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DigiFarm – A Machine Learning based holistic Crop Prediction Platform for Farmers

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Abstract

The world population is increasing everyday and to keep up with it an extensive food production system has to be designed. Farming is one of the most important occupations in India. Traditional farming is used by most of the farmers these days, however it has its own disadvantages like less yield leading to less income. It makes use of pesticides which degrades the quality of the soil and the crops. To overcome these disadvantages farmers nowadays are shifting to digital farming which yields more crops thus increasing their income. This research work intends to delineate the details of the newly built platform "DigiFarm" which aids the farmers in making informed decisions based on their soil pattern and weather condition. The central aim of DigiFarm is to help the farmers in predicting the crop which is most suitable for their land to gain maximum yield. To get accurate crop prediction, in this research work two Machine Learning algorithms have been compared. They are Random Forest(RF) and Gradient Boosting (GB) algorithms. The RF algorithm outperformed with better accuracy compared to the GB algorithm. Hence, RF algorithm has been used in the platform for crop prediction which helps the farmers in predicting the best crop for their land based on various factors like soil composition, weather, etc., The platform also provides an Artificial Intelligence based chatbot named 'AgriBot' which helps the farmers in guiding them through the platform and also helps them in predicting the crops as well as answering their other queries.

Keywords: DigiFarm, Random Forest Algorithm, Gradient Boosting Algorithm, Crop Prediction Model, AgriBot.

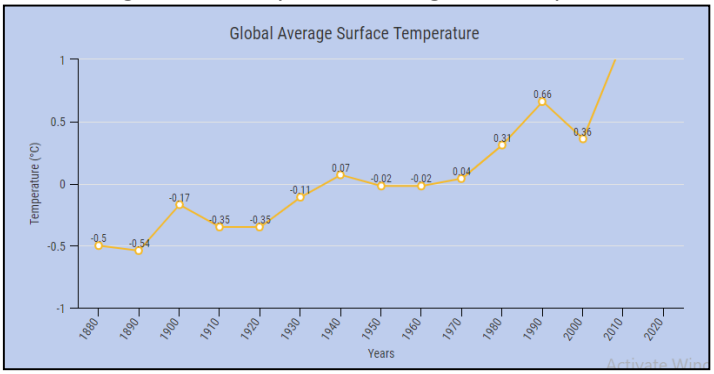
Introduction :

Farmers, the soul of the Indian economy, are the ones who feed the huge population of India. Without them, no one would be getting food on their plate today. With a continuous increase in the population, there is a need to increase the yield of the soil in order to support the growing demands of the twenty-first century world. Authors [1] argue that there is a massive need to upgrade the production to meet the increasing population which is anticipated to reach 9.5 billion by the year 2050. In the literature [2], the authors note that 80% of the cultivable land grows single crops like rice, corn, wheat and soybean that deteriorate the quality of production across the world. Thus, there is a need to find alternatives where agriculture does not suffer because of the depletion and under-utilization of resources. While these literatures summarize the current issues which the agricultural sector is encountering, it does not give innovative details to resolve the same. In other words, the arena of digital farming remains untouched in the traditional purview.

The question arises - How far would digitalization be accepted by the indigenous farmers? According to the author P K Sofia [3] 70% of the population in India depends on traditional farming methods for their livelihood because it is economical and environment friendly to a certain extent. Almost 90% of the tribal population in India is dependent on and acts as guardians of conservative methods of farming [4] [5]. There are several reasons behind the continuation of these methods. For example, according to Lincoln NK [6], traditional farming requires local resources that replenishes the soil constituents and keeps them intact. Scholars like Timothy Johns [7] stated that traditional farming provides financial support to the

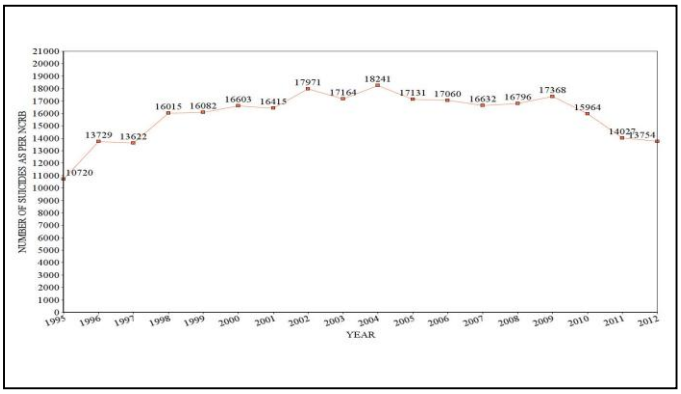
farmers that secures the diet and nutrition of the global population. Despite its advantages, traditional farming is not the best method of farming and there are numerous drawbacks for the same. The foremost problem is soil erosion caused due to water, wind, ice or gravity. The authors [3-7] do not take into consideration that to increase the total yield on a tract of land, traditional farming resorts to the use of excessive pesticides. While approximately a couple of decades ago, the pesticides and fertilizers were nearly hundred percent organic, the farmers increasingly shifted to using synthetic products which depleted the soil quality and was harmful for the crops. Climatic changes leading to water depletion, air and soil pollution, eutrophication has also created hurdles in the traditional farming methods. Climate change has become one of the most pressing concerns in modern times. The world has indeed experienced some drastic changes in the recent past, from glaciers melting to erratic rainfall. These challenges will continue to grow with the ever-increasing population. In addition to affecting crop growth rate, climate change also affects rainfall variability. They all play a role in raising global temperatures. Figure 1 shows the yearly increase in global temperature from 1880-2020. Global warming has led to a drastic increase in global temperature and it continues to increase every year.

