INTRODUCTION

1.1 Overview

This is one of such projects that solely concentrates on making the farming process more efficient and accurate by analysing the different conditions of a farmland. This project not only helps in easing the farmer's jobs and making their life better but also helps in saving variety of environmental resources. Agriculture is not a very promising occupation, as there is no guarantee that crops will be healthy and farmers could make profit out of it, most of the farmers do cultivation alongside other occupation instead of taking farming as primary occupation. This leads to poor care of the crops as the time that these farmers could allocate to these crops are very limited in their busy schedule. So, this is where this project comes into play. The main motivation of this project is to provide these farmers with a system that tries to resolve the issues thereby saving time, resources, money and man power. The main goal of this project is to act as a kit for the farmers by aiding them with the agricultural process from beginning to end.

1.2 Purpose

The purpose of this project is to find a place for the crop or find the crop for the place based on the temperature, rainfall, soil type, wealth of the soil and profit in that process. This project gives the detail of the agriculture process that take place in the land with their requirements. This project includes suggestion of crops that would be best suitable for cultivation in a particular farmland after the consideration of the weather and climatic conditions of that geo-location. It is very helpful to build the ecosystem in a certain area of people to cultivate of different crop not leading in harvesting the same crop high and also harvesting the crop in small. By making a discussion can make the market better. It's the basic process but build a basic strong makes the success.

The main idea of the project is to giving choices for the traditional farmers to seed their crop in correct condition. They knew how the crop will grow ,when to use pesticide and so on. But now the climatic condition is changing and so the calendar of the crop was changed. This project helps to analyse the starting stage of the agriculture.

LITERATURE SURVEY

2.1 Existing problem

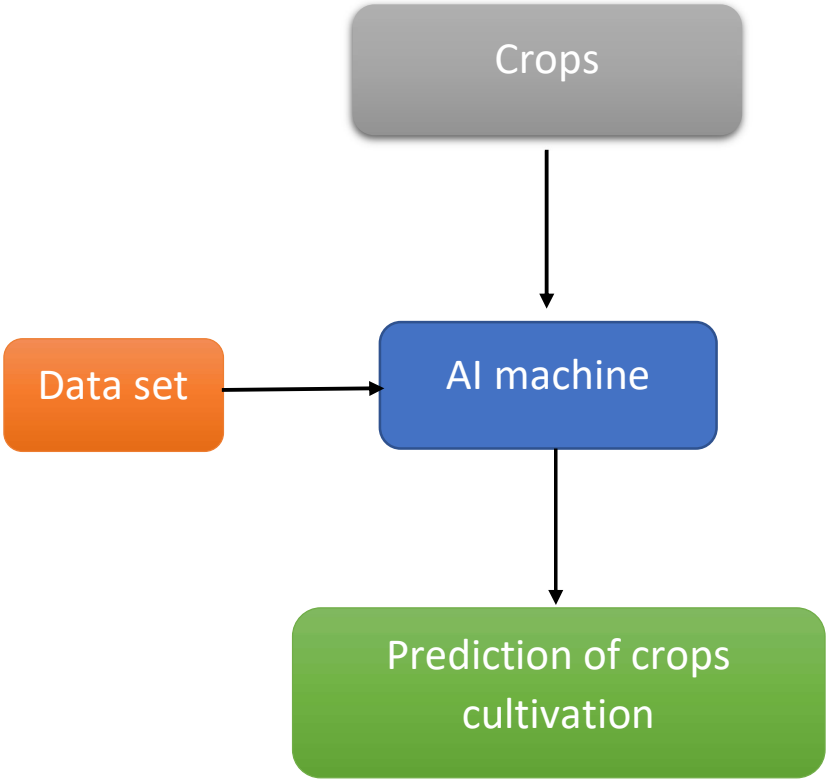
S/N	Author(S)	Year	Problem	Method	Contribution
1	Jeong et. al. [4]	2016	This work aimed at examining the performance efficiency of the random forest algorithm in crop yield prediction for the wheat crop, potato crop, and maize crop.	The random forest algorithm was used to train the datasets, and the same datasets were applied to an MLR model as a benchmark for the random forest algorithm.	The work showed that the random forest algorithm is far more effective in crop yield prediction.
2	Ming et. al. [5]	2016	This work involved classification of land cover based on image and remote sensing.	Random forest machine learning algorithm was used in the classification of image data.	Random forest is an efficient classification algorithm and performs effectively without using special selected features.
3	Chen and Cournede [7]	2017	This work focused on finding the most efficient way to predict the yield of corn based on meteorological records.	This work studied a new methodology named multiple scenarios parameter estimation and used the CORNFLO model.	Random forest regression was shown to be the most efficient for crop yield prediction.

