

**Crop Yield Prediction Using Adaptive Techniques**

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Abstract — Usually farmers declare several months as Crop Holiday due to lack of water content and knowledge on other crops, and simply losing the yield. Traditional farming techniques and crops to be selected are inherited from the fore fathers. In the olden days, this helped farmers a lot, but, as the conditions change day by day very rapidly, farmers are forced to cultivate more and more crops. But in the current scenario, most of them don't have enough knowledge about the new crops and are not completely aware of the benefits they get while farming them. The main objective of this paper is to predict the crop and maintain the crop.

The proposed method is that to give necessary suggestions to farmers to grow more than a crop in a year by giving suggestions about other crops which are suitable for their land conditions in their area. It will help farmers from Indian villages to grow more than a crop in year and attain self sustainability, to increase the fertility of the soil and to learn the features and techniques of other crops and their possibility. The major steps of the system are soil selection with in which the soil of the actual area is decided and selected, season selection in which the season that is needed for the suggestions, crop selection in which the crops are listed out based upon the soil and the season selected before and a suitable crop is selected, maintenance in which the steps that are necessary to maintain the crop efficiently are described in brief. The scope of the system is that it can be extended further to give necessary information and alerts to farmers about the crops that they are growing.

Keywords-Prediction, Crop Holiday, farming techniques, Soil Selection, Season Selection.

I. INTRODUCTION

Data Technology (IT) has acquired progressive changes the world and greatly affects the way we live and work. The advancement of top of the line innovations, for example, media communications, processing and the Internet has made life so straightforward and simple that any sort of data can be discovered utilizing Computers. The IT business is becoming exponentially everywhere throughout the world including India. The IT business has spread over many fields including Agriculture. It has been utilized for different purposes, for example, recording opportune information of yield cultivating, research, and data archive.

The objective of the Crop Prediction system is to provide necessary information regarding the crops that can be cultivated in a particular region. This is a new concept as the traditional information is only printed on paper and not in electronic format. This system is a computerized form of the critical data and information regarding the crops and helps farmers by facilitating ease of gaining knowledge on the crops, both old and new. More functionality can be added to this system. The Crop Prediction is an information providing application which contains data regarding various crops that can be cultivated. The application is supported by a database consisting of the details of the crops. We can add more crops to the database.

In India, there are three crop seasons and one season as a Crop Holiday. Crops are cultivated during these three seasons and the land is left alone during the Crop Holiday without any usage. Usually, farmers declare several months as Crop Holiday due to lack of water content and knowledge on other crops, and simply losing the yield.

Traditional farming techniques and crops to be selected are inherited from the fore fathers. In the olden days, this helped farmers a lot, but, as the conditions change day by day very rapidly, farmers are forced to cultivate more and more crop. This will prove to be beneficial to agriculture which will increase crop productivity resulting in better yields to the farmers. The paper aims to implement an application that helps farmers to gain knowledge of the new crops that can be cultivated in their region thereby eliminating the idle time during Crop Holidays. It will help farmers from Indian villages to grow more than a crop in year and attain self sustainability, to increase the fertility of the soil and to learn the features and techniques of other crops and their possibility.

II. LITERATURE SURVEY

A harvest expectation is a far reaching issue that happens. Amid the rising season, a rancher had interest in knowing how much yield he is going to anticipate. In the prior period, this yield expectation turn into a self evident actuality depended

on Farmer's long haul understanding for particular yield, crops and climatic conditions. Agriculturist specifically goes for yield forecast as opposed to worried on harvest expectation with the current framework. Unless the right product is anticipated how the yield will be better and furthermore with existing frameworks pesticides, ecological and meteorological parameter identified with harvest is not considered. Advancing and alleviating the horticultural creation at an all the more quickly pace is one of the basic circumstance for farming change. Any harvest's creation demonstrate the path either by enthusiasm of space or upgrade in yield or both. In India, the possibility of enlarging the locale under any yield does not exist with the exception of by re-setting up to increment trimming quality or product substitution. Thus, varieties in a bad position the zone and produce thorough trouble. Thus, there is have to endeavor great procedure for harvest forecast keeping in mind the end goal to defeat existing issue.