Figure 1. Yearly increase in global temperature



The changing climate, erratic rainfall, pollution, drawbacks of traditional farming are the central cause behind the magnifying farmer suicide rates all the world every year [8]. Between 1995 and 2006, 1,66,304 farmers committed suicide [9] in India and the number has only increased since then. The author [10] says that farmer suicides increased between 2002 to 2007 and the main reason for this was indebtedness. In order to earn more in a shorter span of time, the farmers start growing cash crops like sugarcane, cotton on the soil that deteriorates its quality. Moreover, the farmers are able to retain a very small percentage of earnings. The cash crops are labour intensive and require more care [11]. Inflation has further added to the troubles of the farmers. Figure 2 shows the farmer suicide rate in India reported as per the National Crime Records Bureau (NCRB), India [12]. This shows the poor conditions of farmers in India and how they have to suffer for revenue and to pay off their debts. The need of the hour is to transform the way in which farming is viewed. Every sector has not only introduced digitalization but is turning entirely virtual. This is the new world and the future. In order to keep up with the developments, our primary sector also needs a major revamp which shall be attained with digitalization.

Figure 2. Farmer suicide rate as per NCRB [12]



This is where Digital Farming (DigiFarm platform) steps in. It is introduced with the sole purpose of helping farmers. The aim of DigiFarm platform is to aid the farmers in selecting the crop that can give them best yield and helping farmers in other aspects. The changes that are caused on their land and soil due to the climatic changes requires an innovative approach. The authors who have previously talked about the latest advancements in agriculture and digital farming such as field scouting and harvesting. They even mentioned various concepts such as sensors and robots that can be used extensively in digital farming [13]. Their research is very beneficial for bringing a major change to the current farming trends that can be insightful for the farmers. However, they fail to predict the crops which the farmers could grow for better yield. DigiFarm is primarily aimed at farmers which can assist them with their needs. The motive is to make the farmers aware of digital farming and its benefits. By tracking the latest climatic changes, soil patterns and weather conditions, using DigiFarm farmers can predict which crops can be sown on their land for maximum yield.

The prediction is based on the machine learning model which is trained with adequate amounts of statistical data so that the prediction is accurate and is ultimately helpful for the farmers to increase their income. In the literature [14] it is mentioned that the authors used the algorithm that makes use of the arrangement calculation of Help Vector Machine to improve the crop prediction module. The algorithm detects the dirt and gives information about which crop would be best suited and it also tells which nutrients are not present abundantly for that specific crop. Authors Dhivya Elavarasan and P.M. Durairaj Vincent [15] have created a Deep learning based crop yield prediction model and authors [16] have created a ML model for crop yield prediction. In both the cases [15] and [16] they have emphasised on crop yield prediction. Authors [17] have prepared a soil classification and crop prediction model by using Support Vector Machines and k-Nearest Neighbour algorithms. Researchers [18] have used time series analysis for predicting the production rate of crops. They have used SVM and Naive Bayes for classification ML models. Researchers [19] have created a crop prediction model by making use of Artificial Neural Network approach where one can predict the crop using parameters such as rainfall, humidity, copper, calcium, magnesium etc.,

The main aim of DigiFarm platform is to help the farmers in growing their business by growing the right crop at the right time and making them aware about Digital Farming. Due to the global accessibility of DigiFarm, even a farmer in some remote village can access it and make profit thereby. All their queries will be answered by the Artificial Intelligence powered chatbot named “AgriBot” present in the DigiFarm platform. DigiFarm which is designed carefully and accurately to predict the most suitable crop that the farmer can produce in his region. For achieving this, Machine Learning algorithms have been used to develop a crop prediction model using Random Forest and Gradient Boosting algorithms and the dataset which has been used for training the crop prediction model was procured from “Indian Chamber of Food and Agriculture” (ICFA) [20]. In the literature [21] the author says that if machine learning models are used then agriculture will be highly beneficial. By the use of machine learning appropriate recommendations are provided about crops. On training the Random Forest and Gradient Boosting models with the dataset the accuracy from Random Forest was 98.9% which was higher than the accuracy of the Gradient Boosting Model. The platform is designed to equip the farmers with digitized farming so that with the aid of this platform, they can receive precise information about which crops would be most suitable for their land. DigiFarm also provides the latest news related to agriculture in the news section.

