ANALYTIC FRAMEWORK TO EXTRACT KNOWLEDGE FROM PRECISION AGRICULTURE DATA

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***Abstract* – The agriculture is the backbone of Indian economy. In India around 80% of the population depend on the agriculture for improving yielding in agriculture precision agriculture was introduced. In this we are developing a system in which sensors are placed at the corners of the field to collect the information regarding the humidity, temperature of a soil. It helps the farmers to predict the quality and quantity of the soil. So that they can yield good results.**

Keywords – In Precision, Precision agriculture, GIS,GPS, farming

I. INTRODUCTION

India is a country with more than 1billion population. Out of which 70% will depend on agriculture system which is almost 30% of GDP and employs 70 % of the population. In Today, the rank of India is in second place in farm output. The main problem is we are unable to predict the future agriculture system regarding the soil, humidity, temperature and cost. Farming or cultivating frameworks in India is adjusted reasonably, as per most suited areas. India is an unconquerable nation with more than billion or more individuals; furthermore one of the worlds's quickly maintaining economies. Out of these 58% are trusting horticulture arrays So our accomplishments in crop yields are just 30-60%.. Numerous new ideas are being produced to permit rural mechanization to thrive and convey its maximum capacity. To exploit these advances, we ought to not simply consider the ramifications of building up another single innovation however ought to take a gander at the more extensive issues for complete improvement of a framework.

Today, India positions second worldwide in farm yield. Farming and unified parts represented 13% of the aggregate GDP (Gross Domestic Product) in 2014; around half of the aggregate workforce. Agriculture is geologically the broadest financial part and assumes a typical part in the parts of financial that has an economical association of India. However, the existent report states that the farming division keep on trailing for India. The monetary expansion of agribusiness to India's GDP is by implication diminish with the nation's financial development.

1.1 Productivity:

Crop yields for a few homesteads in India are inside 90% of the best accomplished yields by ranches in created nations no single product is best in each harvest. These distinctions in horticultural efficiency are an element of nearby base, soil quality, small scale atmospheres, neighbourhood assets, rancher's learning and advancements. The low efficiency in India is a consequence of the accompanying.

- The normal size of the area possessions is little and is subjected to discontinuity because of area roof acts.
- Use of innovation is insufficient.
- High costs.

In order to meet future requirements we follow precision agriculture.

1.2 Precision Agriculture:

Precision agriculture (PA) is management concept in agriculture that gives the information about the amounts of water input, pesticides etc. The biggest problem in agriculture is that the cost of farm machinery is very high and only very few farmers can afford them. For irrigation so many farmers will depend on the condition of the weather, here precision agriculture will helps the farmers the correct time for increasing the crop yields.

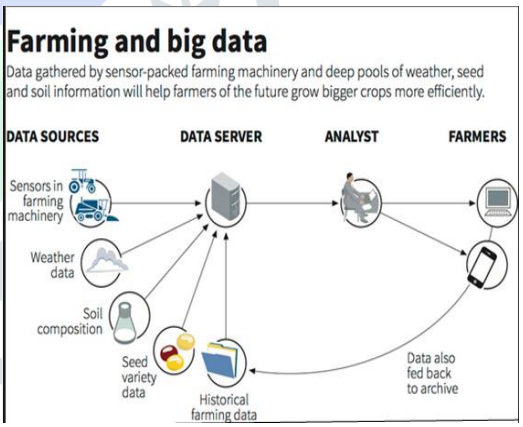


Fig 1: precision agriculture architecture

II. LITERATURE SURVEY

Many researchers have performed analysis on precision agriculture .The problems which the authors identified and stated are as follows.

The Author M.Sabesh have acquainted a framework approach with re-arrange the farming framework for a lower-info, higher-productivity, horticulture which is feasible [1].This proposed approach have the great results or advantages from the improvement and converging of a couple of progressions, including the Global Positioning System (GPS), geographic information structure (GIS), downsized PC portions, customized control, in-field and remote distinguishing, flexible figuring, impelled information. From his study the cutting edge the same

PCs has been used to mechanization, computerization for the choice on the agribusiness research. Starting late remote distinguishing and geographic information system has place a pivotal part in horticulture research.

