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Qualitative Agriculture Product Analysis Based SPSS Software & Management using Cloud Computing

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Abstract

Cloud computing technology has brought great opportunities to the development every sector. This technology allows for much more efficient computing by centralizing storage. Developed countries are using Management Information System to assist different task for their end users or clients. One of the ancient fields in India which plays a major role in our economic development is agriculture domain. However our ancient techniques are still prevalent in India which is a main hurdle for fast development. Keeping this scenario in view we developed a agricultural information system to maintain the agricultural crops details on cloud. The agricultural information system provides facility to farmer to upload up to date crops details on cloud and its users get comparative output of the crop. Online information about the crops. This will provides direct communication between farmer and user. So that there is no intermediate person in between farmer and user. Cloud will act as an intermediate in this. This Information System provides the external users, the ability to obtain summarized information in a preferred format. Cloud will provide comparative output to the users. The comparison will take on certain factor like quality, rate, nearest location, etc. In this information system our focus is also on prediction of future crop production. The problem of yield production can be solved by using SPSS software to perform analysis on available data.

Keywords: Cloud computing, agricultural economy, eAgriculture, SPSS software.

1. Introduction

In recent years, many challenges have been faced by agriculture industry. In a country like India, where much of the population depends on agriculture for survival, corps monitoring is critical and the demand for environmental monitoring and remote controlling in agriculture is rapidly growing. However, there has been little research on sensor network applications for agriculture. An agricultural monitoring system provides monitoring services, and thus maintains the crop-growing environment in an optimal status. This system also improves the convenience to and productivity of users. However, existing agricultural monitoring systems are mostly applied and utilized in closed agricultural environments such as greenhouses, cattle sheds, etc., as it is difficult to apply agricultural monitoring systems in outdoor locations because of lack of IT infrastructure.

The productivity of agriculture is very low. So as the demand of food is increasing, the researchers, farmers, agricultural scientists and government are trying to put extra effort and techniques for more production [4]. In addition, when a user want to verify the monitored information in an existing monitoring system, the user must manually check the status through installed sensors or terminals installed in the agriculture facilities.

The agricultural information system provides its users to get online information about the crop, statistical details and new tendencies. The trends of the crops act so that these will be pretty important to the users who access these via the Internet. The main features of the information system includes information retrieval facilities for users from anywhere in the form of obtaining statistical information about fertilizer, quantity available, price, suitable soil concentration for the corresponding crops and etc.

The paper also surveys and analyzes future production of crops. We perform linear regression analysis by using SPSS software, which compares the previous year data to obtain a conclusion that what will be the possible production of crops. Analysis will be perform on certain factor like climate, water supply, soil fertility, pesticides used, etc.

2. Proposed System

Developing an user friendly agricultural Information System for the world wide web, which fulfil the Agriculture interested people's requirements. The main objective of this proposal is to introduce an agricultural information system for the major crops of various species. This system will be Helpful for getting full details regarding the Crop for quality and quantity. It will also provide facility to get the complete details of assumed production. Here, actual work is focusing over the

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prediction of future crop production after performing analysis. This Information System provides the external users the ability to obtain summarized information in a preferred format. It will provide direct communication between customer and farmer. Customer will get the comparative crops details. This system will also provide analysis of uploaded crop to predict the future output crop production.

2.1 Cloud computing

Cloud computing is a distributed computing technology, through a computer network the huge computing handler will be split and analyzed by a number of separate servers, then ultra millions or even hundreds of millions of
Information services will be available within seconds, so the users not only can get super computing capabilities but also can reduce resource inputs and waste [4].

2.2 SPSS Software

SPSS (Statistical Package for Social Science) is widely used for Statistical analysis. SPSS can read a variety of data formats, including data files saved in SPSS format, SAS datasets, database tables from many database sources, Excel and other spreadsheets, and text data files with both simple and complex structures used to generate tabulated reports, charts and plots of distribution and trends. SPSS data file can contain more than simple data values. The SPSS dictionary can contain a variety of metadata attributes, including measurement level, display format, descriptive variable, and value labels, and special codes for missing values. You can perform different functionality for analysis, to more advanced tasks.
In SPSS Linear Regression command calculates multiple regression equations and associated statistics and plots. Linear Regression also calculates co linearity diagnostics, predicted values, residuals, measures of fit and influence, and several statistics based on these measures. Linear Regression analysis finds relationship between independent and dependent variables.

