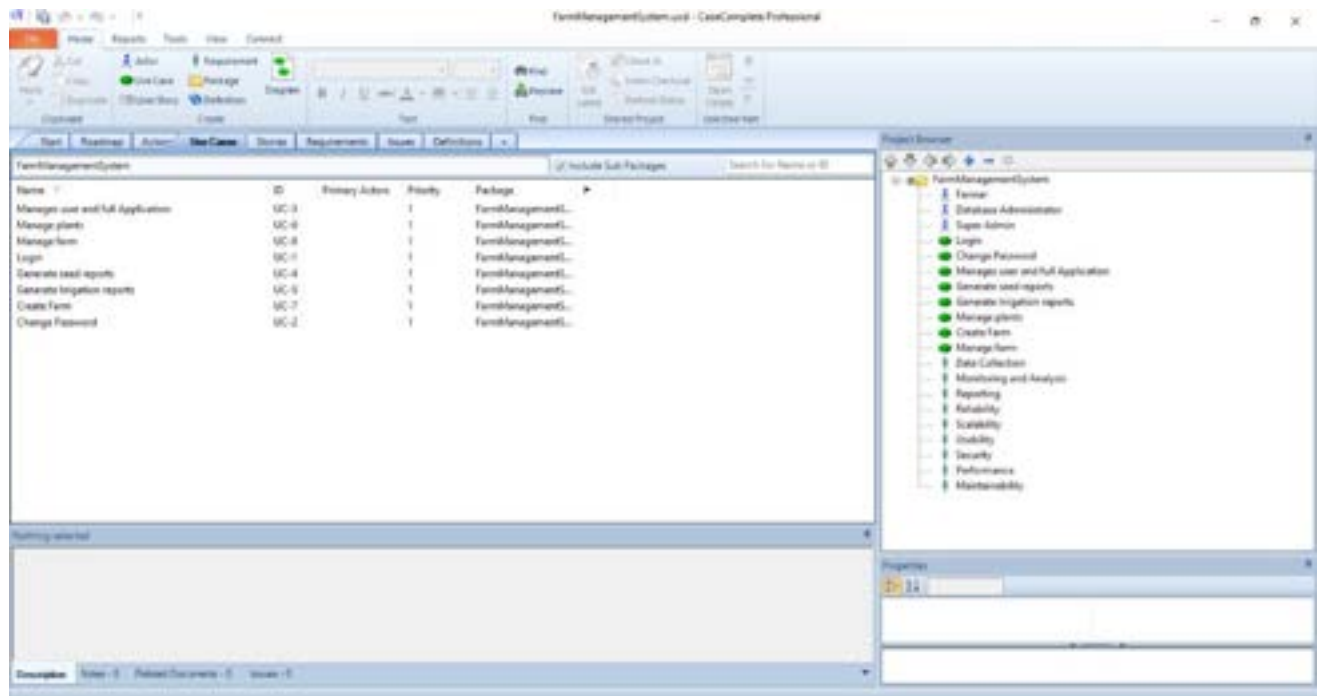
ACTORS AND ROLES:



Actors and Goals

Actor	Description	Goals
A-1	<i>Farmer</i> The person who uses the system.	<ul style="list-style-type: none"> Access the System Access data on seeds, Irrigation and Plants details.
A-2	<i>Database Administrator</i> The person who updates and manages the Database.	<ul style="list-style-type: none"> Generates report and updates the values. Manages user and full applications
A-3	<i>Super Admin</i> The person who manages the System.	<ul style="list-style-type: none"> Maintains the system and manages the system as a whole.

USE CASES:



UC-1 - Login

[Farmer](#) and [Super Admin](#) can Login here.



UC-2 - Change Password

[Farmer](#) and [Super Admin](#) can Change Password.



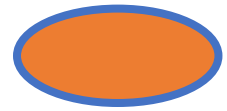
UC-3 - Manages user and full Application

[Super Admin](#) and [Database Administrator](#) do this.