The research paper is organised in the following manner: Section II presents the Methodology (i.e. about the dataset and about the algorithms used for crop prediction model). Section III presents the Result

and Description of the DigiFarm. Section IV summarizes the conclusion to our study derived from the DigiFarm.

2. Materials and Methods :

DigiFarm is a user-friendly platform designed in such a way that users can use it to predict the best crop that can be grown on their soil. Artificial Intelligence (AI) and Machine Learning (ML) technologies have been made use of to achieve this crop prediction model. The chatbot for the platform uses Artificial Intelligence technology to assist users (i.e. mainly Framers) to get their queries solved. The crop prediction model is implemented with the help of ML algorithms [22] such as Random Forest (RF) and Gradient Boosting (GB) algorithms.

Following are the steps that have been followed to create the crop prediction model:

1) Data collection
2) Data preparation and analysis
3) Choosing the algorithm for training the crop prediction model
4) Training and Testing ML model
5) Deploying the model

1) Data collection

To train this prediction model the dataset (as shown in Figure 3) has been procured from Kaggle website [20]. This dataset was built by Indian Chamber of Food and Agriculture (ICFA) by gathering information regarding rainfall, climate and fertilizer data available for India over a period of time.

Figure 3. Dataset used to train the ML Model

	A	B	C	D	E	F	G	H
1	N	P	K	temperature	humidity	ph	rainfall	label
2	90	42	43	20.87974371	82.00274423	6.502985292	202.9355362	rice
3	85	58	41	21.77046169	80.31964408	7.038096361	226.6555374	rice
4	83	95	50	26.51682337	77.79913575	5.50947065	108.8547508	banana
5	119	90	48	28.66725136	79.59242542	5.986442306	118.2583441	banana
6	78	42	42	20.13017482	81.60487287	7.628472891	262.7173405	rice
7	69	37	42	23.05804872	83.37011772	7.073453503	251.0549998	rice
8	38	15	30	28.91862016	48.13974548	5.075504537	97.01331604	mango
9	12	37	30	31.09779147	47.41196659	4.546466109	90.28624348	mango
10	38	19	31	34.73823882	49.08864345	5.855119268	90.65022183	mango
11	8	33	29	29.98080499	49.48613279	6.442393461	91.82271568	mango

2) Data preparation and analysis

The Dataset which is shown in Figure 3 has 2201 samples among which 90% (i.e. 1980 samples) were used for the purpose of training. The remaining 10% (i.e. 221 samples) are used for testing purposes. The dataset contains 8 attributes (they are Nitrogen, Phosphorous, Potassium, Temperature and humidity of the region, pH of the soil, Rainfall in mm in that region and the crop name). The dataset contains 22 distinct classes (i.e., Apple, Banana, Blackgram, Chickpea, Coffee, Cotton, Coconut, Grapes, Jute, Kidneybeans, Lentil, Maize, Mango, Mothbeans, Mungbean, Muskmelon, Orange, Papaya, Pigeonpeas, Pomegranate, Rice and Watermelon).

Before training the dataset the following preliminary analysis of the dataset were conducted:

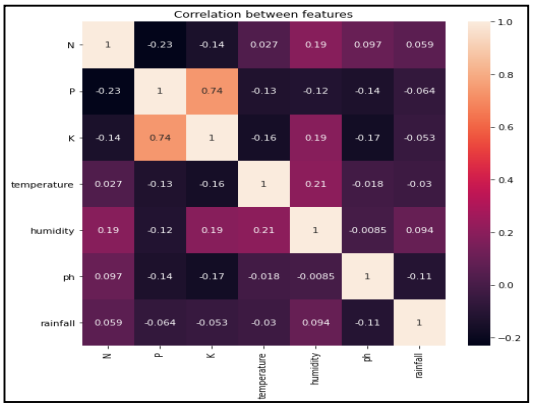
i) Finding out some statistical information about the data which is summarized in the Table 1