The Author Jean-Marc A. Gandonou states that the problems in the agriculture farming have been increasing .For managing the risk environment new technologies are adopted like precision agriculture The Precision Agriculture(PA) innovation or technology was defined as a thorough framework intended to optimize the production of agriculture by customizing soil and harvest management and to compare the unique condition found in every field while keeping up the natural quality[2].

The Authors M. R. Bendre,V. R. Thool, R.C .Thool gave a thought regarding how to find extra experiences from accuracy farming information through huge information approach.They also listed out the types of data like unstructured and structured data. Here Big data in precision agriculture comes .The population in the world is increasing day by day and in next generation it is going to cross 15billion.So in order to feed this population ,important development must be takes place in agriculture. The agriculture is mainly depending on weather conditions. The prediction of weather is important for farming in agriculture[3].

The Authors Rupika Yadav,Jhalak Rathod,Vaishnavi Nair states that in India most of the people will depend on agriculture. But today agriculture practices are not environment support. In further generation it will become more, so in order to build high-yield at low costs we use computer technologies like big data to store the huge amount of the data that is generated**.** [4]

III. PROBLEMS INPRECISION AGRICULTURE:

The main problem in the present agriculture system is how long we are meeting the demands and challenges of the new technologies. So many members are defining the precision agriculture but not processing it. Specific recommendations for the Farmers are not going on properly.For recommending the farmers first we have to process and analyse the data. Here we are using the remote sensing for collecting the data. It sense the variability in crop filed and identify the crop stress. So that we can estimate in advance more than 90% accuracy

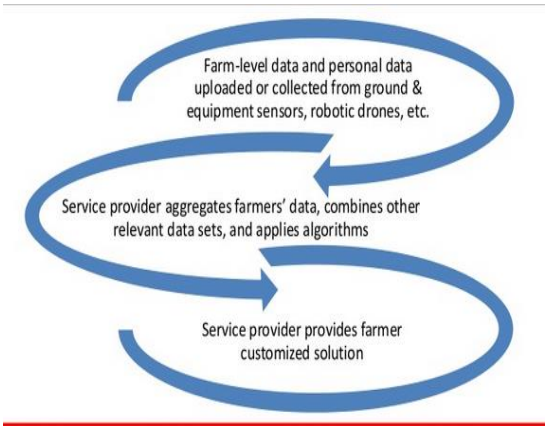


Fig 2: Service providing process to the farmers

IV. PROPOSED SYSTEM

The collected data from the sensors is sent to the Hyper Text Terminal (HTT),which is connected to the sensor equipment. This data is stored in the text format and is saved for regular time intervals. This data has to be extracted from the personal computer (PC), which is stored. This data has to be converted to the excel format using Rtool technologies. We generate the frequent data from both predefined and sensor data. After that we compare the both frequent values and recommend the farmers for the better result. So that they can predict the future and will take the required requirements.

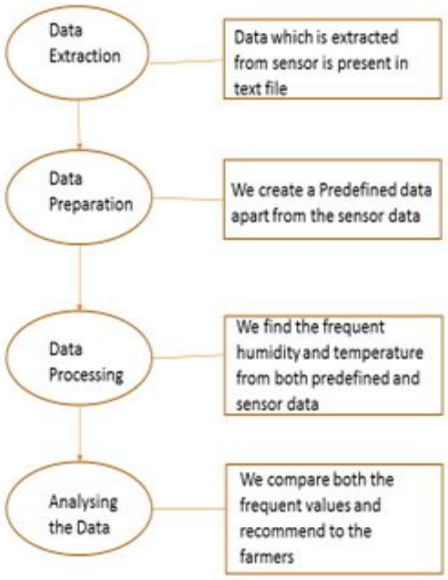


Fig 3: Data preparation

4.1 Step byStep Instructions to Get Data

The supplies are presently turning out to be effective. So here we utilize implanted framework to get the data which is required to get the information. We are making suitable data in light of the checked levels to send data to a centralized monitoring system. This actualizes the essential information correspondence conventions. Testing and estimation are the key necessities in all experimental and building exercises. The measuring gear we use in labs to gauge parameters, for example, weight, temperature, weight, stickiness, voltage, current and so on are all inserted frameworks. Test hardware, for example, oscilloscope, range analyzer, rationale analyzer, convention analyzer, radio correspondence test set and so on is implanted frameworks worked around capable processors. Thank to scaling down, the test and measuring gear are currently getting to be compact encouraging simple testing and estimation in the field by field-faculty.