2.2 Proposed solution

The main idea of the project is to giving choices for the traditional farmers to seed their crop in correct condition. They knew how the crop will grow, when to use pesticide and so on. But now the climatic condition is changing and so the calendar of the crop was changed. This project helps to analyse the starting stage of the agriculture. This project suggests the crop based the land, initial amount, location, and other factors based on the agriculture. This is very helpful to the farmer to decide and be confident in their decision.

THEORITICAL ANALYSIS

3.1 Block diagram



3.2 Hardware / Software designing

HARDWARE SPECIFICATION

- Processor : Dual core processor 2.6.0 GHZ
- RAM : 1GB
- Hard disk : 160 GB
- Compact Disk : 650 Mb
- Keyboard : Standard keyboard
- Monitor : 15 inch colour monitor

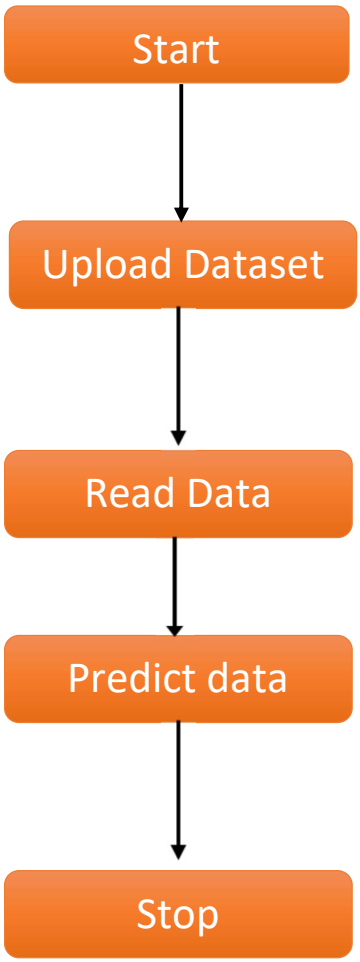
SOFTWARE SPECIFICATION

- Operating system : Windows 10
- Front End : Java
- Back End : Data base
- Tool : IBM Cloud