Table 1: Basic statistical information about the dataset

Statistical Parameters	Nitrogen	Phosphorous	Potassium	Temperature	Humidity	pH value	Rainfall
Count	*2200.0*	*2200.0*	*2200.0*	*2200.0*	*2200.0*	*2200.0*	*2200.0*
Mean	*50.55*	*53.36*	*48.14*	*25.61*	*71.48*	*6.48*	*103.46*
Standard Deviation	*36.91*	*32.98*	*50.64*	*5.063*	*22.26*	*0.77*	*54.95*
Minimum Value	*0.0*	*5.0*	*5.0*	*8.82*	*14.25*	*3.50*	*20.21*
25%	*21.0*	*28.0*	*20.0*	*22.76*	*60.26*	*5.97*	*64.55*
50%	*37.0*	*51.0*	*32.0*	*25.59*	*80.47*	*6.42*	*94.86*
75%	*84.25*	*68.00*	*49.0*	*28.56*	*89.94*	*6.92*	*124.26*
Maximum Value	*140.0*	*145.0*	*205.0*	*43.67*	*99.98*	*9.93*	*298.56*

ii)The correlation between different attributes which is summarized in the following Figure 4

Figure 4. Correlation between different features



iii) Since there were no missing cells or null values, the approach proceeded to the next step, i.e. choosing the algorithm and training the crop prediction model.

3) Choosing the algorithm for training the crop prediction model :

In this research work, from the dataset [20] the "*crop name*" attribute has been considered as a target label and "Multiclass Classification" model has been used (i.e. 22 classes). Gradient Boosting algorithm and Random Forest algorithms have been used for training the ML model.

Random Forest (RF) Algorithm :

The Random decision forests or Random forests are an ensemble method (it groups multiple Decision tree predictors) which is used for regression and classification tasks. This was invented by Leo Breiman [23]. In this research study, the RF algorithm has been used for classification task (i.e. to classify the crops).In RF each tree makes their own prediction and they are accumulated into a final prediction as votes for classification models. In RF there are two aspects of randomness involved. The first aspect of randomness is, which features in each decision tree, a random subset of features is chosen. The second aspect of randomness is using only a sample of the training data each time a tree is fit. The central aim behind this is to have each row and feature utilized in at-least one of the decision trees, however not to use all the features in any one single decision tree. This allows us to build trees that are not correlated while adding variation to our collection of models and reduce the risk of overfitting. Even with this approach overfitting is still a concern that can be solved by setting the max depth. Max depth is the number of questions asked before reaching the prediction. We limit the depth to reduce the risk of overfitting.

Gradient Boosting (GB) Algorithm :

The Gradient Boosting method for Machine Learning is widely used to perform classification and regression tasks. This algorithm was invented by Jerome Friedman [24]. In this research work, the GB algorithm has been used for classification tasks (i.e. to classify the crops). It is a boosted ensemble of trees as opposed to a bagged ensemble; they are less interpretable as the second tree in the model may or may not predict the same value as the previous model. Using the residuals from the preceding trees, successive trees try to predict how far the original predictions were from the truth. As a result, each successive tree in the GB model slowly reduces the errors of the preceding trees. As a result, GB models have high predictive power but low interpretability. In addition, GB models are quite prone to overfitting the training data, to combat this there are several extra hyper parameters which can be used.

4) Training and Testing ML model :

On training the RF and GB ML models with 90% samples data and subsequently testing it with 10% samples of the data the accuracy that was achieved is summarized in the Table 2. As it is evident that the RF model outperformed GB model by having higher training and testing accuracy than GB model.

Table 2. Accuracy of RF and GB ML models

Accuracy	Random Forest Model	Gradient Boosting Model
Training Accuracy	0.998	0.996
Testing Accuracy	0.989	0.982

5) Deploying the ML model :

Since the accuracy of RF was high in both training and testing phases which can be seen in table 2, the RF model was chosen for deploying and using it in our platform for predicting the crop. For deploying this RF model, IBM cloud services have been used.

3. Results and Discussion :

DigiFarm is designed to equip the farmers with digitized farming so that they can make the most out of their crops. In this section, the outcomes of the platform “DigiFarm” are discussed. With the aid of this platform, they can receive precise information about which crops would be the most suitable for their land.

3.1 Software Compatibility :

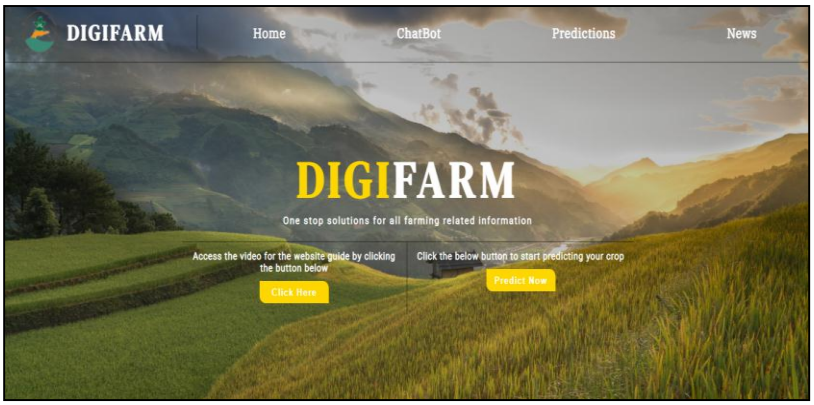
The platform DigiFarm is compatible with latest versions of browsers such as Google Chrome, Microsoft Edge, Mozilla Firefox etc. The Front-end of DigiFarm is designed using HTML 5, CSS 3 and JavaScript whereas for the Back-end Django 3.2.5 has been used (i.e., a Python back-end framework).

