The Modern Technology for Crop Production

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Abstract-The purpose of this project is Agricultural Land Suitability Evaluation for crop production. According to the weather condition and type of soil this system will predict whether crop is suitable for their land or not. Normally when soil testing is performed that time farmers only get to know about land properties and what kind of fertilizers they have to use to increase their crop production. So they don't get to know is the crop they are going to produce in their land is suitable or not. Our system will tell them their land suitability level with respect to environmental factors and crop type. It is a data mining software which will analyze all data which consist land properties and environmental properties for crops. And after applying data mining algorithm on that data user will get the land suitability level for that crop which farmer want to produce in his land. Our project is user friendly interface so user can easily use it and it is cost efficient.

Index Terms-Data Mining, Selection of crop type, Classification Techniques, Prediction

I. INTRODUCTION

Our Project is under Data Mining domain and belongs to agriculture field. Normally when farmers want to get to know about their land properties they perform soil testing. From that soil testing they get know that is their land has enough capacity to produce good amount of crop production. But they don't get know which crop is suitable for their land. So we have developed a system which will tell them land suitability level of their land for particular type of crop which they want to produce in their land. We are providing input as land properties means value of all soil components, environmental properties of farmers region and crop type which they want to produce, our system have one database which is consisting land properties and environmental properties with their values for all type of crops. So after entering information into system, system will perform fetch data from database and will perform computation with respect to that entered data and as result system will display land suitability level of that land for a particular type of crop. We have divide suitability level in 4 levels S1 , S2 , S3 and N. S1 is highest level means land is fully suitable for that crop and N is lowest level means land is not suitable for that crop.

Motivation:

1. Farmers can't predict which type of crop is suitable for their land means through which crop they willearn more port.After performing soil test farmers only get to know about their land properties and how much of fertilizers they have to use to

increase their crop production. But they don't get know which type of crop will give 8 them more profit[1].

2. Farmer's never get know that is their land is suitable for any kind of crop or not Sometimes land is not suitable for production of any type of crop. Means no any crop will give them max profit so that time they don't have to take any type of crop. But after soil testing they don't getknow about this and over system will also notify this.
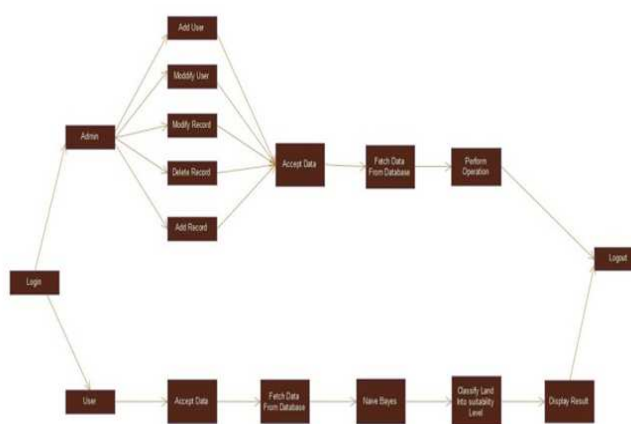

Figure1.Flowchart

II.TECHNIQUES FOR LAND EVALUATION

2.1 Micro-LEIS:

The Micro-LEIS is for land data transfer and Agro-ecological land evaluation (Rosa et al., 1992,

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2004,2009). Its important components consists of land evaluation using the following literal units: place (climate), soil (site-soil), land (climate, site, soil), and field (climate, site, soil, management) data and knowledge of engineering through the use of a variety of Geo-referenced Databases, Computer Programs, and Boolean, Statistical, Embedded System and Neural Metwork modeling Techniques (Rosa et al.,2004, 2009). But the system gives a disadvantage that this system does not allow the user to build a personal expert system (Nwer, 2006)[2].

2.2 LIMEX :LIMEX is an integrated expert system withmultimedia that was developed to assist lime growers and extension agents in the cultivation of lime for the purpose of improving their yield (Mahmoud et al., 1997). The scope of the LIMEX expert system includes assessment, irrigation, utility of fertilizers, and pest control. Expert system was augmented with multimedia capabilities by the integration of text, image, sound, video, and data which allows for a good feedback from users, assists in better understanding of the system, and allows more flexibility in the interactive. System has as input a digital map of an area and its geographical database, displays this map, evaluates the land units selected by the user and at last shows the results of the land units in color (Tsoumakas and Vlaha-vas, 1999). In the point of view of constraint of this system is that it does not support wide range of problems in land evaluation[3].

2.3 LEIGIS : LEIGIS it is software application resulting from invented by Kalogirou (2002). It is designed to support rural planners with the first view of the land suitability for cultivation of certain crops. The aim of this work was to produce a physical evaluation of land capabilities and to use this to provide an economic evaluation of land for different types of agriculture. The implementation of LEIGIS includes models for general cultivation and for specific crops (wheat, barley, maize, seed cotton, and sugar beet) (Kalogirou, 2002). This system is limited to five crops and does not include characteristics such as climate.[4]

2.4 VEGES : In VEGES expert system the diagnosis and treatment of pests, diseases and nutrient disorders of certain vegetable species (Yialouris et al., 1997). This method of representation easily fits into any rule based ES development tool, and thus is anbenifit of the system. The advantages of this method are that it is simple, easy to understand, and has a graphical presentation. However, it has the disadvantage in that it cannot account for interactions between land characteristics [5].

