

A Synopsis on

Transforming Agriculture with Technology

Submitted in partial fulfillment of the requirements
of the degree of

Bachelor of Engineering

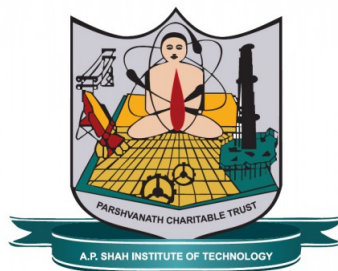
in

Information Technology

by

Amit Prajapati (15104014)
Amisha Karia (15104008)
DhruvKumar Patel (15104026)
Lavina Budhwani (16204019)

Prof. Rujata Chaudhari & Mr.Vinayak Narkar
Prof. Nahid Shaikh



Department of Information Technology
A.P. Shah Institute of Technology
G.B.Road,Kasarvadavli, Thane(W), Mumbai-400615
UNIVERSITY OF MUMBAI
2018-2019

CERTIFICATE

This is to certify that the project Synopsis entitled “*Transforming Agriculture with Technology*” Submitted by “*Amit Prajapati (15104014), Amisha Karia (15104008), DhruvKumar Patel (15104026) & Lavina Budhwani (16204019)*” for the partial fulfillment of the requirement for award of a degree *Bachelor of Engineering in Information Technology* to the University of Mumbai, is a bonafide work carried out during academic year 2018-2019

Prof. Nahid Shaikh
Co-Guide

Prof. Rujata Chaudhari
Guide

Mr. Vinayak Narkar
Guide

Prof. Kiran Deshpande
Head, Department of Information Technology

Dr. Uttam D.Kolekar
Principal

External Examiner(s)

1.

2.

Place: A.P. Shah Institute of Technology, Thane

Date:

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Amit Prajapati (15104014)

Amisha Karia (15104008)

DhurvKumar Patel (151040260)

Lavina Budhwani (16204019)

Date:

Abstract

In India, farmers have to search for the warehouse manually by visiting available warehouses in nearby location to find place for grain storage, this consumes a lot of time, efforts and money. If the particular warehouse accommodation is full then they need to visit various warehouse in search of space.

So we came up with the thought of making a site or application where in farmers can see online warehouse storage facility, crop suggestions, etc. So our solution will help Indian farmers to avoid problems such as waiting in long queue to get the space in warehouse for storage. The basic idea behind our project is to give an online web based application to the farmers so that he can get the storage space faster without much wasting of time, money and efforts. Our system will also give a notification to the farmer regarding the expiry of stored goods in particular warehouse according to their lifespan. Our system will be a multilingual for understanding of farmers. We will also provide them with informational videos regarding how to store grains at small scale if they cannot afford the price of warehouse. Along with that we are also providing a forum that can be utilized by the farmers to share their problems and get the solution for the same.

Introduction

Online storage space booking for grains will allow the farmers to ensure that the space is booked and so he can then transfer the grains to warehouse storage. It is a web based application that will allow the farmers to store their crops in a warehouse. Using our system they can book space for their goods which can save both time and money of a farmers. Farmers can check availability of space and can directly approach to the nearest warehouse for storage. Our system will also help the farmers to take decision about which warehouse he should select based on the passed data analysis and geographical location using Machine Learning. We are providing a forum wherein farmers can discuss their problems and get their solution which will lead to formation of a farmers community. Our system has a Super-Admin to take care about validation on warehouse owner also a particular farmer. Our application will be a user friendly application so that the farmer can use it easily with convenience.

The purpose of this project is to provide online store so that the grains which are produced are stored properly and wastage of grains is avoided. The main users of this website will be farmers, warehouse owners and Super-Admin. It will help the farmers to get the storage space online so that they can book the space in warehouse for grain storage in advance. This will help them to sell their products at profitable rate and they will get the proper income because if the storage space is real time it will reduce the efforts taken by an individual farmer to search space for storing their goods. It will help the farmers for weather analysis i.e. they will be getting the weather related information which will help them to take various precautions related to their crop cultivation. Also we are going to provide some alternative solution videos on our forum and community page from which they will get help how to use that solutions and the farmers have privilege to add any comments or give suggestions.

Objectives

The objective of our project is to provide an application or a web based service of warehouse booking system for crops storage to farmers. Using our system they can book warehouse space for their goods which can save both time and money of a farmers. Farmers can check availability of warehouse space and can directly approach to the nearest warehouse for storage. Also a site which is multilingual and will provide a forum to discuss various problems amongst the farmers is also the objective. Weather Analysis system for predicting crop cultivation which will help the farmers to gain more profit by cultivating that particular crop in that weather condition.