3.2 Home Page :

DigiFarm platform along with its name is shown in Figure 5. The logo displayed on the top left corner has two central elements: a hand and the water. The water is representative of rivers and oceans that

forms the backbone of the irrigation system in Indian agriculture. The hand that is holding a plant represents the farmers who grow the crops. Since India is an agrarian economy, not only is the population dependent on the farmers for food, but the national economy is also dependent on the yield from the primary sector.

Figure 5.Home Page of the DigiFarm



This page connects the user to all the different pages on the platform. The Navigation bar on the homepage as shown in Figure 5 has different buttons for various purposes such as ChatBot, Prediction and News. Additionally, there are two buttons at the center of the homepage:

1. To get the detailed tutorial on how to use the DigiFarm platform and make the best use out of it for the farmers
2. To predict the most suited crop(s).

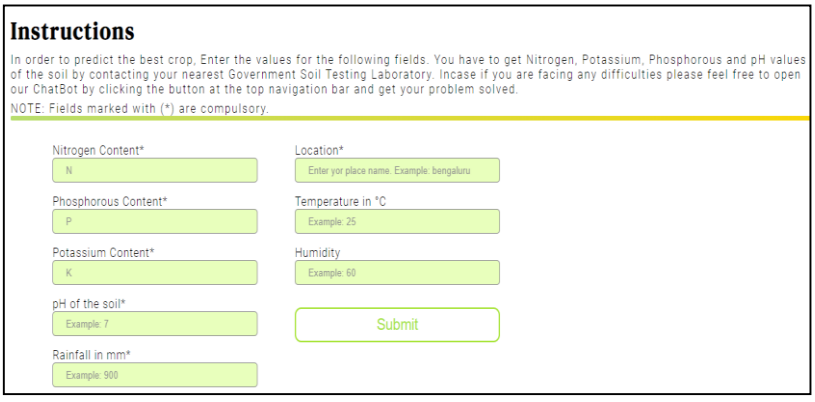
According to the authors [25] User Interface (UI) should be simple to grasp for the user to understand it. Hence, DigiFarm platform has a very simple UI because of which farmers can access and navigate through our platform to get the best out of it without facing any hurdles.

The following sections of the platform have been discussed in detail:

3.3 Prediction Section :

The prediction section is the main part of DigiFarm. The “Prediction” section can be used to predict the most suitable crops that can be sown on the farmer’s land. As shown in Figure 6 farmers can predict the crop by entering details such as rainfall, humidity, temperature, and pH value along with the composition of the soil content (i.e. nitrogen, phosphorus, and potassium). The ML model will predict the crop which is most suitable for the given geographical conditions.

Figure 6. Crop Prediction form



In this research work, two ML algorithm have been used. They are Random Forest (RF) algorithm and Gradient Boosting (GB) algorithm. Let us discuss in detail how these two algorithms are used in predicting the crop.

Discussion on crop prediction ML models :

RF and GB algorithms have been used for predicting the crop. The dataset which was used for training these ML models is explained in Methodology Section.The confusion matrix that was generated on running the test data with RF and GB model is as shown in the Figure 7 and 8 respectively where the numberings 0-21 refers to the “crop name” as shown in the lookup Table 3.