The crop content [4] consists of farm data like crop varieties, soil types, soil-ph value, crop disease and pesticides, seasonal parameter such as kharif, rabbi and summer crops. The knowledge-base conjointly of zones similarly as district information, environmental parameter such as maximum and minimum temperature value and average rainfall.

The researchers worked [8] on precipitation inconstancy examination and its effect on yield profitability. The impact of watched regular climatic conditions, for example, precipitation and temperature inconstancy on harvest yield expectation was considered [7] through an exact product demonstrate. Besides, there are two ways to deal with explore the effect of environmental change on harvest generation which incorporate the yield reasonableness approach and the creation work approach [6]. Specialists were found that the yields of winter wheat are decreased when temperatures ascend, because of the subsequent lessening of the development periods of the plant [2] and furthermore presumed that the unpredictability of a model depended on the level of point by point examination [10] or it was less detailed with just estimations of dampness substance [11].

Because of the importance of crop yield prediction, the purpose of this study is to apply several forecasting methods for evaluating crop yield forecasting models. Crop yield prediction, which provides information to decision makers, is important in many ways to the economy. Because of its importance, researchers have proposed many forecasting methods to improve accuracy of yield estimates. Then to getting accuracy is not the easy one, as many factors have impacts on crop production and thus crop yield. Many strategies are utilized in yield forecasts and totally different models have generated different results.

III. METHODOLOGY

In this paper, data plays an important role. But the required data is not readily available for usage. The data regarding the required crops are to be collected from various resources of Agricultural Department, Agricultural College and Farmers. Moreover, the data will be in Telugu and hence is to be translated into English before it is used in the Paper.

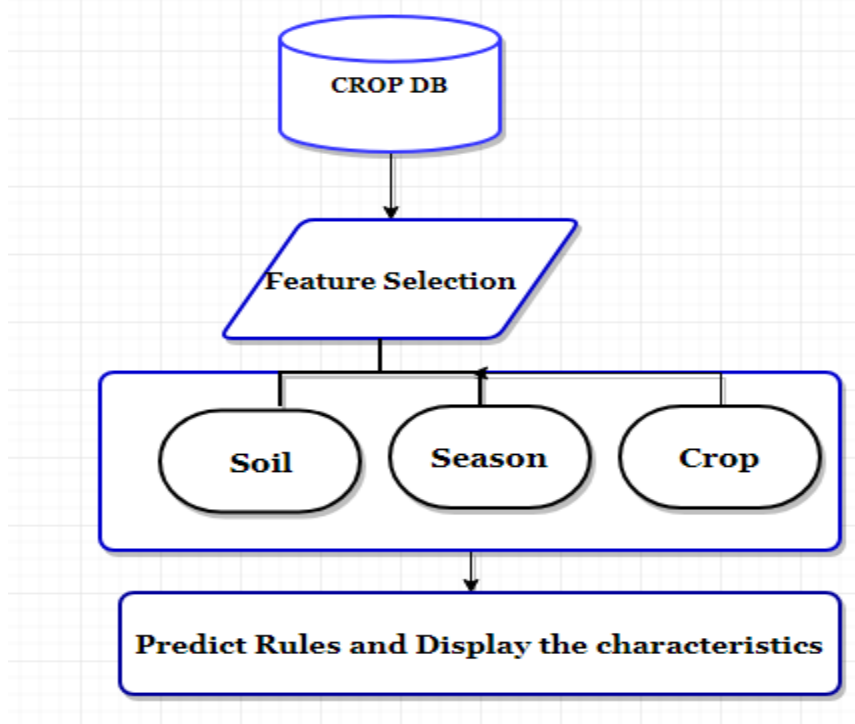


Figure1: Architecture of Crop Prediction

Figure1 demonstrates the design of yield expectation which incorporates an information module which is in charge of taking contribution from agriculturist. The element determination module is in charge of subset choice of characteristic from yield learning base. The product learning base is comprise of homestead learning, for example, area id, district name, soil-sort, water ph, precipitation, moistness, daylight, arrive data, ecological parameter, season, trim information such yield sort, seed sort. At that point expectation tenets will be get brings about terms of harvest, pesticide and cost.