Here in this gear we utilize two sensors
1. Temperature sensor
2. Moisture sensor

To tackle the problems of agricultural sector regarding Green house energy system with available water resources. Prolonged periods of dry climatic conditions due to fluctuation in annual precipitation, may appreciably reduce the yield of the cultivation. The expenses in establishing many of these crops and

their relative intolerance to drought make an effective irrigation system a necessity for profitable enterprises. Here we take dry/wet (humidity) sensors and Temperature sensor. The condition of soil and the temperature maintained are being displayed on LCD and the same values are being sent to the PC using zigbee communication.

As we are concentrating on the extraction of information from the terminal which is associated with the primary framework we simply have a viewpoint of the outline of the hardware how it is associated with the principle framework i.e (pc) which is for sparing the information read in the hyper content terminal.

V. RESULTS

1. CSV DATA :

N	P	K	yield target
150	5	150	50
150	5	150	55
250	5	100	45
250	5	100	50
120	4	60	30
120	4	60	40
100	6	250	20
100	6	250	24

2.REGRESSION MODEL:

```
>  x<-read.csv(file.choose())\
Error: unexpected input in " x<-read.csv(file.choose())\"
>  x<-read.csv(file.choose())
> head(x)
    N P   K yield.target
1 150 5 150           50
2 150 5 150           55
3 250 5 100           45
4 250 5 100           50
5 120 4  60           30
6 120 4  60           40
>  fit<-lm(yield.target ~ N + P + K,data=x)
> summary(fit)

Call:
lm(formula = yield.target ~ N + P + K, data = x)

Residuals:
   1    2    3    4    5    6    7    8
-2.5  2.5 -2.5  2.5 -5.0  5.0 -2.0  2.0

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  485.0000    89.0891   5.444  0.00553 **
N              0.8167     0.1408   5.800  0.00440 **
P           -163.0000    31.7234  -5.138  0.00680 **
K              1.7333     0.3476   4.987  0.00756 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.555 on 4 degrees of freedom
Multiple R-squared:  0.9309,    Adjusted R-squared:  0.8791
F-statistic: 17.97 on 3 and 4 DF,  p-value: 0.008739
```

coefficients :

```
> coefficients(fit)
 (Intercept)           N           P           K
485.0000000   0.8166667 -163.0000000   1.7333333
```

Confint :

```
> confint(fit, level=0.95)
                    2.5 %      97.5 %
(Intercept)   237.6488912  732.351109
N               0.4257123    1.207621
P            -251.0783177 -74.921682
K               0.7682995    2.698367
```

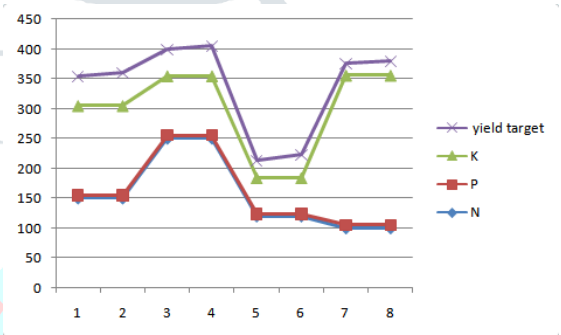
Fitted :

```
> fitted(fit)
   1    2    3    4    5    6    7    8
52.5 52.5 47.5 47.5 35.0 35.0 22.0 22.0
```

Prediction :

```
> head(x)
    N P   K  X
1 120 5 120 NA
result = predict.lm(fit,newdata=x)
result
 1
24
```

NPK vs YIELDING :



VI. CONCLUSION

Here the data is extracted from the field by using small sensors is in the structured form and this helps to study the properties of the soil in order to provide the recommendation to the farmers. In the future, more complex data can be extracted by using a variety of sensors which may help to gain more information regarding the properties of soil and to provide a better or more suitable recommendation to the farmers.

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