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IoT BASED FERTILIZER INJECTOR FOR AGRICULTURAL PLANTS

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Abstract - *Agriculture is very important thing for everyone. Farmers counting are reduced day by day, so that automation is implemented in agriculture. In farming process have a lot of work like a planting, watering, fertilizing, etc. In this project the fertilizers are sprayed by the pump by the commands are given by the user. Here the fertilizer and water are in the tank with segment. The NPK fertilizer and water are in the tank with segment. It consist of three mode from which the user can select among these mode In manual mode the ratio of fertilizers and water is given by the user. In Auto mode the ratio of fertilizer and water is selected automatically by knowing the name of plant. In Smart mode the name of the plant ,ratio of fertilizer and water is automatically and it is given by atmosphere temperature, moisture and crop data. The user enter the type of plant and enter their preferred mode by using mobile that system will mix the need fertilizer with water and sprayed to the plant through the sprayer machine.*

Key Words*: *Fertilizer, Manual mode, Auto mode, Smart mode, Plant, temperature, humidity.

1. INTRODUCTION

India is one of the agricultural country and its climatic conditions randomly change in many times .Farmers are facing drought condition .Soil plays a major role in agriculture .There are different types of soil for the crop yield. The technique of offering vital vitamins to vegetation by delivering fertilizer aggregate at the side of the irrigation water is called fertigation.

Based on the type of soil ,Fertilizer can be injected to soil for the better crop yield production. Fertigation assure equal distribution of fertilizers to all of the vegetation and better absorption of nutrients. Based on recent technology, the climatic condition like temperature, humidity, moisture and Ph in the soil can be analyzed and fertilizer like nitrogen, phosphorous and potassium is injected to the flora.

The soil fertility and soil type plays a vital role in agriculture and to check the availability of ground water and rainfall in crop yield production can be improved . There are two types of agricultural land that is dry land and wet land .In dry land ,the cash crops yield more profit for farmers and in wetland wheat and sugarcane yield more profit for farmers. There are different types of agro climatic regions in India and among the types of regions can be divided. The ultimate aim of the project is achieving the maximum crop at minimum yield.

Fertigation assure the identical distribution of fertilizers to all the plants and higher absorption of nutrients. This paper offers with designing an automatic fertigation machine as a way to perform the manner of nutrient delivery and water management in a controlled and unique manner. Implementing an automatic fertigation system will store time and assets because vitamins and water are given required amount thereby in addition growing the performance and final results of agriculture.

In efficient control of nutrient inputs has placed a big constraint at the environment and human's health. The unsystematic use of nitrogen and phosphorus fertilizers has caused floor water pollutants. So the farmers have considered this as a highly attention to nutrient and water management and incorporate the concept of balanced plant nutrition and moisture content material of soil into their farming strategies.

Therefore an automated fertigation machine that reduces the water and fertilizer wastage thereby heading off overuse is wanted to overcome the shortcomings..

Inappropriate use of N, P and K leads to the pollution of the ground water stages. With the assist of this method it's important viable to maintain a tab on the amount of N, P and K provided and can control the floor water pollutants. Continuous water tracking will lead to powerful control of water..

Agriculture is a very essential for everyone's life. now a days agriculture reduces because of farmers revenue.so we have initialize automation in agriculture. Agricultre consist of planting, watering, fertilizing.

By comparing these three methods fertilizing is a most complex process. In this project we have a solution for this complex process. By using IOT the amount of fertilizer will be injected automatically.

Here the fertilizer and water are in the tank with segment. The user enter the type of plant and enter their preferred mode by using mobile that system will mix the need fertilizer with water and sprayed to the plant through the sprayer machine.

This project gives a model to be particular and correct in predicting crop yield and supply the user with right hints approximately required fertilizer ratio based totally on atmospheric like temperature, humidity, moisture and soil parameters like NPK of the land which decorate to boom.

The Moisture Sensor can be used to detect the soil moisture in land or judge if there is moisture across the sensor, allow the flora for your lawn reach out for human help.