Literature Review

We did the on-site survey where we visited various warehouses, had a word with farmers and concluded that they are facing some problems for storing the grain, and they need to travel alot if the warehouse booking is full which ultimately leads to wastage of time and money. So we came up with the idea of giving an online interface to the farmers, so that they can book the storage space online, get a crop prediction, also a forum where in they can discussion the problems to the various solutions.

Igor Oliveira, Renato L. F. Cunha, Bruno Silva, Marco A. S. Netto have presented a paper at 14th IEEE eScience entitled "*A Scalable Machine Learning System for Pre-Season Agriculture Yield Forecast*". They have implemented a Deep Neural Network (DNN) using machine learning model to predict Pre-Season Agriculture Yield Forecast. This system is a very useful tool for farm management and can help stakeholders to perform critical decisions in their agricultural operations. Their results show that farmers and agriculture stakeholders can benefit from useful information with significantly fewer data requirements and maintain useful accuracy values. They have give two contribution, first to check the yield forecast system based on fewer data requirements compared to existing yield forecast solutions which demand large amounts of remote sensing data and the capability of forecasting yield before the beginning of the crop season.

Pamidi Srinivasulu, R Venkat, M. Sarath Babu, K Rajesh have presented a paper at 2017 International Conference on Electrical, Instrumentation and Communication Engineering (ICE-ICE2017) entitled "*Cloud Service Oriented Architecture (CSOA) for Agriculture through Internet of Things (IoT) and Big Data*", they used various technologies like Big Data, Internet of Things (IoT), Cloud Computing, etc which is proving to be a big boon to the farmer who otherwise is made to undergo a tough time in view of lack of the technology that he/she should have been adapted by this time. They provide service like crop management, marketing, finance management, e-commerce, web services through cloud etc. which also will reduce the unemployment problem in the youth. It also makes agriculture not only a profession for living but also a profitable sector in the globe which further enhances the GDP.

Shreya S. Bhanose, Kalyani A. Bogawar, Aarti G. Dhotre, Bhagyashree R. Gaidhani have presented a paper in INTERNATIONAL JOURNAL OF ADVANCE SCIENTIFIC RESEARCH AND ENGINEERING TRENDS, — Volume 1 — Issue 1 — April 2016 — ISSN (Online) 2456-0774 "*Crop and Yield Prediction Model*" using data mining algorithm like k-Means, k-Means++ and traditional k-Means for crop and disease prediction as well as predict crop water requirement. By Modifying the cluster algorithm they have improve the accuracy of a system as it achieves the high quality clusters duet initial cluster centric selection. In this proposed, they have to change existing algorithm like K Mean clustering algorithm because Traditional clustering algorithms such as k-Means, improved rough k-Means and-means++ makes the tasks complicated due to random selection of initial cluster center and decision of number of clusters.

S.Pudumala, E.Ramanujam, R.Harine Rajashree, C.Kavya, T.Kiruthika, J.Nisha have presented a paper at 2016 IEEE Eighth International Conference on Advanced Computing (ICoAC) entitled "*Crop Recommendation System for Precision Agriculture*". Precision agriculture is a modern farming technique that use research data of soil characteristics, soil types, crop yield data collection and Suggests the farmers the right crop based on their site-specific parameters. This system reduces the wrong choice on a crop and increase in productivity. By growing the grain which is soil specific will give the farmer more yield and ultimately more financial profit. They have used data mining algorithms- Random Tree, CHAID, Naive Bayes and K-NEAREST NEIGHBOR to do the processing of data set and come to a result.

Prof. D.S. Zingade, Omkar Buchade, Nilesh Mehta, Shubham Ghodekar, Chandan Mehta has presented a paper at International Journal of Advance Engineering and Research Development Special Issue on Recent Trends in Data Engineering Volume 4, Special Issue 5, Dec.-2017 entitled- "*Crop Prediction System using Machine Learning*" using data analysis techniques. The proposed project provides a solution for Smart Agriculture by monitoring the agricultural field which can assist the farmers in increasing productivity to a great extent. Weather forecast data obtained from IMD (Indian Metrological Department) such as temperature and rainfall and soil parameters repository gives insight into which crops are suitable to be cultivated in a particular area. This work presents a system, in form of an android based application, which uses data analytics techniques in order to predict the most profitable crop in the current weather and soil conditions. The proposed system will integrate the data obtained from repository, weather department and by applying machine learning algorithm: Multiple Linear Regression, a prediction of most suitable crops according to current environmental conditions is made. This provides a farmer with variety of options of crops that can be cultivated. Thus, the project develops a system by integrating data from various sources, data analytics, prediction analysis which can improve crop yield productivity and increase the profit margins of farmer helping them over a longer run.