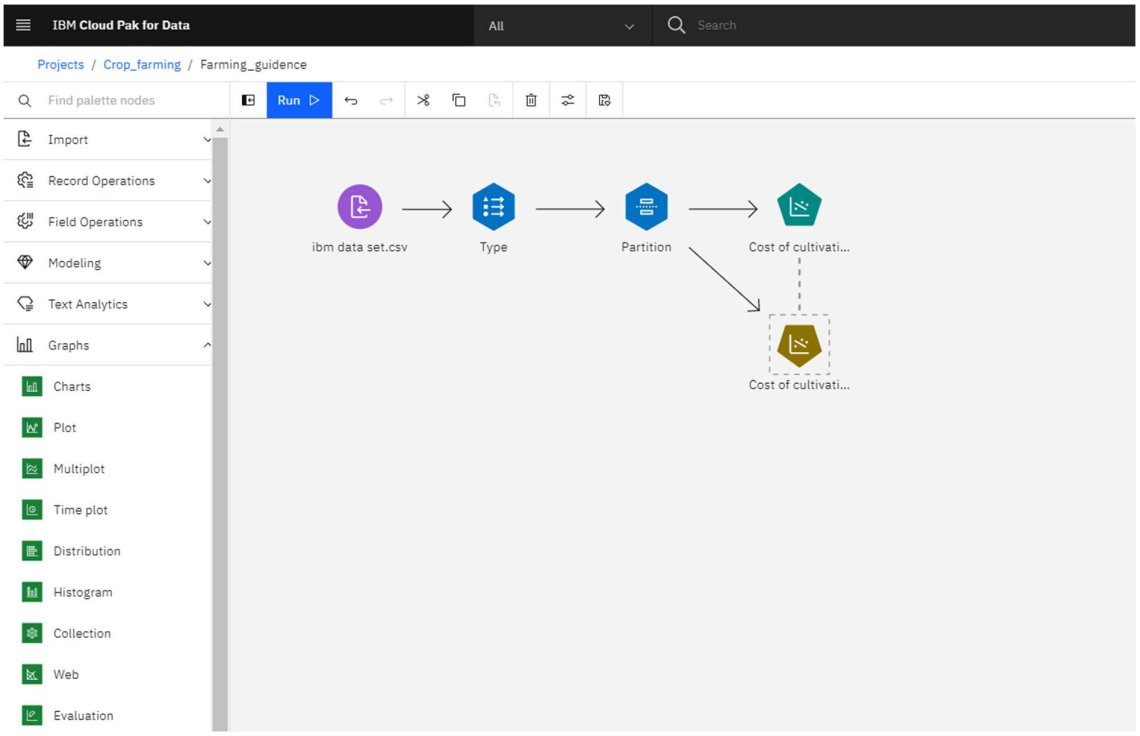
EXPERIMENTAL INVESTIGATIONS

The analysis was done in all the factors that the crop depends. The factors that the crop depends are rainfall required for the crop, average rainfall of the state, temperature, Ph of soil, nitrogen, phosphorus, potassium of the soil(npk), type of the soil. Based on the crop, the table was made with where it mostly cultivated and requirements of the crops which is the factors mentioned above. And a person who worked in Agri department helped us to confirm that the data is correct or not.

FLOWCHART



RESULT



View Model: Cost of cultivation

Regression

EVALUATION

Model Summary

ANOVA

Coefficients

MODEL VIEWER

Build Settings

Training Summary

Model Summary

	1
R	0.978 [1]
R Square	0.956
Adjusted R Square	0.779
Std. Error of the Estimate	940.007

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ANOVA

	1		
	Regression	**Residual**	**Total**
Sum of Squares	19148907.135	883613.698	20032520.833
df	4.000	1.000	5.000
Mean Square	4787226.784	883613.698	
F	5.418		
Sig.	0.310		

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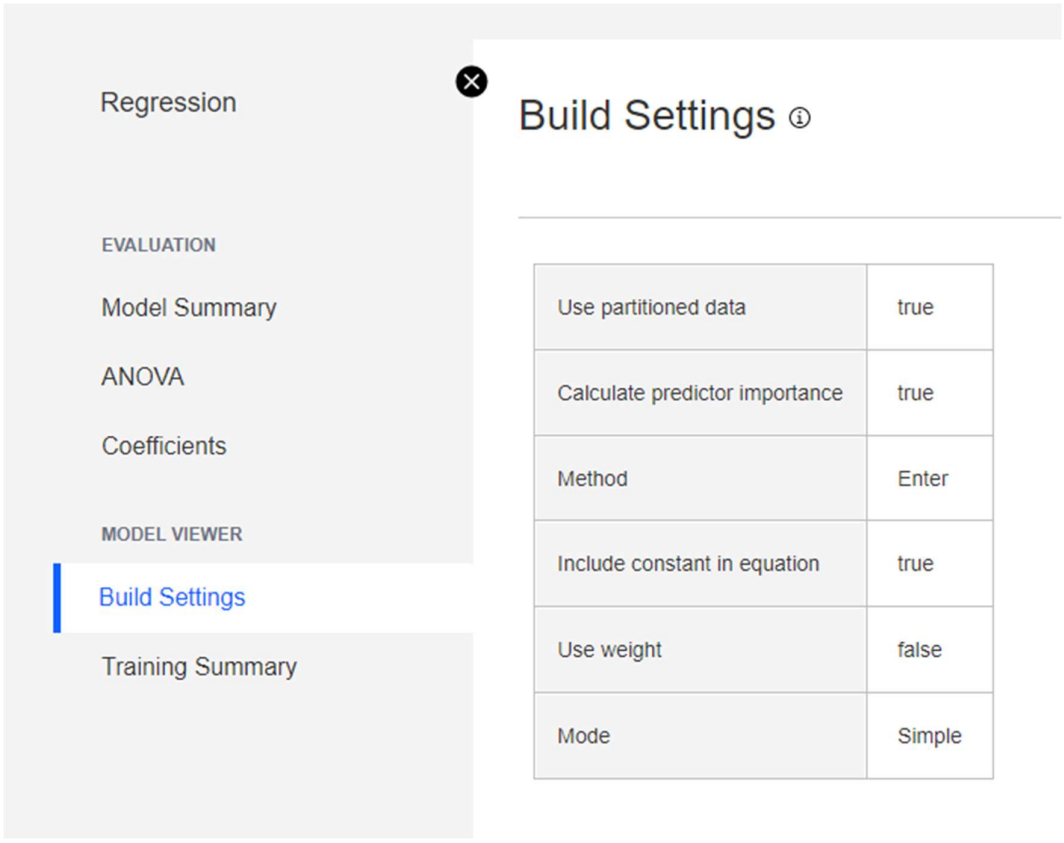
Coefficients