Figure 7. Confusion Matrix for RF Model

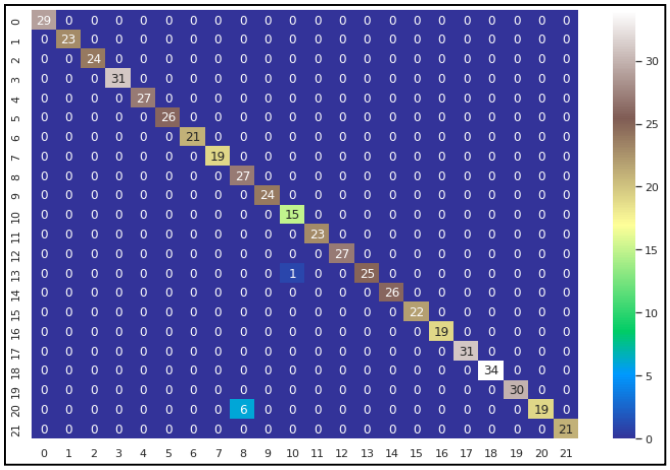


Figure 8. Confusion Matrix for GB

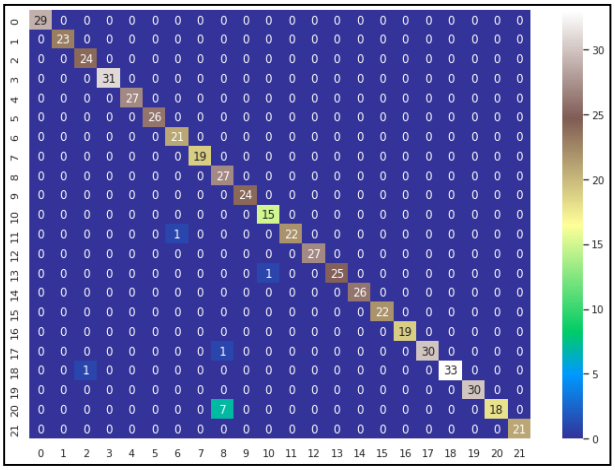


Table 3. Crop lookup table

Index	Corresponding Crop	Index	Corresponding Crop	Index	Corresponding Crop
0	Apple	8	Kidneybeans	16	Papaya
1	Banana	9	Lentil	17	Pigeonpea
2	Blackgram	10	Maize	18	Pomegranate

3	Chickpea	11	Mange	19	Watermelon
4	Coffee	12	Mothbeans	20	Ric
5	Cotton	13	Mingbean	21	Coconut
6	Grapes	14	Muskmelon		
7	Jute	15	Orange		

Table 4 summarizes the Confusion matrix parameters (i.e., True positive rate, True negative rate, False positive rate and False negative rate) for RF model and GB model.

Table 4. Confusion matrix parameters of GB and RF model

Confusion Matrix Parameters	**Random Forest Model**	**Gradient Boosting Model**
True positive rate	0.990	0.981
True negative rate	0.990	0.999
False positive rate	0.0004	0.0008
False negative rate	0.009	0.018

The crop prediction models have been measured with respect to few performance metrics (i.e. accuracy, precision, recall and F1 score). The below are the formulae for the performance metrics.

$$Accuracy = \frac{TruePositives + TrueNegatives}{TruePositives + TrueNegatives + FalsePositives + FalseNegatives}$$

$$Presicion = \frac{TruePositives}{TruePositives + FalsePositives}$$

$$Recall = \frac{TruePositives}{TruePositives + FalseNegatives}$$

$$F1\ Score = \frac{2}{(\frac{1}{Precision} + \frac{1}{Recall})}$$

Table 5. Performance measures (i.e. Accuracy, Recall, Precision, F1 Score) of RF and GB predictive models

Performance Measures	RandomForest Model	GradientBoosting Model
Accuracy	0.989	0.982
Recall	0.990	0.981
Precision	0.990	0.981
F1 Score	0.990	0.981

Even though the RF model accuracy and GB model is close to one, the accuracy (testing accuracy) of RF model is higher than GB model by 0.007 as shown in Table 5.Similarly, other performance measures such as Recall, Precision and F1 Score of GB model are higher than RF model by a value 0.009. Authors Disha Chiplonker et al., [26] have created a crop prediction model using machine learning methods such as linear regression and Random Forest regressor. But they have an accuracy of 94.63%. whereas the model used in DigiFarm can predict the crop with an accuracy of 98.9%. For crop prediction model using RF algorithm, Training and Cross-validation curve of accuracy is as shown in Figure. 9. As it can be seen in the Figure 9 there is a steep increase in the cross validation score till 500 training instances later on the curve tends to saturate. And the training score curve is approximately a straight line indicating that the accuracy is almost equal to one with very less losses and our model is neither a under fit nor a overfit model.

Figure 9.Training and cross-validation accuracy for RF model

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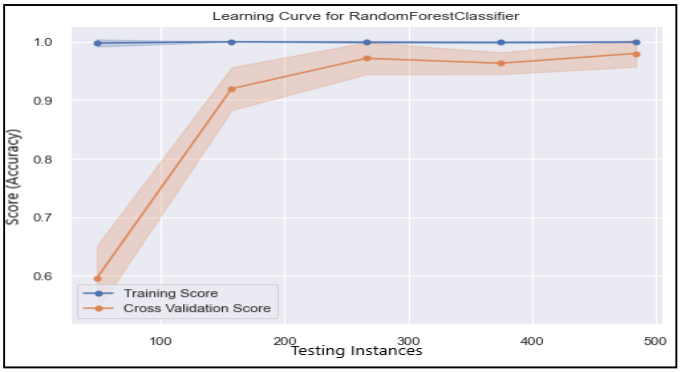
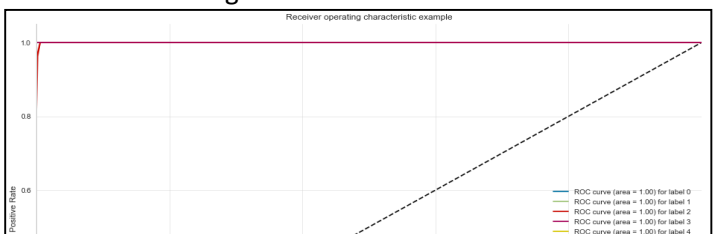