Problem Definition

Existing System

Now a days, lots of amount of Agriculture products/grains/goods get waste just by keeping it in own storage for long time. And also, problem faced by the farmers is to store their food grain to the warehouse. They have to wait in long lines to get the storage space in warehouse for their grains. If warehouse gets full then remaining farmers need to search for other warehouse which leads to wastage of time, efforts and money. Another problems faced by farmers to use website is language barrier due to which they are not able to use website or apps. Farmers also faced problems due to climate change. Farmers grow crops but dont get desired production, due to climate change crops are affected.

Solution Proposed

So we have propose the solution which will solve all the above problems. We will make an online web portal where in the farmer will be able to choose desired warehouse based on his location and crop capacity. Once he chooses the warehouse and stores his grain he will get notification regarding the expiry of the stored grains in warehouse. Along with online warehouse facility we are also giving a weather analysis report to predict the next crop cultivation. The most important aspect is the language barrier so the site will be multilingual, according to their choice farmer can access the site with desired language. Also informational videos related to storage of grains at small scale without warehouse will be available so that the farmer who cannot afford the cost of warehouse can refer them and store grains remotely. Online forum for discussion with other farmers will also be provided.

Proposed System

Our Project is divide in four major module and we are going to form network of these four different module for more reliable communication in our system. We have following module:

1. Farmer
2. W-Owner
3. Super-Admin
4. Intelligent System

- **Farmer**

We are more focusing on the farmer that's why the main user of our system will be a farmer. When Farmer want to use our service then he has to enter the details required to do the registration with Aadhar no which will be use as key point of user verification if require. All the entered data will be sent to the server for validating particular user and it will also check whether the user is register or not. It will be check by making request from Web Server to database server which have Registered User Data. After checking the

response from the database server if the user is already registered then the user can access the web application by Login into our system using credentials.If user does not exist in the Register User Database then data will be store in database and user will be registered. Once user will submit the details user will get OTP for mobile verification using SMS API on the Phone no which they have used for registering to web application. After entering the OTP our system will validate the OTP if user submit correct OTP then he will be redirected to the login page where user have to enter the username and password.When user will click on the login button username and password will be sent to the server for verification. If the login parameter will matches with the Register User Data present in database then user will be login and login session will be started. Once farmer will login first time he must complete the remaining details for enabling warehouse booking service using their location.Location of the user will be send to the server and the location of the user will be compared with the location of warehouse.and result will be sent to the user. Here we can use location API so that appropriate farmer location is sent and results are generated accurate.

Farmer will view the warehouses which are nearby to there own location and check out space availability and book them accordingly.After finalizing ever aspect he re queries,he will then click the book button for the warehouse which he wishes to book.Once selected a plot for booking the user have to pay certain token amount within a particular period of time or else the system will revoke the booking of that slot for payment user will be directed to the payment portal. When a token amount is paid by user ,she/he will now allotted the chambers in the warehouse.In my booking they can view booked space and the time period for which they have booked the chamber.We are going to provide them crop recommendation according to the weather analysis.We are going to collect the data for weather analysis and then store it to our website and according to the weather we will recommend farmers for the crop cultivation.We are going to provide them alternate solution videos for storage if the farmer is not able to pay the rent then he/she can simply watch the video and can make some sort of small storage in there house itself.