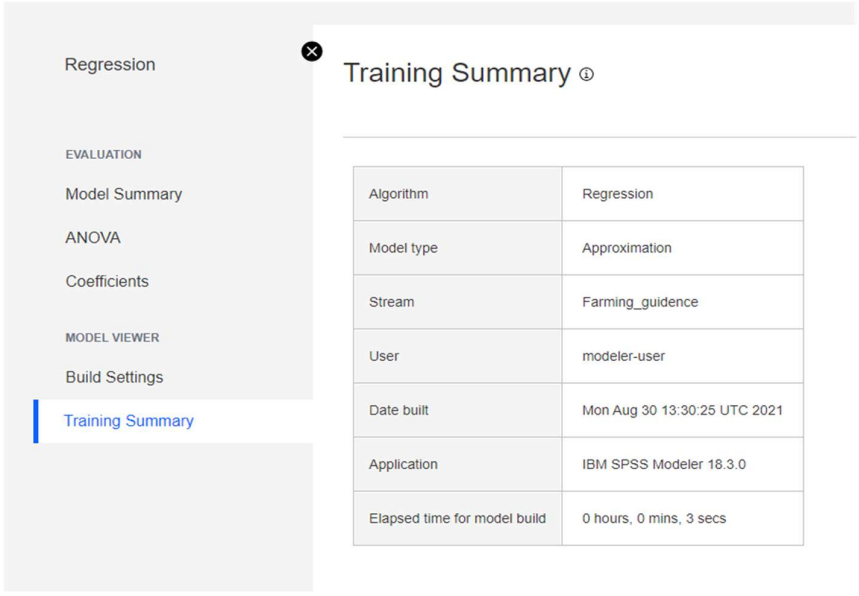
		1				
		(Constant)	**Nitrogen**	**P[h]**	**Potassium**	**Phosphors**
Unstandardized Coefficients	B	108.423	125.016	902.753	-66.149	-31.187
	Std. Error	32003.753	84.638	6000.162	132.229	131.599
Standardized Coefficients	Beta		1.152	0.072	-0.794	-0.277
t		0.003	1.477	0.150	-0.500	-0.237
Sig.		0.998	0.379	0.905	0.705	0.852
Fraction Missing Info.						
Relative Increase Variance						
Relative Efficiency						

View Model: Cost of cultivation



Use partitioned data	true
Calculate predictor importance	true
Method	Enter
Include constant in equation	true
Use weight	false
Mode	Simple

View Model: Cost of cultivation



Algorithm	Regression
Model type	Approximation
Stream	Farming_guidence
User	modeler-user
Date built	Mon Aug 30 13:30:25 UTC 2021
Application	IBM SPSS Modeler 18.3.0
Elapsed time for model build	0 hours, 0 mins, 3 secs

ADVANTAGES

- The main advantage of this project is to bring confident to the farmer that the selected crops definitely match to the factors of that land.
- The farmer will get the clear idea of the investment and the profit of the crop.
- The project along with the neighbourhood farmers discussion makes there is no loss of money as well as the cultivated product by high yielding or low yielding.
- And the above point makes the market in economically well.
- It helps the farmers to achieve high yield.

DISADVANTAGES

- The main disadvantage in this project is farmer needs know about the capacity of the soil and other factors of the soil.
- And the farmer needs to know how to access this project.

CONCLUSION

The study presented in this work introduces are useful to increase the productivity of an agricultural company, deepening the study of the smart farm model; the technological progress in a field that needs control and optimization can really contribute to save environmental resources, respect the business and international laws, satisfy the consumer needs, and pursue economic profits. The three different data sources, with a special eye for the IoT sensors dataset, have been exploited using machine learning techniques and the more standard statistical ones. The first task shows that the forecast of apple and pear total crops on the dataset could be reached with a neural network model with a success rate close to 70%, it emerges that for the regression models are more suited considering the nature of the dataset.

The main reason for the proposed system using different machine learning techniques is that an exploratory and highly experimental work has been employed; the Information Fusion together with the related optimization of methods and results is expected in future work, where new experiments and tasks exploit other sensor types and datasets will be designed and performed to meet the great heterogeneity of Agri-companies and of the hardware sensor market. The intelligent systems developed with machine learning algorithms (supervised and non) have to manage fault tolerance and hardware malfunction prediction, and, in this way, they require designing of integrated tools, user-interfaces, and machines that easily adapt to a context subjected to natural events not as easily predictable as the agricultural one. Finally, systems that provide real-time suggestions and make long-term forecasts based on user choices and preferences must be studied and tested.