III. PROPOSED METHODOLOGY

In this paper we have studied different methodologies which can be useful to complete the given problem. Recent research in computer vision has increasingly focused on building systems for effective land evaluation and predicting suitable crop. So that we have suitable database of land properties and environmental factors[6].

3.1 Software Description : It is Data Mining Application which is predicting the crop type and suitability level for that land on the basis of land properties and environmental properties.We have developed a software using java technology for front end and to implement business logic and SQL for back end. There are around 9 inputs value from which PH value , EC value , K value , N value , P value ,Temperature , Moisture of soil , Rainfall are at value and crop type is string[7].

3.2 Size and Bound Of Inputs :

Values	Range
PH Value	1.0 to 9.0
EC Value	1.0 to 6.0
K Value	1 to 500
P Value	1 to 500
N Value	1 to 500
Temperature	15 to 50
Moisture of soil	10 to 100
Rainfall	10 to 100

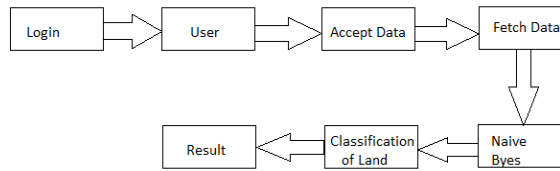## IV.GRAPHICAL USER INTERFACE OF SYSYEM

Figure4. Graphical User Interface

The user must have to login into the system with username and password. The system is accessible to only administrator and user. The customer have to provide a necessary information. These information in the type of values is entered by the user in the mandatory fields of the system then the system accepted those values and starts the actual process.

The process of consultant result is made by the comparisons of the values present in the database and the values given by the customer. The result is nothing but the Land Evaluation Suitability Level. These levels are of different types according to the ruled database the result is displayed[8].

V. ALGORITHM

S=(C1,C2,C3.........,Cn)
        Where S is the sensitivity analysis is used to determine the level of importance of each criteria.
C1,C2..,Cn are the criteria (eg.
Crop,temp,rain,moisture,N,P,K,Ec,Ph) .
S tekes values form 0 till 100 where,
        S1= highly suitable,
        S2= moderately suitable,
        S3= marginally suitable and
S4(N)= not suitable.
For finding the suitability level we have to calculate the probability. Calculate probability of number of records which has crop type with its criterions. Compare the pobabilityvalues withit's suitability leveI[9].
        The aim of each scenario is to identify criteria that are sensitive. Hence level of importance for each criteria can be determined. Different weighting scheme were applied for the suitability criteria.

1) Accept Input From user.
2) Get the number of records for that input crop.
3) Calculate probability for each property. In that calculate p(yes) and p(no) for that crop.
4) Check p(yes) for temperature , rainfall and moisture.
   a. If it is greater than 0 then goto 5
   b. If it is less than 0 then goto 7
5) Multiply all the p(yes) and p(no) of all attribute.
   a. If p(yes) > p(no) then goto
   b. If p(yes) < p(no) then goto
   c. If p(yes) = p(no) then goto
6) Land suitability level is S1. Goto 11
7) Land suitability level is N. Goto 11
8) If p(yes) of 1 or 2 attribute is 0 then categorize land into S2 goto 11
9) If p(yes) of 3 or 4 attribute is 0 then categorize land into S3 , goto 11
10) If p(yes) of 5 attribute is 0 then categorize land into N , goto 11
11) Display result
12) Exit

Output :

Crop :Jowar
Temp : 30
Rain : 51
Moisture : 61
K : 100
N : 50
P : 50
Ec: 2.3
Ph: 6
Solution :
- No of records which has crop type as Jowar : 32
- No of records which has crop type as Jowar and Temp as 30 : 00
  So probability of temp for yes is : $0/32 = 0$, And for no is : $32/32 = 0.5$
- No of records which has crop type as Jowar and Rainfall is 51 = 16
  So probability of rainfall for yes is : $16/32 = 0.5$, And for no is : $16/32 = 0.5$
- No of records which has crop type as Jowar and Moisture is 61 = 16
  So probability of 60 for yes is : $16/32 = 0.5$, And for no is : $16/32 = 0.5$

Here temperature is not suitable for crop and we can't manipulate it so land suitability level of this land is N i,e. this land is not suitable for jowar.
Same for rainfall and moisture if this properties of that land is not suitable for crop if other properties are

suitable for crop then also land is not suitable for that crop.

VI. CONCLUSION

We have successfully implemented a system for the agriculture which accept Land properties and Environmental properties from farmer and when the values enter it into system then system will identify the suitability level of that land for that crop which farmer want to produce based on properties entered by user. The result of the system is based on or not on the assessment of the land. The main benefit of the system is that it not takes time for the results of crop and an assurance.

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