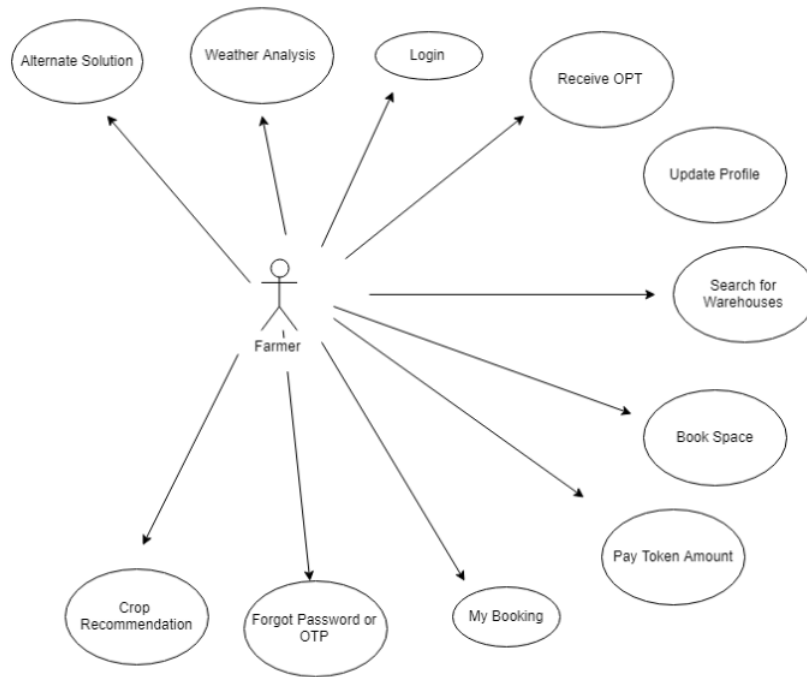


Figure 1: Use Case Diagram of Farmer

• Warehouse Owner

Owner have to enter the details required to do the registration and also have to fill the Aadhar detail. It is mandatory while filling the details the owner has to provide the location. Once the warehouse-owner have entered the details then it will be sent to the server for checking that the particular user is valid owner and also not a registered owner and that server will be handled by the super admin. If the w-owner is already registered then the w-owner will receive a prompt that the w-owner is already existing.If w-owner does not exist then w-owner will be registered and w-owner will receive an OTP on their entered mobile number.

Now w-owner will enter the no of chambers and the capacity of chambers. W-owner can edit,remove or change status of the chamber. When a user books space in the warehouse w-owner will receive the notification. W-owner can also view the users who have booked the chambers in their warehouse. W-owner can view the transaction history of the warehouse.If w-owner owns multiple warehouses so he/she can add the other warehouse and its details.

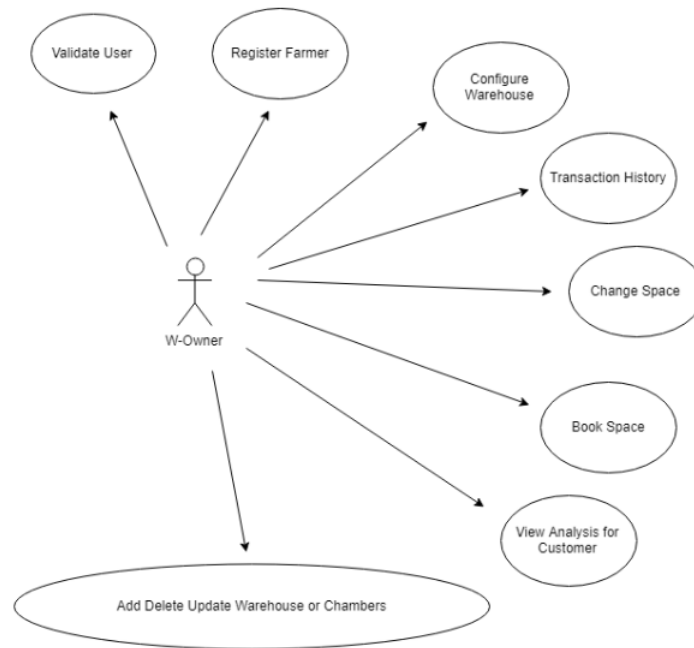


Figure 2: Use Case Diagram of Warehouse Owner

- **Super-Admin**

The super admin has all the rights to control the farmer and the w-owner. The super admin will receive the complaints from the farmer and also from the w-owners. Once the complaints are received the super admin will work on it and provide them the perfect solution for the problems they are facing. The super admin is going to provide the analysis report to the owner and the farmer once the analysis is provided to them they are going to get the notification. As the weather analysis report is generated it is going to be sent to the higher authorities for the verification i.e the report is sent to the government. once it is verified then it is going to be displayed on the website also if the report include some important notice that will be sent to all the website users via a notification using ML system. The super admin is going to generate the survey report.

