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Farmer's Friend System using IOT

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Abstract - The population of the country is growing exponentially day by day. Therefore it is very necessary for the system to manage the economy of the country and also to provide its citizens healthy food. The backbone of the food industry depends on the products supplied by the farmers of the country. It is therefore very essential to help the farmers so that they can produce hefty amount of food grains for the country. The production should be rapid but not by any means of false methods. This can be done with their past experiences for the production of the grains. This model completely focuses on the data analysis which notifies the farmers to take appropriate and necessary steps and make proper use of the resources for meeting the goals in the least minimum time. Moreover, this is the cheapest form of method that the farmers can use to meet the needs

Keywords - AI; BP Series; Controller; IFTTT; IOT; Moisture Sensor; ThingSpeak

INTRODUCTION

The development of a country depends upon the population and its contribution to the country's economy. The country's food industry solely depends upon the production of agricultural farm land which is maintained by the farmers of our country. In India, agriculture in villages plays a vital role in developing the country.
Thus, our main aim is to help the farmers so that they can improve the yield of the agricultural land. And will make them to understand the suitable crop for the farm land so that the particular land will give them the maximum yield.
Apart from all these parameters, this system will also provide the platform for the farmers to view and refer the various prices of the crops that are being sold in the country. This will help the farmers to sell the crops in their required price range and the consumers in return can also get the benefit from the crops being sold in the proper rate.

CIRCUIT DIAGRAM

The electronic sensors are the prime components in this proposed system. The cloud services are used to fetch the values from the sensors and trigger mail to the users. Below is the block diagram for this proposed model for the better understanding of the model

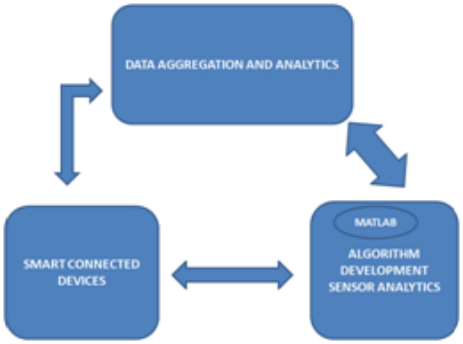

Fig. 1. Block diagram for this proposed model

The components and the softwares used for building this proposed system are described in the following sections.

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A. NodeMCU1.0 (ESP-12E Module)

NodeMCU popularly known as the Wi-Fi module which is used in various fields of IOT and this device application is on a large scale.

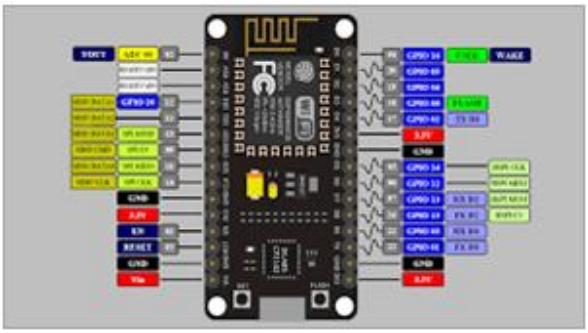

Fig. 2. NodeMCU 1.0 (ESP-12E Module)

The Wi-fi module is fitted with the chipset, whose model no. is ESP8266. There are basically 30 pins in the board to be used in any functions according to the user. The specifications of the pins are described below:

Microcontroller	ESP8266
Frequency	80MHz
Flash	4MB
RAM	80KB
Vendor	NodeMCU

B. IFTTT

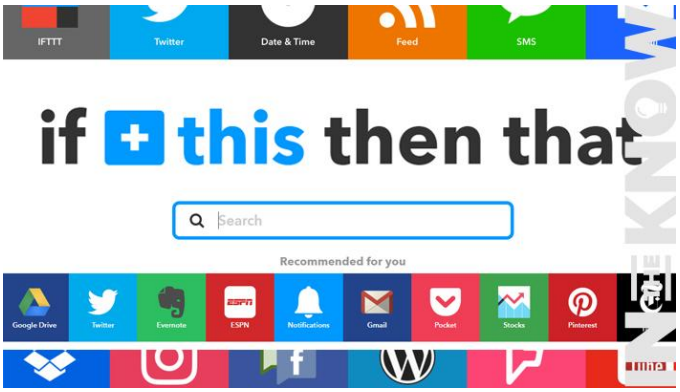

Fig. 3. IFTTT app

This is the carrier by which messaging and mail can be done to notify the farmers so that they can easily apply the solutions and increase the productivity. All the steps applied are directly informed to the farmers.