Figure 10. ROC Curve for RF model



The ROC curve for RF model is as shown in Figure 10.From Figure 10 we can see that the area of the curve is equal to one for all the classes For crop prediction model using GB algorithm, Training and Cross-validation curve of accuracy is as shown in Figure. 11. . As it can be seen in the Figure10. Here the training score curve is approximately equal to one with very less losses and our model is neither a under fit nor a overfit model.The ROC curve for RF model is as shown in Figure 12. In the Figure 12, we can see that area of the curves is equal to 1 for all the classes except for the class 18 (i.e. for the crop Pomegranate) it is 0.98.

Figure 11. Training and cross-validation accuracy for GB model

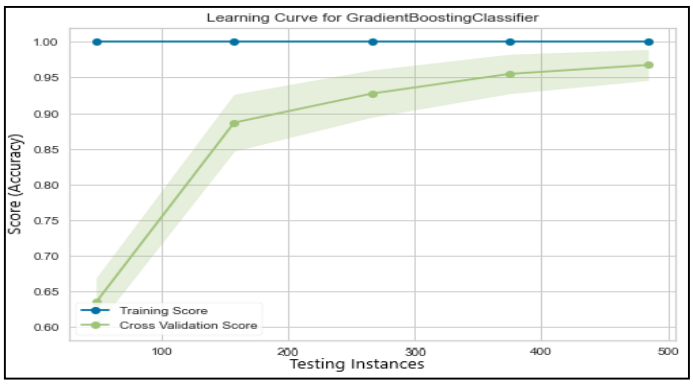
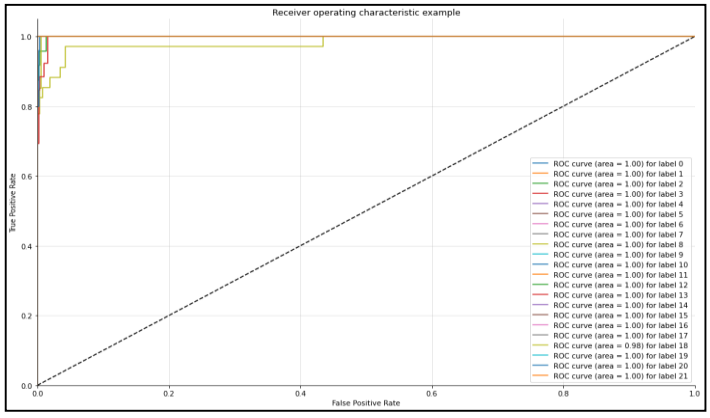


Figure 12. ROC Curve for GB model



As it can be seen that the RF Model outperformed GB Model in all the aspects (i.e. Accuracy, Precision, Recall, F1 Score, ROC curve) hence RF model was chosen to deploy and use it for predicting the crop. This proposed system of crop prediction results in accuracy and efficiency which is unprecedented.

Sample output after deploying RF crop prediction model :

Consider an instance, when the farmer fills the given form with nitrogen content as 20, phosphorus content as 89, potassium content as 40, pH value as 6, rainfall as 700, location as Bengaluru - the ML model will predict the crop based on the values entered and the result is displayed as Coconut which is as shown in the Figure 13. Similarly, for if the input values were 86 for nitrogen, 76 for phosphorous, 54 for potassium, 29°C for temperature, 80% humidity, 5.9 for ph and rainfall is 90mm then our model accurately predicted Rice as the best crop that can be sownbased on the conditions mentioned (as shown in the Figure 14).

Figure 13. Sample Output 1 of the crop prediction model

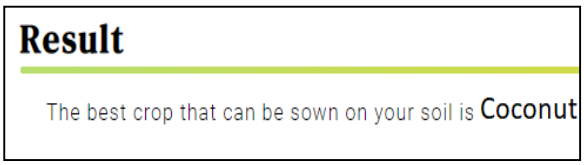
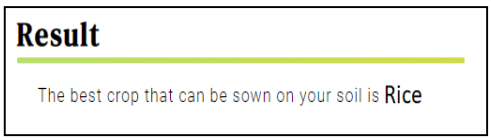