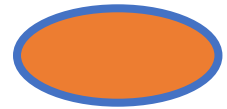
UC-4 - Generate seed reports

[Super Admin](#) and [Database Administrator](#) involve in this.



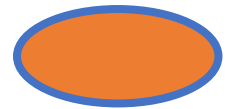
UC-5 - Generate Irrigation reports

[Super Admin](#) and [Database Administrator](#) involve in this.



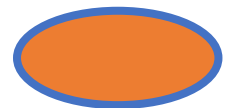
UC-6 - Manage plants

[Super Admin](#) and [Database Administrator](#) involved in this.



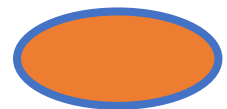
UC-7 - Create Farm

[Farmer](#) creates the farm.

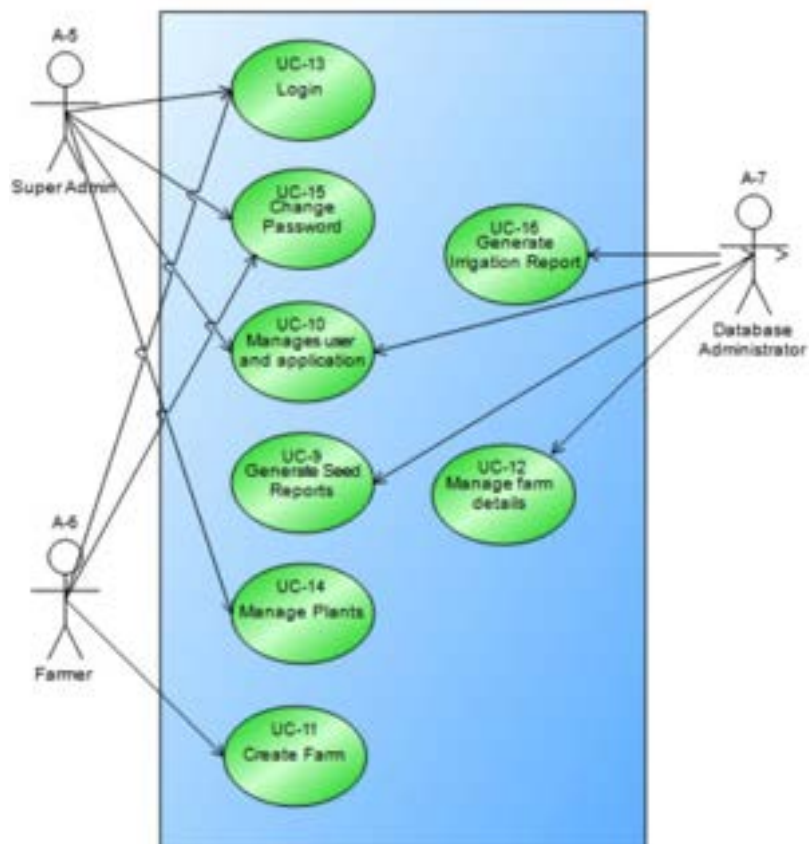
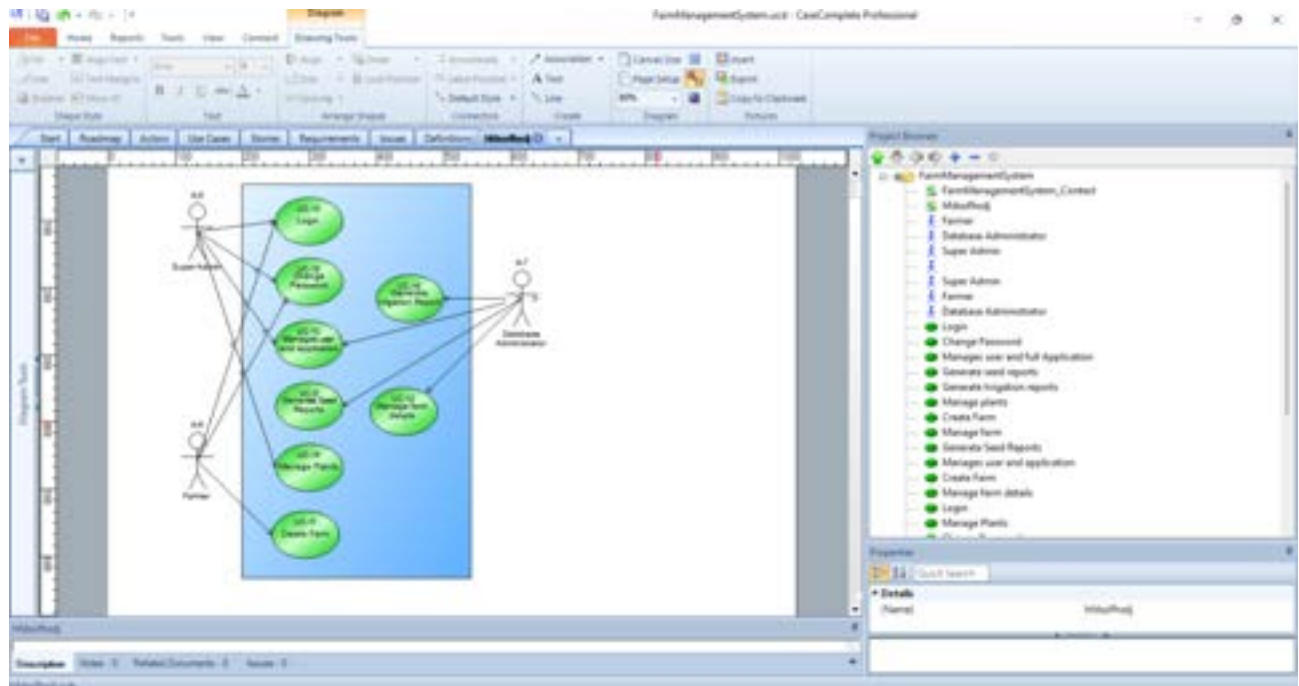