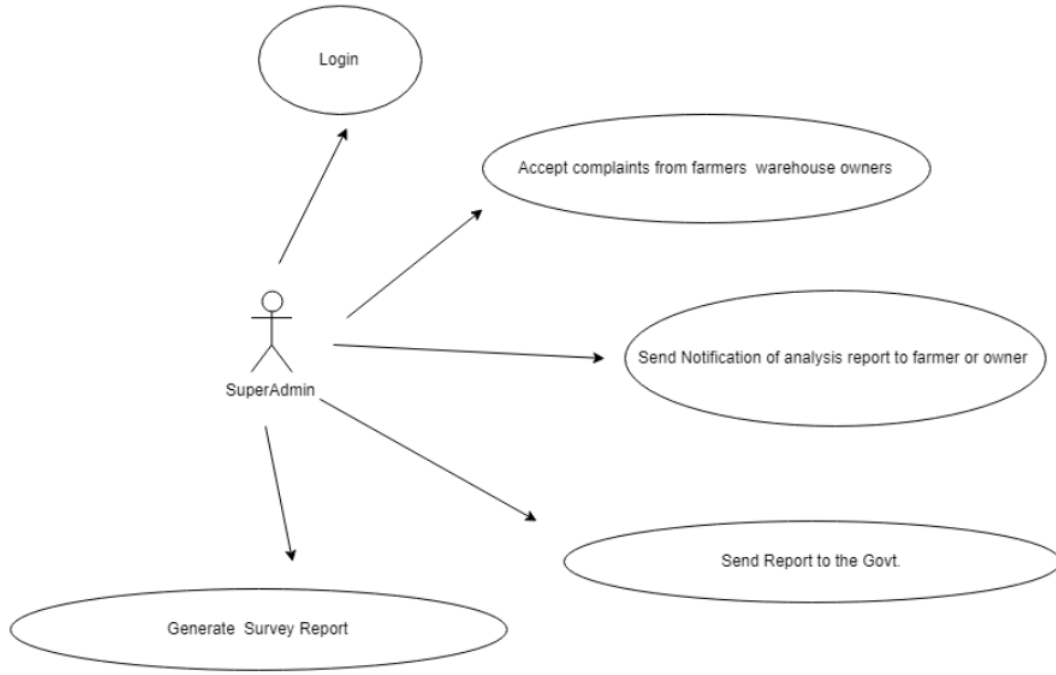


Figure 3: Use Case Diagram of Super-Admin

- **Intelligent System: Heart of Warehouse Management System**

Intelligent System is center point of Our Warehouse Management System. Intelligent System consist of Machine Learning engine will calculation and will take all parameter such as location of user using Location API, data set of Crop and Grain, data set of weather API. All this data set will be compute by Intelligent System and it will build a prediction system will be use to will do future Predication of Crop based on Location and Weather condition.

Intelligent system will also send the notification to all farmer about crop suggestion and weather prediction. System will also generate auto report whenever Super Admin will click on Generate report button, all the analysis will be summarize and visualize for under stability for higher authority where Super Admin will send the report for verification. This all functionality is very much important and Intelligent system will perform all this activities that's why we called it as Heart of Warehouse Management System.

Summary

The project include three main modules-Farmer, Warehouse Owner and Super Admin.The project can be operated either as a warehouse owner or farmer, they have the utility to register themselves and avail the various options of the site such as booking a warehouse,adding new chamber, change chamber size,getting a notification for crop prediction,etc. We also have a forum where in the farmers can discuss their problems and get the solution for the same.

We have done research on how a data warehouses work also we found out that warehouse has various chambers and every chambers have their name and farmers are allotted the chambers according to their requirement.We have created SRS document based on our research and the IEEE Standard format provided by our guides. It includes each and every point as specified in the Standard format template.We also prepared prototype of our paper where in we have designed the flow of our site for each user.