LM35 is a precision IC temperature sensor with its output proportional to the temperature (in oC). The sensor circuitry is sealed and consequently it isn't always subjected to oxidation and different strategies. With LM35, temperature may be measured extra as it should be than with a thermistor. It additionally process the low self heating and does no longer motive extra than zero 0.1 oC temperature.

Moisture sensors choose up adjustments in the resistance value of the sensor element in response to the trade inside the moisture. Thick film conductor of metals like porous is printed and calcinated inside the form of the comb to shape an electrode. Then a polymeric film is applied at the electrode; the movie acts as a moisture sensing film because of the life of movable ions.

2. LITERATURE SURVEY

[1] Savitha N. Ghaiwat , et. al., proposed that Prediction of Crop Yield and the Efficient use of Fertilizers[1] India is an agriculture country and its finanace mainly depends on agriculture yield production is boom and agro industry products. Data analysis is an increasing research subject in analysis of crop yield.The crop Yield prediction is a serious issue in agriculture

[2] Sanjay B. Dhaygude, et. al., proposed that A farmer fascinate is by knowing how maximum production of crop should be yielded. Analyze the diverse related attributes like region, pH fee from which alkalinity of the soil is determined. Added to that, percentage of nutrients like Nitrogen(N), Phosphorous (P), and Potassium (K) Location is used alongside with the usage of applications like APIs for climate and temperature, sort of mud, peptic value of the mud in that place, quantity of rainfall inside the nearby places, soil composition can be decided.All those composition of data can be scrutiny, to know the records with heterogeneous suitable machine getting to know a designs for creating a version.

[3] Sabah Bashir, et. al., analysed the methodology.., proposed a leaf disease detection. The important techniques used here are Back Propagation Neural Network(BPNN),K-nearest neighbour algorithm(KNN),Radial Basis Function(RBF) and Probabilistic Neural Network(PNN). Back Propagation Neural Network method is easy to implement as well as wide range of problems are applicable but it is a slow learning process. In Radial Basis Function, the training phase is faster as well as the hidden layer is easily interpreted but the execution process is very slow when the speed is considered as the factor.

[4] Y.Q. Xia, et. al., used a method Distribution of fertilizer system in the past some years, but probable of ICT is yet to be this industry. This paper basically acesss the probability of increasing the good result and successful of fertilizer grouping system with a opinion ICT formation.The survey based on, the need for computrized and administer of fertilizer system especially in emerging country like India is registered. This can help the farmers for the greater level of recognition and understanding of agriculture methods to be assume in their farming capability for issue of fertilizers

[5] K. Padmavathi et. al., proposed a comparative study that gives the RGB and gray scale image of the plant leaves. The paper also configuration the growing business surroundings with the[3] passes of the probability of the fertilizer allocation system. Agriculture is the vital factor providing to Indian Economy. According to the data its GDP sector configuration is 21.15%.India is the largest producer of agricultural products. In order to produce more agricultural products without any devastation, technical advancement are needed in this appropriate state. In research of recognition of nitrogen inadequacy and prediction of fertilizers usage by bleak, the images of chilly was detained at two steps. Leaf part of plant is main factor in spotting of nitrogen scarcity.

[6] Sachin D. Khirade et. al., Identification of the plant diseases is the key to stopping the losses in the yield and quantity of the rural product. Disease detection entails the steps like picture acquisition, photograph pre-processing, photograph segmentation, function extraction and classification. This paper discussed the strategies used for the detection of plant sicknesses using their leaves snap shots.

[7] P.Revathi et. al., . During distingution of inadequadifferent facet like quality facet region of the leaf image are estigate. Feature uprooting is the prime key for the discovering of lack of nitrogen. The farmers usually have few control over the usage of fertilizers. There is required for appropriate enlightenment for maximum usage of these fertilizers and is needed by farmers in the way to get high yields and supress wastage. Research task put through so far only spot the mallnourishment and disorder identification.

[8] Mr. Pramod S. Landge,et. al., In this advocate and experimentally compare a software program answer for automatic detection and category of plant diseases via Image Processing. This paper addresses this hassle with the goal of developing photo processing algorithms that could understand issues in crops from pics, based totally on coloration and texture.