Application contains following steps

1. Soil Selection
2. Season Selection
3. Crop Selection

1. Soil Selection

The purpose of this selection is to provide information regarding crops based upon the soils. When the user selects a particular soil, then he would get information regarding all the crops that are available and can be cultivated in that particular kind of soil.

2. Season Selection

The purpose of this step is to provide information regarding crops based upon the seasons. When the user selects the particular season, then he would get information regarding all the crops that are available and can be cultivated in that particular area in the selected season.

3. Crop Selection

The purpose of this selection is to provide information regarding the crop that the user has selected. This is an independent module and would give a better result if combined used with the first two modules.

Table1: Data set of Jonna

Jonna					
ID	Type	Season	Duration	Yield	Soils
3	CSH-13	Kharif/Rabi	110-115	12-14	Alluvial Soil
18	CSH-13R	Rabi	110-115	13-14	Loam Soil
5	CSH-14	Kharif	95-100	12-13	Alluvial Soil
20	CSH-15R	Rabi	110-115	13-14	Alluvial Soil
4	CSH-16	Kharif	105-110	15-17	Loam Soil
6	CSH-18	Kharif	110-115	16-17	Loam Soil
1	CSH-5	All	105-110	14-16	Loam Soil/Alluvial Soil
2	CSH-9	Kharif/Rabi	105-110	16-18	Alluvial Soil
14	CSV -216R	Rabi	110-115	12-14	Alluvial Soil
19	CSV-14R	Rabi	115-120	10-12	Loam Soil
8	CSV-15	Kharif	110	10-12	Alluvial Soil
17	M35-1	Rabi	115-120	10-12	Alluvial Soil
12	N-13	Rabi	95-100	7-8	Loam Soil/Alluvial Soil
13	N-14	Rabi	110-115	10-12	Loam Soil
9	Nandyala Tella Jonna - 1	Rabi	105-110	10-12	Alluvial Soil
10	Nandyala Tella Jonna - 2	Rabi	95-100	12-14	Loam Soil
11	Nandyala Tella Jonna - 3	Rabi	100-105	12-14	Loam Soil
16	NTJ-4	Rabi	90-98	13-15	Loam Soil
15	Palem – 2	Kharif	105-110	11-12	Alluvial Soil
7	PSV-1	Kharif/Rabi	105-110	10-12	Alluvial Soil

Table2: Dataset of Sajja

Sajja					
ID	Type	Season	Duration	Yield	Soils
2	ICMH-451	Kharif/Summer	85-90	10-12	Sandy Soil
5	ICMV-221	Kharif/Summer	85-90	8-10	Sandy Soil
4	ICTP-8203	Kharif/Summer	80-85	8-10	Sandy Soil
3	Mallikarjuna	Kharif/Rabi	80-85	8-10	Sandy Soil
1	WCC75	Kharif/Summer	85-90	8-10	Sandy Soil

The Type field indicates the type of the Crop. The Season field indicates the seasons in which the crop type can be grown. The Duration field indicates the duration of the crop in days. The Yield field indicates how many Quintals of the crop can be produced from one acre of farming. The Soils field indicates the soils in which the crop can be grown. The Characteristics field indicates the characteristics of the crop. The Seed % indicates the percentage of seed from a plant of the oil crop. The Oil % indicates the percentage of oil from a seed of the oil crop. Here we present data base loading and report on selected crop.

