ISSN (ONLINE): 2454-9762
ISSN (PRINT): 2454-9762
Available online at www.ijarmate.com

International Journal of Advanced Research in Management, Architecture, Technology and Engineering (IJARMATE)
Vol. 8, Issue 2,February 2022

Crop Recommendation Prediction by Using Machine Learning Techniques

Dr. P Sudarkodi [1], **Neha B** [2]
Associate Professor, Department of Management Studies, Koshys Institute of Management studies, Bangalore, India[1]
Student, Department of Electronic and communication, Nitte Meenakshi Institute of Technology, Bangalore, India[2]

***Abstract*— Agriculture is certainly the pillar of our nation. India is the second-largest producer of agricultural goods in the world, produces more than 280 million tones, contributing to greater than 15% of India's GDP. Crop production is influence by different factors like soil types, pressure, suitable weather, temperature, season and market. This paper mainly focuses on the algorithms used to predict crop type based on different factors which can aid farmers to grow apt type of crop and help in framing effective farming strategy.**

Index Terms*—Artificial Neural network, Crop type, Dataset, Machine Learningin Agriculture*

Introduction

Artificial intelligence is built on the code that human intelligence can be expressed in a way that a machine can easily imitator and execute tasks, from the simplest more to complex. Learning, reasoning, and perception is the major goal of AL. Machine learning is stepping up pace in the agribusiness. Every one of these advancements can help the horticulture department by gathering the information from the field which will improve high exactness crop investigation and mechanized cultivating methods. Artificial Intelligence technologies has helped in effectively organising data for farmer, control of pest, generate healthier crops, monitor soil nutrition and improve wide range of agriculture related task. Effective cultivation procedure equipped with dataset accuracy will empower crop yield.

A dataset is a wide variety of data corresponds to particular variable. The study has taken input dataset of rainfall, climate and fertilizer data available for India. This dataset which would allow the users to build a predictive model to predict the most recommended crops to grow in a particular farm based on various parameters

Data fields

- N - ratio of Nitrogen content in soil
- P - ratio of Phosphorous content in soil
- K - ratio of Potassium content in soil
- temperature - temperature in degree Celsius
- humidity - relative humidity in %
- Ph - Ph value of the soil
- rainfall - rainfall in mm

For implementing a predicting model 2199 datasets pertaining to India are taken and apply a high accuracy algorithm. Artificial Neural network is the techniques for the prediction model.

The variety of crop to be predicted are (0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21)

[Rice, maize, chickpea, kidney beans, pigeon peas, moth beans, mung beans, muskmelon, apple, orange, black gram, lentil, pomegranate, banana, mango, cotton, jute, grapes, watermelon, papaya, coconut, coffee]

Review of literature:

Zhang et al. (2010), researchers consider the linear regression model estimation is a generally utilized strategy for prediction of crop yield. The research concluded that NDVI and precipitation contributed more to the crop yield
Sanchez et al. (2014), researchers show a positive correlation among a few components (linear and nonlinear) for prediction of crop yield. Optimal attribute subset in training algorithm used old sample data whereas test is unseen sample where performance is judged.
Ravichandran et al. (2016) suggests some fertilizers that could improve the productivity. The system is developed as an Android Application, which could be installed in a Smart Phone and could be easily check out.
Sudarkodi P (2019) suggested knowledge Management play an important role in decision making in selecting variables to analysis the data.

Data collection, extraction and classification

The implementation includes the datasets taken from use the kaggle.com to feed the system with 2199 generic data of agriculture features. These includes N, P, K, temperature, humidity, Ph and rainfall. To practice the predictive system the machine learning algorithms requires two types of data - Trained data and Test data. Trained data is the survey data collected from past record, whereas test data is the current survey data. Both these data will be merge together also known as classification techniques.The algorithm takes 30% of

ISSN (ONLINE): 2454-9762
ISSN (PRINT): 2454-9762
Available online at www.ijarmate.com

International Journal of Advanced Research in Management, Architecture, Technology and Engineering (IJARMATE)
Vol. 8, Issue 2,February 2022

the test data (Random data) as the size given tothe system and remaining 70% train data is taken.

('/kaggle/input/crop-recommendation-dataset/Crop_recommendation.csv')

	N	P	K	temperature	humidity	ph	rainfall
0	90	42	43	20.879744	82.002744	6.502985	202.935536
1	85	58	41	21.770462	80.319644	7.038096	226.655537
2	60	55	44	23.004459	82.320763	7.840207	263.964248
3	74	35	40	26.491096	80.158363	6.980401	242.864034
4	78	42	42	20.130175	81.604873	7.628473	262.717340
...	...	..	..	...	...	...	...
2195	107	34	32	26.774637	66.413269	6.780064	177.774507
2196	99	15	27	27.417112	56.636362	6.086922	127.924610
2197	118	33	30	24.131797	67.225123	6.362608	173.322839
2198	117	32	34	26.272418	52.127394	6.758793	127.175293
2199	104	18	30	23.603016	60.396475	6.779833	140.937041

Figure 1-Indicating snapshot of final processed independent variables

Proposed System

The regression model generated is tested for accuracy score and found 96% accuracy for train model and 93% accuracy for test model

```
from sklearn.metrics import accuracy_score
accuracy_score(y_train_pred,train_y)
```

```
0.9646258503401360
```

```
accuracy_score(y_test_pred,test_y)
```

```
0.9317460317460318
```

After applying the logistic regression model, we can predict the types of crops to be cultivated. In real time the values of the logistic equation are used to make a prediction about the desire types of crops to be grown.

```
myinput=[[84,43,40,25,88,7,169]]
pred=lg.predict(myinput)
print(pred)
```

```
[8]
```

```
myinput=[[92  , 40  , 30   , 23.357232 , 55.187922 , 6
pred=lg.predict(myinput)
print(pred)
```

```
[5]
```

[8]-Mung beans

[5]-Kidney beans

Conclusion

Logistic regression is a powerful tool allowing multiple explanatory variables being analyzed simultaneously, meanwhile reducing the effect of confounding factors. The study presented in this work introduces to smart farming, practical, cheap and easy to develop task that are used to select an appropriate type of crop production. The combination of Smart Irrigation and control to machine learning algorithms can stave off many issues of agriculture.

REFERENCES

[1] Kitchen N R, Lundb S T D, Sudduth K A and Buchleiter G W (2003) Soil electrical conductivity and topography related to yield for three contrasting soil-crop systems Agronomy Journal 95 483-495
[2] Ravichandran G, Koteeshwari R S 2016 Agricultural Crop Predictor and Advisor using ANN for Smartphones IEEE
[3] Zhang et al. (2010) A review of vegetated buffers and a meta-analysis of their mitigation efficacy in reducing nonpoint source pollution, Nursery crop Science
[4] S. Chetty; A. O. Adewumi (2014) "Comparison Study of Swarm Intelligence Techniques for the Annual Crop Planning Problem" IEEE Transactions on Evolutionary Computation
[5] Sudarkodi P (2019) "Knowledge Management practices-An Empirical study of State Bank of India." International Journal of social science and economic Research, ISSN:24455-8834, Vol:04, Issue: 03
[6] SR Rajeswari (2019) Smart Farming Prediction Using Machine Learning International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-7