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RESULTS

TABLE I Collected Data Sets Sample

	Crop	Production 2014-15	Production 2015-16	Production 2016-17	Production 2017-18	Production 2018-19	Area 2014-15	Area 2015-2016	Area 2016-2017	Area 2017-18	Area 2018-19	Yield 2014-15	Yield 2015-16	Yield 2016-17	Yeield 2017-18	Yield 2018-19
0	Total Foodgrains	158.8	168.6	171.3	159.4	178.9	128.5	128.8	127.6	126.0	131.7	123.6	130.9	134.3	126.5	135.9
1	Rice	200.8	207.9	213.3	191.6	206.4	168.5	168.9	175.1	161.2	164.8	119.2	123.1	121.8	118.9	125.2
2	Wheat	131.6	136.4	140.1	140.3	150.8	115.0	115.2	114.0	116.9	119.5	114.4	118.4	122.8	120.0	126.3
3	Jowar	124.3	137.8	126.0	116.5	121.8	120.7	110.6	107.3	111.0	105.2	103.0	124.6	117.4	105.0	115.8
4	Bajra	136.4	161.5	143.9	105.4	167.9	94.5	95.1	87.0	88.5	95.6	144.3	169.7	165.4	119.0	175.8

The above shown Table I is the collected data sets for the proposed model. It visualizes rather highlights the main four crops that are being grown in India. The average of each crop is also being depicted in the above collected data set. Likewise, all the crops have their respective averages.

TABLE II Described Data Sets from the Collected Sample

	Production 2014-15	Production 2015-16	Production 2016-17	Production 2017-18	Production 2018-19	Area 2014-15	Area 2015-2016	Area 2016-2017	Area 2017-18	Area 2018-19	Yield 2014-15	Yield 2015-1
count	55.000000	55.000000	55.000000	55.000000	55.000000	55.000000	55.000000	55.000000	55.000000	55.000000	55.000000	55.00000
mean	168.698182	182.629091	179.952727	173.749091	210.181818	116.025455	118.403636	120.530909	118.203636	127.216364	146.829091	153.77454
std	179.503163	199.671545	187.409253	184.231322	232.535985	37.990960	41.287797	44.460177	44.976615	54.842653	144.836331	153.24310
min	53.900000	54.400000	50.000000	42.900000	42.100000	47.900000	47.400000	43.600000	37.500000	36.100000	86.000000	75.30000
25%	124.500000	122.200000	116.050000	105.350000	126.900000	92.550000	93.300000	93.200000	88.650000	90.650000	106.800000	116.80000
50%	142.700000	160.100000	156.500000	140.300000	169.000000	120.700000	121.700000	121.900000	120.900000	129.400000	118.700000	124.50000
75%	184.300000	200.100000	188.550000	197.050000	217.350000	131.050000	135.800000	136.250000	134.800000	147.950000	137.600000	154.40000
max	1427.700000	1571.500000	1463.000000	1430.300000	1790.600000	222.700000	241.600000	254.500000	260.300000	314.700000	1176.600000	1247.70000

Table II describes the data set for the collected data set. Here, the mean, std, and the min , etc. values are also being given for easy study. A brief conclusion about the production rates about various crops can be taken out from the above data. Basically, this is the average of all the crops and their rates in particular parameters. This data set is now treated as an unstructured data, thus we have clustered all the data and produced separate centroids and collected the index of each crops.

TABLE III Plot of the clustered data from the collected data sets

```
array([[ 121.92105263,  129.25      ,  125.1       ,  116.42894737,
         140.40789474,  103.02368421,  102.28684211,  102.24210526,
          98.37105263,  103.77631579,  120.44736842,  127.31842105,
         124.56052632,  120.94736842,  137.14210526],
       [1427.7       , 1571.5       , 1463.        , 1430.3       ,
        1790.6       ,  121.3       ,  125.9       ,  126.5       ,
         122.        ,  136.6       , 1176.6       , 1247.7       ,
        1156.8       , 1172.1       , 1310.8       ],
       [ 201.10625   ,  222.6       ,  230.0375    ,  231.35      ,
         277.11875   ,  146.575     ,  156.2125    ,  163.59375   ,
         165.06875   ,  182.3       ,  145.125     ,  148.2375    ,
         145.69375   ,  146.275     ,  158.075     ]])
```

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All the centroid data are produced from the described data sets and this will help to produce the indexes and then respective plotted clusters are produced, bad–segments are also produced and that will help to analyse properly, so that the area with the lowest crop production is found out and proper steps can be taken to increase the productivity of the particular area.