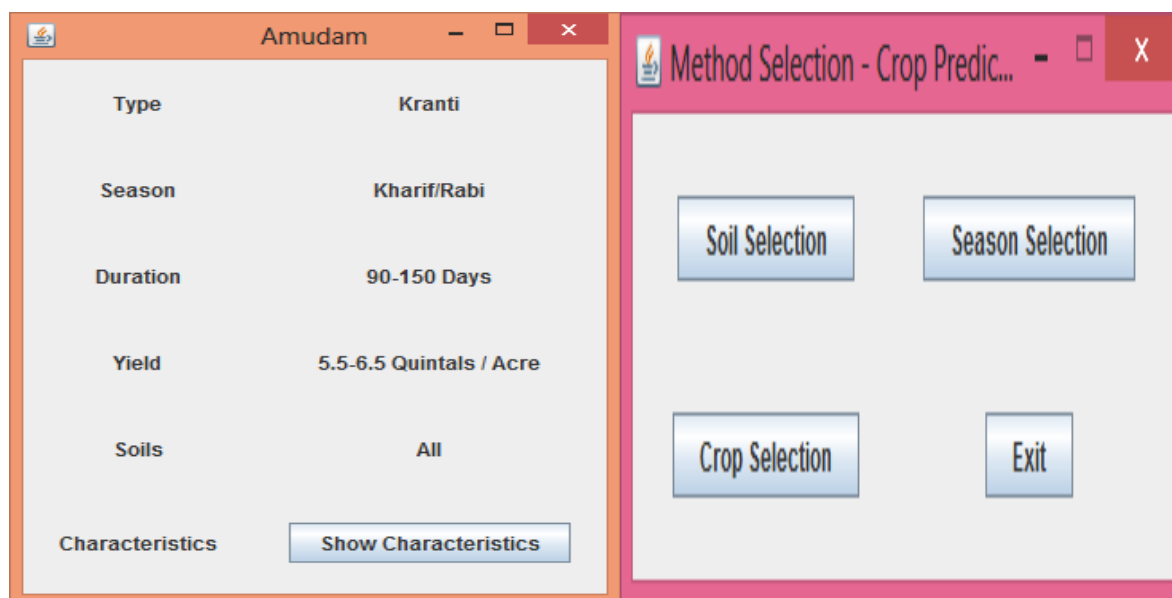


Figure2. Crop Selection

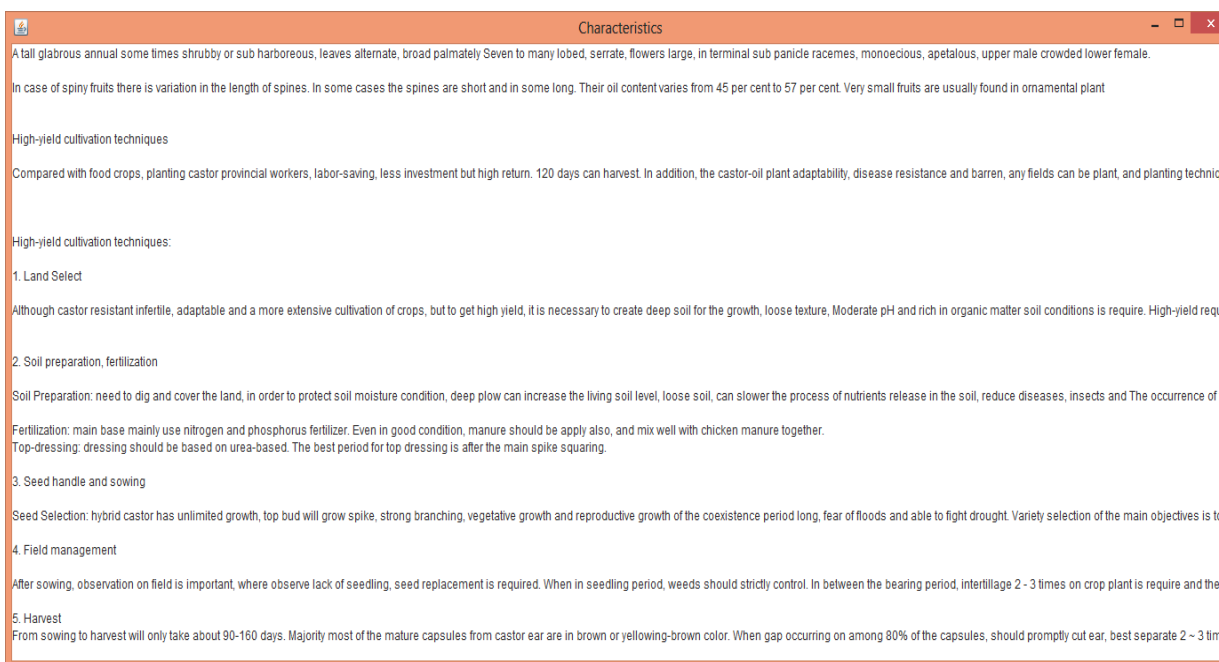


Figure3. Characteristics of Selected Crop

IV. CONCLUSION

This system has been developed incorporating all the requirements. The computerisation of the critical data and information regarding the crops and helps Farmers by facilitating ease of gaining knowledge on the crops, both old and new has been done, and found this paper to be far more difficult than we ever anticipated. We have developed the groundwork for the application with great potential.

V. FURTHER ENHANCEMENTS

The database of the Crops can be further extended so that the paper covers entire area of the State. It can also be extended with Telugu Fonts so that the farmers who don't know English would get benefited as equally as those who know English.

We strongly recommend using this paper to increase the awareness about the new and unknown crops among the farmers community and give necessary information and alerts to farmers about the crops that they are growing. This would be beneficiary to them as they would come to know about the types of crops that can be cultivated in their region. This would also help in an efficient usage of the land during the Crop Holiday season.

REFERENCES

- [1] S. Veenadhari, Dr. Bharat Misra, Dr. CD Singh, "Data Mining Techniques for Predicting Crop Productivity" – A Review Article, www.indianingredients.blogspot.in, IJCST Vol 2, Issue 1, March 2011.
- [2] G R Batts, "Effects Of CO₂ And Temperature on Growth and Yield of Crops of Winter Wheat over Four Seasons", *European Journal of Agronomy*, vol. 7, pages : 43-52, , 1997.