References

- [1] Igor Oliveira, Renato L. F. Cunha, Bruno Silva, Marco A. S. Netto, A Scalable Machine Learning System for Pre-Season Agriculture Yield Forecast,arXiv:1806.09244v1
- [2] Pamidi Srinivasulu,R Venkat,M. Sarath Babu,K Rajesh,Cloud Service Oriented Architecture (CSOA) for Agriculture through Internet of Things (IoT) and Big Data,2017 International Conference on Electrical, Instrumentation and Communication Engineering (ICEICE2017).
- [3] Shreya S. Bhanose, Kalyani A. Bogawar, Aarti G. Dhotre,Bhagyashree R. Gaidhani,Crop and Yield Prediction Model,International Journal Of Advance Scientific Research And Engineering Trends,Volume 1 — Issue 1 — April 2016—ISSN (Online) 2456-0774.
- [4] S.Pudumala, E.Ramanujam,R.Harine Rajashree, C.Kavya, T.Kiruthika, J.Nisha,Crop Recommendation System for Precision Agriculture,2016 IEEE Eighth International Conference on Advanced Computing (ICoAC).
- [5] Prof. D.S. Zingade,Omkar Buchade,Nilesh Mehta,Shubham Ghodekar,Chandan Mehta,Crop Recommendation System for Precision AgricultureInternational Journal of Advance Engineering and Research Development Special Issue on Recent Trends in Data Engineering , Volume 4, Special Issue 5, Dec.-2017.
- [6] Link of the drive of paper referred <https://drive.google.com/open?id=10a-A85xa9Q93tmb40xGigKSSLf2H2Ij>

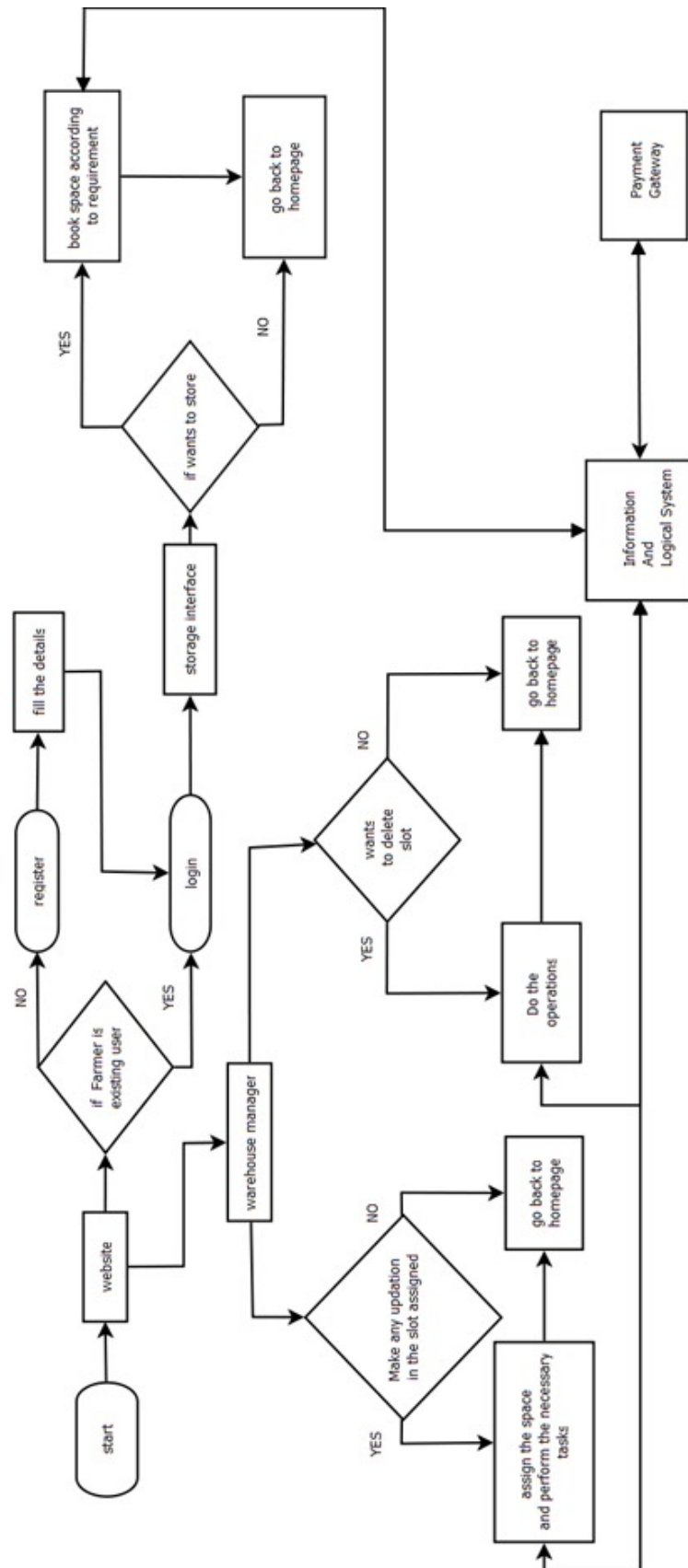


Figure 4: Block Diagram for Transforming Agriculture with Technology