UC-8 - Manage farm

[Database Administrator](#) and [Super Admin](#) manages farm.



USE CASE DIAGRAM:



VISION DOCUMENT:



VISION DOCUMENT

April 5, 2023

SMART FARM MANAGEMENT SYSTEM

Introduction

The purpose of this document mainly is to collect, analyze and define the high-level needs and the features of the Smart Farm Management System. This system focusses on the capabilities and facilities needed by the stakeholder who is the Farmer's and the target users is the farmer itself. The details which are required by the Smart Farm Management System fulfills these needs are given in detailed manner in the Use-Case and the Supplementary Specifications document.

Purpose

Business Opportunity

The Smart Farm Management System (SFMS) provides an efficient, easy to do the agriculture activity by providing the correct details about the crop, the fertilizer and amount of water to be irrigated in a timely manner and helps the farmers to get the report.

Problem Statement

The problem of	Doing the agriculture without knowing the correct time for doing the farming activities
Affects	The growth of crop
The impact of which is	Difficult to give the yield on time
A successful solution	Providing the proper guidance for doing in correct manner

Market

The most of the farming techniques uses the manual examination of the crop by the farmers and the onsite monitoring for the generating of the reports. This system aims to replace the existing system.

Product Position

For	The Farmer's
Who	Needs a guidance for doing the agriculture
SFMS	It is a Web-Based Online System
That	Provides the guidance to the farmer to do the agriculture in a proper way, with timely information.
Unlike	Existing with the complete knowledge of the person who doing agriculture for long time
Our Product	Smart Farm Management System.