- [3] R. A.A. and K. R.V., Review - role of data mining in agriculture," *International Journal of Computer Science and Information Technologies(IJCSIT)*, vol. 4(2), no. 0975-9646, pp. 270-272, 2013.
- [4] D. M. Kiri L. Wagstaff and and S. R. Sain, Harvist: A system for agricultural and weather studies using advanced statistical methods," 2005. [Online]. Available: <https://www.agriskmanagementforum.org>
- [5] www.agri.ap.nic.in, Department of Agriculture, Andhra Pradesh
- [6] M J Foulkes, "Raising Yield Potential of Wheat", *Journal of Experimental Botany*, vol. 62, pages: 469-486, 2011.
- [7] M Trnka, "Projections of Uncertainties in Climate Change Scenarios into Expected Winter Wheat Yields", *Theoretical and Applied Climatology*, vol. 77, pages : 229-249, 2004.

- [8] Mehta D R, Kalola A D, Saradava D A, Yusufzai A S, "Rainfall Variability Analysis and Its Impact on Crop Productivity - A Case Study", Indian Journal of Agricultural Research, Volume 36, Issue 1, pages: 29-33, 2002.
- [9] www.agricoop.nic.in
- [10] R J Brooks, "Simplifying Sirius: Sensitivity Analysis and Development of A Meta-Model for Wheat Yield Prediction", European Journal of Agronomy, vol. 14, pages: 43-60, 2001.
- [11] R V Martin, "Seasonal Maize Forecasting for South Africa and Zimbabwe Derived From an Agroclimatological Model", Journal of Applicable Meteorology, vol. 39, pages: 1473-1479, 2000.
- [12] Dr. K.T. Chandy, Classification of Crops, Booklet No. 227- Agricultural Extension: & Education: AEES-2.
- [13] Dr. Gogineni Veerendhranath, Vyavasaya Panchangam, Agricultural Information and Publications Centre, Acharya N.G. Ranga Agricultural University, 2008-2009.