FUTURE SCOPE

The project has a very vast scope in future. This project can be implemented on a large scale of dataset in future. Project can be upgrade in near future as and when requirement for the same arises, as it is very adaptable in terms of expansion. As the population is growing rapidly and many new technologies are emerging during the years it is important that the agricultural sector also should move forward in that direction. This project can be more implemented and can be connect to the mobile application so that farmer can do the work when they are not present at home. We can also implement the use of drones to collect real time data and to monitor the pace of the crops. It will be great to see innovation in the field of agriculture so that there will be ease to farmers and the generation to come.

APPENDIX

```
import java.io.*;
import java.net.MalformedURLException;
import java.util.Base64;
import java.util.HashMap;
import java.util.Map;
import java.net.HttpURLConnection;
import java.net.URL;
import java.nio.charset.StandardCharsets;
public class HttpClientTest {
        public static void main(String[] args) throws IOException {


                // NOTE: you must manually set API_KEY below using information retrieved from your IBM Cloud account.


        String API_KEY = "nQ2-T6sjOvWMqSkg3m-cqw75fC_vNULpLJ119d1ONT8j";


        HttpURLConnection tokenConnection = null;
        HttpURLConnection scoringConnection = null;
        BufferedReader tokenBuffer = null;
        BufferedReader scoringBuffer = null;
        try {
            // Getting IAM token
URL  tokenUrl = new URL ("https://iam.cloud.ibm.com/identity/token?grant_type=urn:ibm:params:oauth:grant-type:apikey&apikey=" + API_KEY);
                        tokenConnection = (HttpURLConnection) tokenUrl.openConnection();
                        tokenConnection.setDoInput(true);
                        tokenConnection.setDoOutput(true);
                        tokenConnection.setRequestMethod("POST");
                        tokenConnection.setRequestProperty("Content-Type", "application/x-www-form-urlencoded");
```

```
                tokenConnection.setRequestProperty("Accept", "application/json");
                tokenBuffer = new BufferedReader(new
InputStreamReader(tokenConnection.getInputStream()));
                StringBuffer jsonString = new StringBuffer();
                String line;
                while ((line = tokenBuffer.readLine()) != null) {
                        jsonString.append(line);
                }
                // Scoring request
                URL scoringUrl = new URL("https://eu-
gb.ml.cloud.ibm.com/ml/v4/deployments/0bea8b80-cd1d-41dd-bd48-
eea3d5928e02/predictions?version=2021-08-29?version=2021-08-29");
                String iam_token = "Bearer " +
jsonString.toString().split(":")[1].split("\"")[1];
                scoringConnection = (HttpURLConnection)
scoringUrl.openConnection();
                scoringConnection.setDoInput(true);
                scoringConnection.setDoOutput(true);
                scoringConnection.setRequestMethod("POST");
                scoringConnection.setRequestProperty("Accept", "application/json");
                scoringConnection.setRequestProperty("Authorization", iam_token);
                scoringConnection.setRequestProperty("Content-Type",
"application/json; charset=UTF-8");
OutputStreamWriter writer = new  OutputStreamWriter (scoring Connection.
                        getOutputStream(), "UTF-8");

                // NOTE: manually define and pass the array(s) of values to be scored
in the next line
                String payload = "{\"input_data\": [{\"fields\": [array_of_input_fields],
\"values\": [array_of_values_to_be_scored, another_array_of_values_to_be_scored]}]}";
                writer.write(payload);
                writer.close();
```

```
                scoringBuffer = new BufferedReader(new
InputStreamReader(scoringConnection.getInputStream()));
                StringBuffer jsonStringScoring = new StringBuffer();
                String lineScoring;
                while ((lineScoring = scoringBuffer.readLine()) != null) {
                        jsonStringScoring.append(lineScoring);
                }
                System.out.println(jsonStringScoring);
        } catch (IOException e) {
                System.out.println("The URL is not valid.");
                System.out.println(e.getMessage());
        }
        finally {
                if (tokenConnection != null) {
                        tokenConnection.disconnect();
                }
                if (tokenBuffer != null) {
                        tokenBuffer.close();
                }
                if (scoringConnection != null) {
                        scoringConnection.disconnect();
                }
                if (scoringBuffer != null) {
                        scoringBuffer.close();
                }
        }
    }
}
```