Crop Analysis and Profit Prediction using Data Mining Techniques (Id:39)

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***Abstract*—Farmers are the backbone of our country. They cultivate different varieties of crops. In some cases it is difficult for the farmers to get back the contributed amount from the harvest due to the market value of the yield. Farmers will not realize the market value until they bring the crops to the market which makes them to battle a great deal. These crop rates can be controlled if there is a system which helps the farmers to know about the crops planted around his location with prediction to suggest the farmers about the crops to be cultivated to maximize profit. In this paper a system is been proposed which will gather information about all the crops that are cultivated from different places around the state so that the farmers can use the system to know about the on growing crop details and to predict the best crop that allows him to get more profit. This system uses various criteria such as place, population, crop type, soil type, stock, current requirement, season, number of farmers cultivating the same crop, crop duration etc to predict the crop for farmers.**

Keywords—Datamining, ID3, agriculture, classification

I. INTRODUCTION

Farmers and agricultural businesses need to settle on various choices consistently in agriculture area and tangled complexities requires the different variables impacting them. Agriculture has been a show focus for information mining. Atmospheric conditions, changeability in the soil, input levels, combinations and stock expense made it even more relevant for farmers to utilize data and get help to settle on basic cultivating choices.

Data mining is defined as a process of checking large pre-existing datasets to produce new information. It implies that usable data is extracted from larger dataset and examined through applied technique. As the evolution of technology, the intense use of technology has increased which leads to interest in data mining concept tremendously. Data mining techniques are used by organizations to evaluate their ongoing functionalities. Data mining authorizes the collection of huge data in faster manner. The most significant challenges are to analyze the data and provide meaningful extraction of data which can be used to solve a problem for the organization's growth. As an instance, classification technique of ID3 algorithm approach is used for predicting the crops. ID3 is a scientific calculation used to produce a decision tree from a given dataset by utilizing a top down, avaricious inquiry to test each quality at each hub of the tree.

India's sixty percent of the regions are arable. India is second guiding nation with reference to the total cultivable land, yet the greater part of the farmers are not getting the assessed harvest yield because of a several reasons . The crop yield for the most part relies upon the climate condition, area, soil type. Crop yield figure is a huge cultivating issue. Each cultivator is worried about deliberate, how much gather he is going to anticipate. This paper centers around investigation of rural information utilizing data mining systems to foresee the best harvest and whether the yield is productive or not.

The remainder of the paper is sorted out as pursues: Section-2 exhibits the Background and Related Work, Section-3 shows the Methods, Section-4 displays the Results and Section-5 introduces the Conclusion.

II. BACKGROUND AND RELATED WORK

A. Classification

Classification is an information mining capacity that relegates things in an accumulation to target classifications or classes. The objective of characterization is to precisely anticipate the objective class for each case in the information.

B. Related Work

Agriculture is an economic sector which plays an important role in the socio-economic fabric of India. The classification of soil into low, medium and high categories are done by adopting data mining techniques in order to predict the crop yield using available dataset [1]. The improvement in yields expectation by past agriculture data. It additionally portrays

the determination of best yield contingent upon the climate circumstance and gives expected data to favour the reasonable season to do magnificence cultivating [2]. The soil fruitfulness is resolved utilizing sensor and proposes which crop must be planted and furthermore it predicts the harvest yield. Data about the harvest is as graph. It likewise proposes the compost which must be added to the soil to build the soil richness [3]. The issue of the farmers has been tended to through accuracy farming. Exactness horticulture is a cutting edge cultivating strategy that utilizes look into information of soil attributes, soil types, crop yield information accumulation and proposes the farmers the correct harvest dependent on their site explicit parameters [4]. The stock pattern forecast utilizing regression analysis. Financial exchange forecast with the assistance of relapse examination is the most productive mix to foresee the stocks and the states of the market. The advancement of an energetic application for examining and anticipating securities exchange costs [5]. The regular issue existing among the Indian farmers are they don't pick the correct yield dependent on their soil prerequisites. Because of this they face a genuine mishap in efficiency. This issue of the farmers has been resolved to through precision agriculture. [6]. The spotlights on expectation of rice crop yield amid monsoon season dependent on the recorded rural dataset of semi-bone-dry climatic zone. [7].

III. METHODOLOGY

The system architecture consists of two phases. In the first phase the farmer needs to enter the list of crops along with the location. The system takes in account the factors like temperature, humidity, water level and soil type for that location and then predicts the best crops that can be grown in the area. This analysis is done using ID3 algorithm.