STAKEHOLDERS AND GOALS

Name	Represents	Role
Farmers	This SFMS evolved around the need of the Farmer	The information needed by the farmer for doing the agriculture is vital. The farmer should have the basic idea of using computer so that they can use the application to know the things.
Super Admin	The Super admin is the one who maintains and monitors the system	They have the adequate knowledge of computer skills
Database Administrator	They are responsible for the successful performance of the database environment	They make sure about the organization's database and the related application functions efficiently

Product Overview

The Smart Farm Management System (SFMS) to be develop benefits greatly the farmers and the people who are going to do the agriculture. As this system provides the complete information for doing the agriculture, the seeds that can be farmed in the season which is currently the place has. The system also provides the alerts the farmer for irrigating the crop in time & it also generates the report for the crop as per the given data updated by the farmer.

Features and Benefits

Smart Farm Management System

Customer Benefit	Supporting Features
The farmer can know what can be cultivated in the farm at the seasonal times.	The smart system implemented in the database system.
The farmer is get alerted the right time to do the irrigation.	This is made by using the data provided by the user after he/she irrigated in the field.
The farmer can get the report of the farm for every month.	This is generated from the database system under the monitoring of the super admin.

External Requirements and Constraints

Applicable Standards: -

The user should have either the internet or the wireless connectivity facilities.

System Requirements: -

The System needs to have the Internet explorer or the Google Chrome or Firefox of latest version or other Web Browsers. The mobile device should be able to connect to the Internet.

Performance Requirements: -

- The Information from the website should be able to download within a minute using a 56K Modem.
- The access time for a mobile device should be less than a minute.
- The information in the site should be refreshed for every 1 minute automatically.

Environmental Requirements: -

The Environment requirements for this product is none.

Documentation Requirements: -

User Manual: -

The ask me option describes the use to use of the system to the farmers. It describes the use of the system on the mobile systems. The user manual should be available as a hard copy and also as a online help.

Online Support: -

The SFMS provides the online help to the users who using their service and by which they assist them. The user can ask the query in the online and they get the solutions to their query.

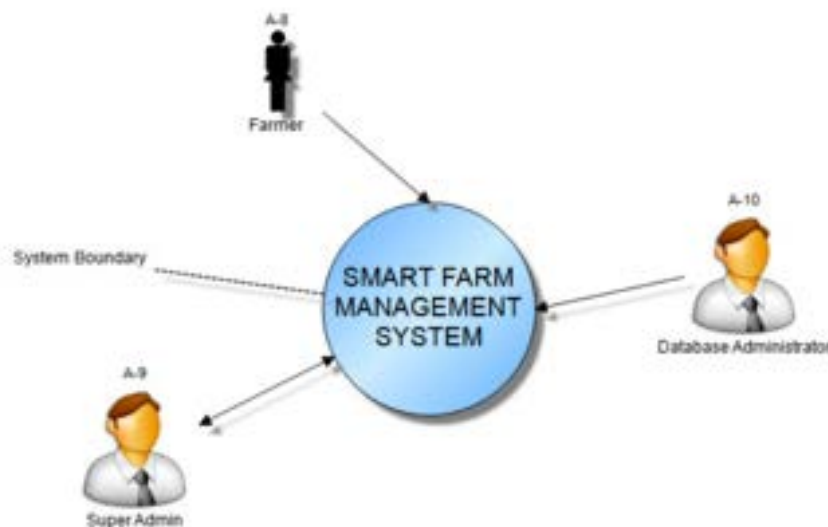
Labeling and Packaging: -

The expected sales of the Smart Farm Management System are less, our representatives will do most of the product installation and promotional materials will not be developed.