3. Related Work

In Indian agriculture field, up till now no such techniques are used to improve the current status of our agriculture. Traditional methods are used for improving the economy, these causes the down fall of the Indian agriculture economy. Government introduces and promotes various information and communication techniques but there is no such development is happened.

3.1. Framework to leverage cloud for the modernization of the Indian agriculture system

[1]Earlier work is done on cloud deployment model, which provides information related to agriculture to the farmer living in the rural area. facing financial and connectivity constraints. The model leverages the existing Government services and mobile service to provide a solution to existing scenario with minimum burden on farmer's pocket.

3.2. AgroMobile: A Cloud-Based Framework for Agriculturists on Mobile Platform

Shitala Prasad, Sateesh K. Peddoju and Debashis Ghosh[3],focused on crop image analysis, which requires large amount of computation power and memory to process for which a mobile devices fails. For computation power and memory author introduces the concept of mobile cloud computing (MCC), so that farmer will upload his details on cloud.

3.3. Analysis of suitability and prospect of the application of cloud computing in agricultural economy in China

[4] discussed the impacts of cloud computing for China's agricultural development; they discuss the application for the storage of agricultural production. They also provide early-warning and policy-making based on the agricultural products market, the tracing management of agricultural products quality.

3.4. Data Mining Techniques: A Tool for Knowledge Management System in Agriculture

Latika Sharma and Nitu Mehta [13] have attempted data mining techniques for knowledge management in agriculture. In Data warehouses is prepared for agriculture data, which makes transaction management, information retrieval and data analysis much easier. This is used for forecasting or prediction in agriculture.

In this paper, we focusing on analysis of factors used for production which will analyze the future production of crop. The paper is also focusing on management of agricultural product for online sailing of the product.

4. Implementation

Implementation of this module is mainly focusing on two modules.

4.1. Application Module

Application module is focusing on customer and farmer direct communication. For this both customer and farmer needs to do registration first.

4.1.1. Farmer Module

Farmer need to do Registration First, he will get a Unique Id. He will upload all Details about his Crops, Productivity, Quality and Quantity. A questionnaire is prepared for respective farmer. He will get the record of order Placed by Customer, and can give details about it. Farmer will be most benefited from this Application ; as there is direct

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communication with Customer. Farmer will insert Details of his Agricultural Productivity and Fertility in Cloud. Only Authenticated user can access Data from the Cloud.

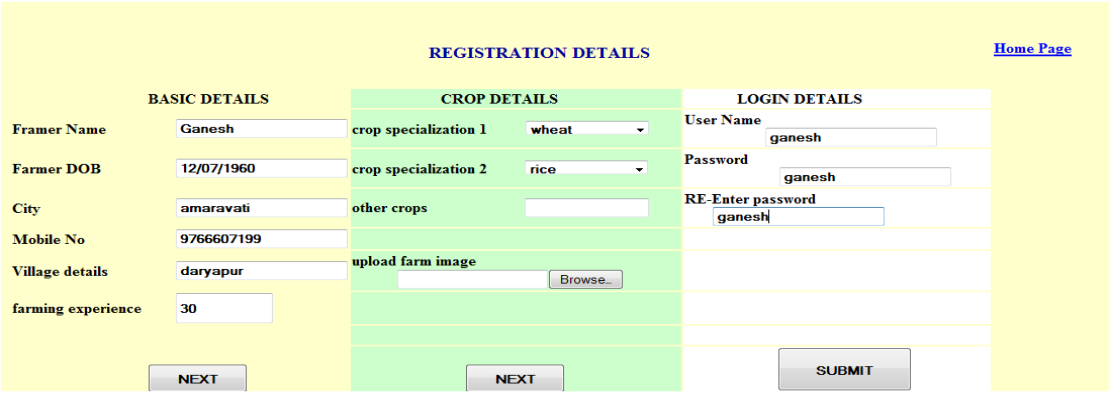

Figure 1 Registration details of farmer

4.1.2. Customer Module

Customer also has to do Registration first, only registered user can placed order .The details about various Customers are maintained in Database properly and each has a unique id. Only Register Costumers can send Query to Cloud and Get reply from it. Customer will place his order by comparing the product with another. Cloud will send details accordingly to the requirement automatically. Customer also sends his particulars to the Cloud which forwarded to farmer via cloud.