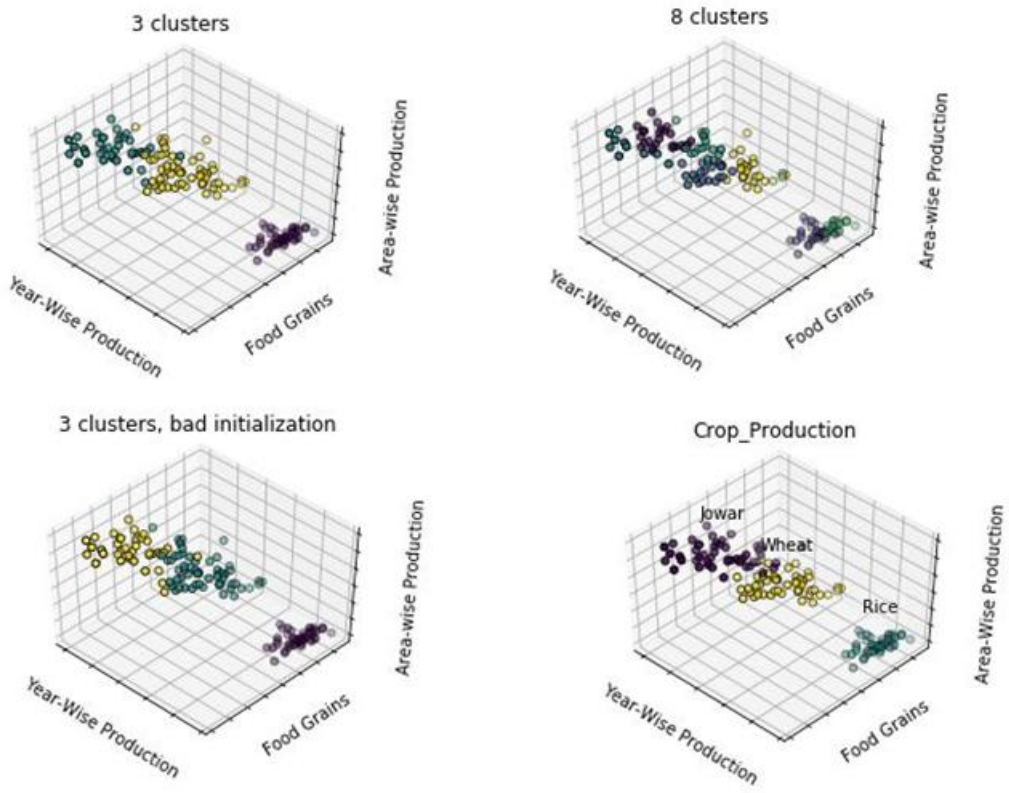

Fig. 4. Final result for the production of various crops

This is the final output of the dataset collected. Decisions are taken to increase the productivity of the crop of the respective area, so that the farmers are benefitted from this model.

PROPOSED MODEL

Below is the hardware model of the proposed model.

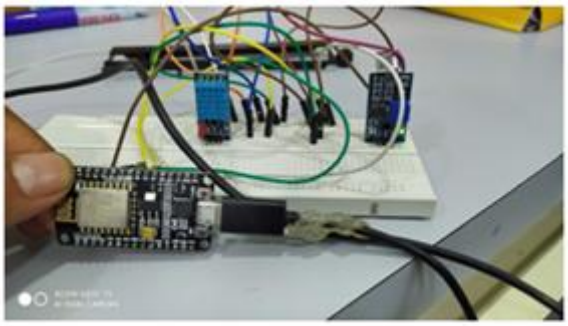

Fig. 5. Hardware Model

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CONCLUSION

The farmer's friend model is the basic model will help the farmer to collect the proper soil quality report and based upon that the farm land is set to grow certain particular crops and thus increasing the yield of the farm land and so the farmers benefit in the form of profit shares.

SCOPE FOR THE FUTURE

A better version of it can be made that to make the model simple and understandable to the farmers, i.e, the mobile-friendly version as well as the web-application so that they can apply this method themselves without seeking the help of the expert , i.e, making them self-independent in the process.

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