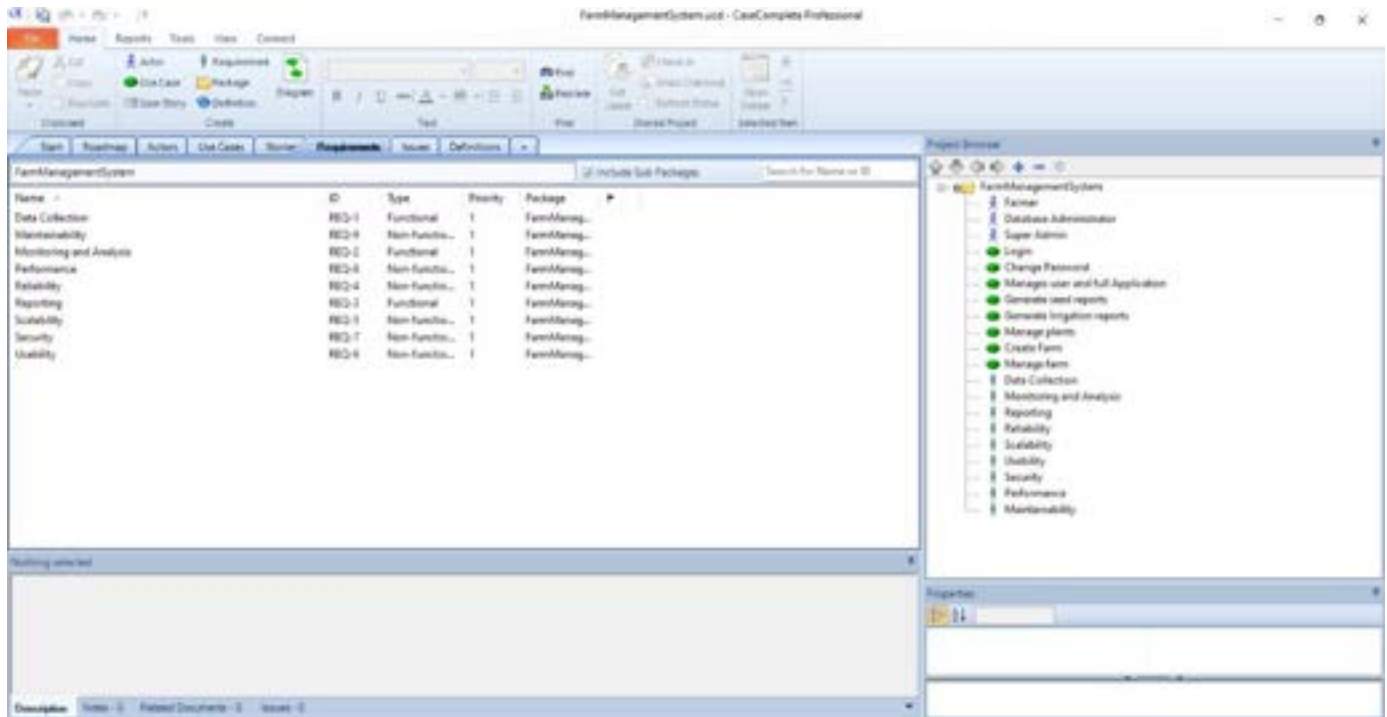
Constraints:

- ◇ The information of the users must be stored in a database and that will be managed by the super admin.
- ◇ The system of the user should have the necessary specification for installing the system.

CONTEXT DIAGRAM:



REQUIREMENTS:



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REQ-1 Data Collection

Functional **Priority 1**

[Super Admin](#) Collects the Data of the [Farmer](#) , Seeds, Plants.

REQ-2 Monitoring and Analysis

Functional **Priority 1**

[Super Admin](#) monitor and Analysis the data collected.

REQ-3 Reporting

Functional **Priority 1**

The system generates the report.

REQ-4 Reliability

Non-functional **Priority 1**

Reliability of the system is providing backup for database.

REQ-5 Scalability

Non-functional **Priority 1**

The ability of a system to handle increased workload or user demand without sacrificing performance is scalability.

REQ-6 Usability

Non-functional **Priority 1**

Ease with which users can interact with a system to achieve their desired goals.

REQ-7 Security

Non-functional **Priority 1**

The protection of a system, network, or application from unauthorized access, theft, damage, or disruption.

REQ-8 Performance

Non-functional **Priority 1**

The speed and efficiency with which a system or application can carry out its intended tasks and handle user requests.

REQ-9 Maintainability

Non-functional **Priority 1**

It helps to maintain the database and application server takes care of system.