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Figure 2 Comparison of product

4.1.3. Order Placement

Customer will place the Order after getting the Suitable product. He will mention all his Basic Details, Order Details of Quantity properly. He will also provide his Shipping Details with Proper address to get his Product on time.

4.2. Research Module

It will provide facility to get the complete details of assumed production.Here, actual work is focusing over the prediction of future crop production after performing analysis

4.2.1. Questionnaire

A questionnaire is prepared for research which consists of series of questions. It is used for gathering information from respondents. It is cheap and do not require much

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effort from the questioner and have standardized answers that make it simple to compile data.

	A	B	C	D	E	F	G	H
	Year	Production of crop	watersupply	climatic factor	soil fertility	pesticides used	Labour force	profitability
	2012	6	5	4	6	5	3	7
	2013	5	5	4	6	8	4	6
	2014	5	5	6	7	5	4	5
	note:	Rating is given from (1-10)	1- Excellent	10- Bad				

Table 1 Questionnaire

4.2.2. Input Analysis

To perform analysis on questionnaire is transferred to SPSS input given as follows

Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
YEAR	Numeric	8	0		None	None	8	Right	Scale	Input
PRODUCTI...	Numeric	8	0		None	None	11	Right	Nominal	Input
WATERSU...	Numeric	8	0		None	None	18	Right	Nominal	Input
CLIMATICF...	Numeric	8	0		None	None	20	Right	Nominal	Input
SOILFERTI...	Numeric	8	0		None	None	21	Right	Nominal	Input
PESTICIDE...	Numeric	8	0		None	None	17	Right	Nominal	Input
LABOURFO...	Numeric	8	0		None	None	11	Right	Nominal	Input
PROFIBALITY	Numeric	8	0		None	None	11	Right	Nominal	Input
LMCI_1	Numeric	11	5	95% L CI for W...	None	None	13	Right	Scale	Input
UMCI_1	Numeric	11	5	95% U CI for W...	None	None	13	Right	Scale	Input
LMCI_2	Numeric	11	5	95% L CI for W...	None	None	13	Right	Scale	Input
UMCI_2	Numeric	11	5	95% U CI for W...	None	None	13	Right	Scale	Input
LMCI_3	Numeric	11	5	95% L CI for L...	None	None	13	Right	Scale	Input
UMCI_3	Numeric	11	5	95% U CI for L...	None	None	13	Right	Scale	Input

Table 2 Input to SPSS

4.2.3. Linear Regression analysis

Linear regression is used to statistical procedure for predicting the value of dependent variable from independent variable. Variable we want to predict is called dependent variable

Equation is

$$Yp=mX+b$$

Yp-predicted value of dependent variable
m-slop of regression line
b- Y-intercept of line

Variables used for linear regression is as given
Dependent Variable:-Production of crop
Independent Variable:-water supply, climatic factor, soil fertility, pesticides used Labor force, profitability

5. Result

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PROFIBALITY, PESTICIDES USED[b]	.	Enter

a. Dependent Variable: PRODUCTION

b. Tolerance = .000 limits reached.

Table 3 Variables Entered/Removed

The variables Entered/Removed part of output states that which independent variables is part of equation. This is to make sure that what independent variable you want as output

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	1.000[a]	1.000	.	.	1.000	.	2	0	.

a. Predictors: (Constant), PROFIBALITY, PESTICIDESUSED

b. Dependent Variable: CLIMATICFACTOR

Table 4 Model Summary

Model summary is useful in multiple regressions. This table gives R and R square value. R value represents simple correlation and 1.00 indicates high degree of correlation. R square indicate how much of the total variation in the dependent variable can be explained by independent variable.
In this 100% can be explained, which is very large.

Coefficient Correlations[a]

Model			PROFIBALITY	PESTICIDES USED
1	Correlations	PROFIBALITY	1.000	.000
		PESTICIDESUSED	.000	1.000
	Covariances	PROFIBALITY	.000	.000
		PESTICIDESUSED	.000	.000

a. Dependent Variable: PRODUCTION

Table 5 Coefficient Correlation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.333	.000		.	.	3.333	3.333					
	PESTICIDESUSED	-.167	.000	-.500	.	.	-.167	-.167	-.500	-1.000	-.500	1.000	1.000
	PROFIBALITY	.500	.000	.866	.	.	.500	.500	.866	1.000	.866	1.000	1.000

a. Dependent Variable: PRODUCTION

Table 6 Coefficient

The coefficient correlation table and coefficient table provides necessary information to production from profitability and pesticides used, as well as to determine

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whether profitability and pesticides used contributes statistically significant to the model.