Figure 14. Sample Output 2 of the crop prediction model



3.4 AgriBot :

As digitization is increasing day-by-day, chatbots made with the help of Artificial Intelligence(AI) methods play a major role by illustrating the concept of a virtual assistant that converses with the means of speech or text methods [27]. Using voice or textual queries, it provides answers, actions, and suggestions tailored to the user's needs. Artificial intelligence has allowed virtual assistants to penetrate every corner of the world [28]. Conversational bots with voice and/or chat interfaces can play a crucial role in solving the user queries by giving instant service. For this platform, the ChatBot which is created as shown in Figure 15 is an AI based bot called the “AgriBot”. It is created using the IBM Watson Chatbot services (i.e. a part of IBM Cloud services). Text methods have been used while making this chatbot. With the use of textual methods the waiting time drastically reduces for the farmers to get their queries solved. The result of the AgriBot is the easy accessibility of DigiFarm platform for the farmers. The AgriBot provides three options (i.e. as shown in the Figure 15) which can be availed one at a time.

Figure 15.AgriBot

The different options available for farmers are:

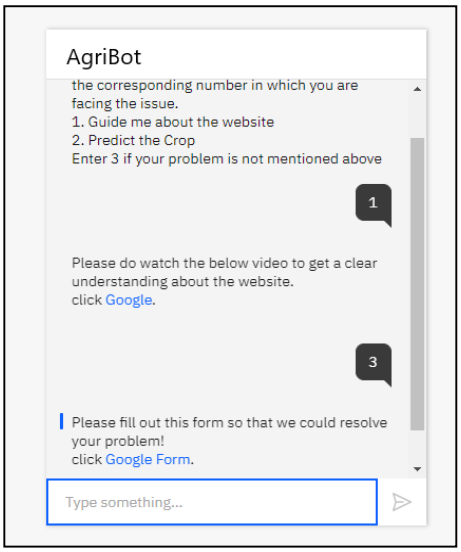
1) To guide the farmers about the platform and how to make use of it.

2) To guide the farmers in predicting the crop

3) Directs users to a Google Form which they can fill for any further queries

For instance, when farmers open AgriBot and want to get the solution for any one of options which is mentioned above, the AgriBot will respond to their query as illustrated in the Figure 16.

Figure 16. Sample output of AgriBot



The presence of an AgriBot on this platform simplifies the user experience which is the broader aim of the Digifarm.

3.5 News Section :

The news section results in bringing together the latest information about agriculture [29] from across the globe [30]. The idea behind this is to inform the farmers about the technological developments happening in the agricultural field from different parts of the world. This enables them to learn from these techniques and apply the suitable ones on their land. The result of this would be increased productivity, developing a nature of taking risks and also equipping them with the most updated advancements which they may find suitable for their farm. In the news section of DigiFarm, a Really Simple Syndication (RSS) news feed from “The Hindu Agri-Business” section as shown in Figure 17 has been used.

Figure 17: News section

The idea of this res[illegible] the farmers holistically and comprehensive[illegible]ng their production and yield per square by choosing the right crop for their field at the right time. Also, it enables them to sell their crop for maximum revenue. DigiFarm would result in digitization of agriculture on a global scale. However, it would prove extremely beneficial to farmers in India who find it difficult to access the information as their outreach is confined which results in using obsolete methods despite the advancements. DigiFarm, with the aid of technology will help them with the best possible information for their farm using a single platform.

Conclusion :

Today, farming is considered one of the most important occupations. Traditional farming is considered to be one of the best methods for farming but it has its own drawbacks like less yield of crops leading to less revenue. The traditional farming process is also quite laborious. Hence in order to avoid these drawbacks digital farming is promoted and it yields more crops thus increasing the revenue of farmers.This paper intends to introduce the new arenas of digital farming. Innovative techniques of farming are required to increase the yield of the tract of land and DigiFarm aims to aid the farmers in this endeavour. By helping the farmers through crop prediction, DigiFarm keeps up with the latest technological advancements. The platform DigiFarm which aids the farmers in making informed decisions based on their soil pattern and weather condition. DigiFarm helps the farmers in predicting the crops which are most suited for their farm for maximum yield. The crop prediction system is designed in such a way that it is user friendly and it gives accurate results. The prediction model which is used for the platform is the result of testing the dataset with several algorithms and methodologies to determine which is best and has the highest accuracy rate. The prediction is based on the machine learning model which is trained with adequate amounts of statistical data so that the prediction is accurate and is ultimately helpful for the farmers to increase their income. DigiFarm is designed in such a manner so that farmers could access the platform from any corner of the world. The platform is designed to equip the farmers with digitized farming so that with the aid of this, they can receive precise information about which crops would be most suitable for their land. The platform answers all their queries by the chatbot present. DigiFarm is designed carefully and accurately to predict the most suitable crop that the farmer can produce in his/her land.DigiFarm also helps by providing the latest news related to agriculture in the news section. Thus DigiFarm helps in revolutionizing farming and helps farmers in their day-to-day lives.

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