In the second phase the best crops obtained from the phase one are further analyzed using the ongoing crop details, current stock, population and season which tells us whether the crop is profitable or not. Hobliwise & Grama Panchayat wise crop area statistics 2015-16 is used as the dataset for training the system.

A. ID3 Algorithm

```
ID3 (Examples, Target_Attribute, Attributes)
    Create a root node for the tree
    If all examples are positive, Return the single-node tree Root, with label = +.
    If all examples are negative, Return the single-node tree Root, with label = -.
    If number of predicting attributes is empty, then Return the single node tree Root,
    with label = most common value of the target attribute in the examples.
    Otherwise Begin
        A ← The Attribute that best classifies examples.
        Decision Tree attribute for Root = A.
        For each possible value, v_i, of A,
            Add a new tree branch below Root, corresponding to the test A = v_i.
            Let Examples(v_i) be the subset of examples that have the value v_i for A
            If Examples(v_i) is empty
                Then below this new branch add a leaf node with label = most common target value in the examples
            Else below this new branch add the subtree ID3 (Examples(v_i), Target_Attribute, Attributes - {A})
    End
    Return Root
```

Fig 3.1. ID3 algorithm

B. Working

The system is trained and updated by using the crop parameters and profit parameters. The farmer needs to register in order to access the information.

Therefore farmer is authenticated each time he logins to the system. The crop name and location is given as input to the system by the farmer. The system analyses the crop information along with the trained dataset. This gives the output whether the crop is adaptable or not. The obtained output is analyzed using profit parameters to predict whether the crop is profitable or not. The system architecture is shown in Fig. 3.2.

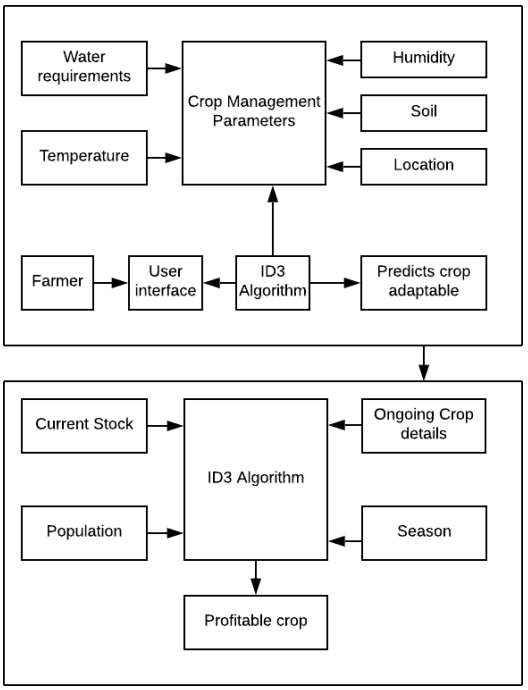

Fig. 3.2. System Architecture

IV. RESULTS

The parameters of three regions namely Bantwal, Belthangady, Mangaluru are updated. Farmer enters the crop name, area of cultivation, land size and season. The updated details of the crop parameters could be viewed by the farmer. The sample outcome of the Proposed project is shown in the below figure.

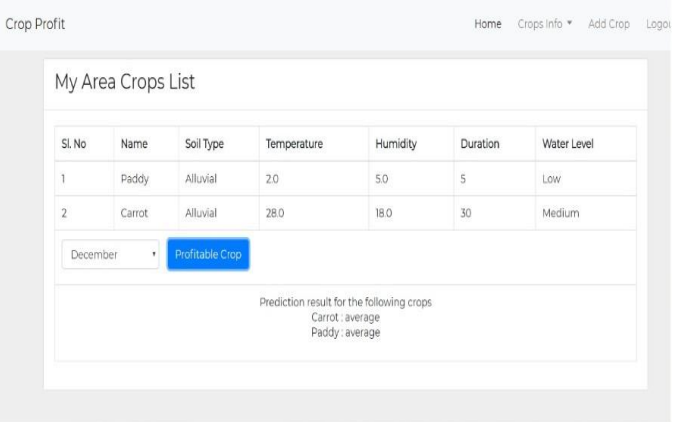

Fig 4.1. Result showing the profitable crop

The result shows that which crop can be cultivated during a particular season. It also shows whether cultivating the particular crop is profitable or not for the farmer. The system is very helpful so that the farmer can take a decision.

CONCLUSION

The project aids the farmers in deciding which crop to be grown in a particular area during a specific period of time and predict whether it is profitable or not. It provides the details by stating whether the crop is profitable or not. Hence this system helps farmers to preserve their time by aiding them in decision making process.

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