Following Scatter graph is generated for analysis

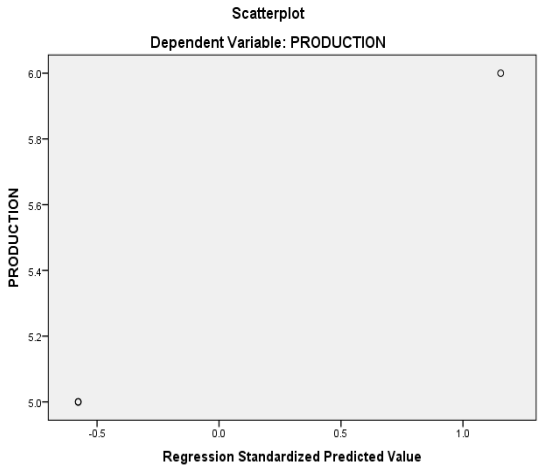

Figure 3 Scatterplot 1

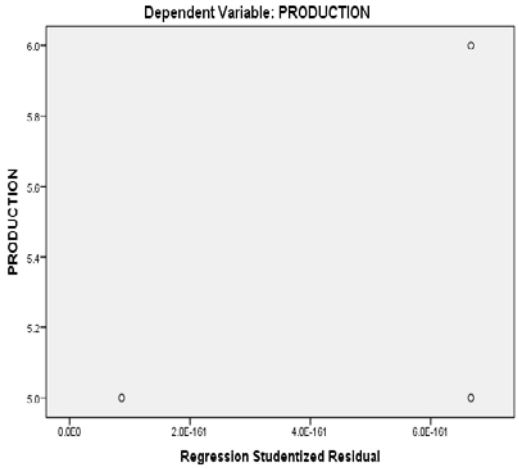

Figure 4 Scatterplot 2

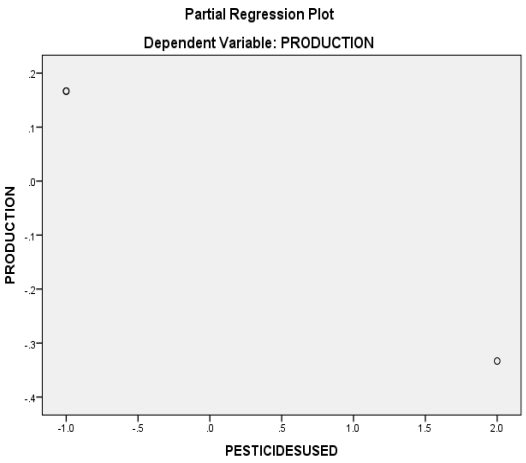

Figure 5 Partial Regression Plot 1

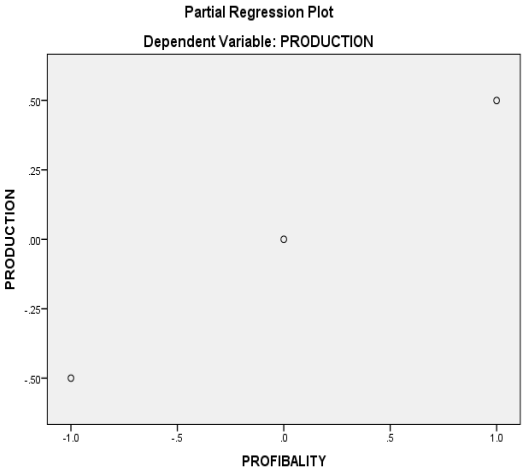

Figure 6 Partial Regression Plot 2

6. Conclusion & Future Work

Here, the work aims at developing the system which can easily retrieve by the farmer to sail his crops online .It is also helpful for the customer who want to purchase his agriculture product online. Use of information technology can change the scenario of decision making and farmer can yield in better way. As it will become more user friendly because the trend of online shopping is increasing day by day. This project is an initial proposal to show that this kind of information system and Shopping Agricultural Product System is forcible. Current system is focusing on major 3 crops which include wheat, rice and sugar. In future scope, this work can be propagated for more crops, vegetables and fruits. For analysis it consider major 7 factors and also consider last 3 years data. In future , these factors can be varied and production year is also increased.

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