[9] Heeb Al Bashish et. al., In this paper an picture-processing-primarily based technique is proposed and used for leaf and stem disorder detection. In step one of the proposed approach, the photographs at hand are segmented the usage of the K-Means method, within the 2nd step the segmented pictures are handed via a pre-educated neural network In this work identifies the nitrogen disorder in arctic, regulate the place of region of insufficient region and envision the amount of fertilizer usage by these insufficient plants. Thus the identification of starvation is helpful to

farmer for proper observing of crop thickening and minimal usage of fertilizers..

3 PROBLEM STATEMENTS

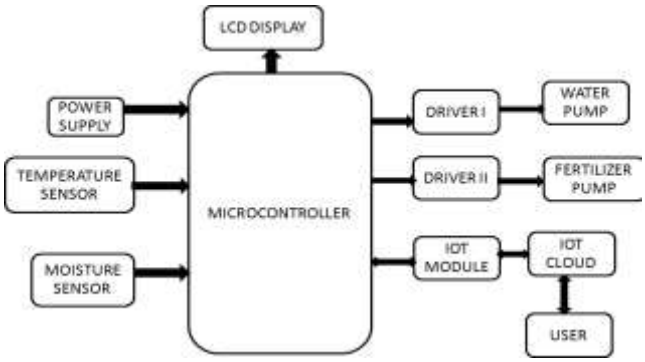
Drip irrigation is less wasteful than sprinklers. It isn't always only extra green for fertilizer usage, but can also be for maximizing nutrient uptake in vegetation like cotton. Drip irrigation the usage of fertigation can also increase yield and first-rate of fruit and plants, especially in subsurface drip structures instead of above floor drip tape. Sprinkler structures leaf and fruit fine. Continuous application-Fertilizer is provided at a constant fee. Three- stage application-Irrigation starts with out fertilizers. Fertilizers are implemented later inside the method. Proportional application-Injection fee is proportional to water discharge rate. Quantitative software- Nutrient answer is carried out in a calculated amount to every irrigation block. Other techniques of application encompass the lateral flow, solid set structures. Concentration of the answer may additionally lower as the fertilizer dissolves, this depends on gadget choice. If poorly decided on may additionally lead to bad nutrient

3.1 BLOCK DIAGRAM

It consist of a tank with segment. If the user is enter the type of plant by using mobile that system will mix the needed fertilizer with water and sprayed to the plant through the sprayer machine. In this block diagram,PIC16F877A Microcontroller is a open source programmable device which is programmed in MPLab compiler .5v Power supply is given to microcontroller .It consist of two sensors temperature and moisture sensor which is placed in the soil to sense the temperature and moisture ratio.

Both the sensor are interfaced with microcontroller temperature and moisture data will be collected continuously in the IoT module and the data will be stored in the IoT cloud. If there is any change in the predetermined data ,it will be indicated in the mobile phone and the required amount of fertilizer ratio will be displayed in the Liquid Crystal Display Correlation: It gives the measure of pixel how it is correlated to the neighbour of the whole image. The value is 1 or -1 for perfect positive or negative image.

BLOCK DIAGRAM OF THE PROPOSED SYSTEM



4. EXISTING SYSTEM

By using efficient method ,the crop yield is predicted (back propagation and random forest algorithm) and suggest how much quantity of fertilizer should be used to get the proper yield for the crop. Only atmosphere data are monitored on mobile network. Only pump On/Off action is done. An effort is made with a view to understand the crop yield production and is proceed by the Random Forest set of rules and Back propagation set of rules. These fashions were experimented with unique styles of crops in several places across India to are expecting the outcome. The fertilizer statistics turned into trained the usage of the Back propagation algorithm and calculate to view the final outcome of a nitrogen, phosphorus is needed for the region of land. Both the fashions for the production of crop had been as compared in the output predicting and via more parameters with recognize to the fault rate. The random woodland algorithm and back propagation wherein we were the fault detector is lesser to the random forest algorithm in wooded area than the lower back propagation

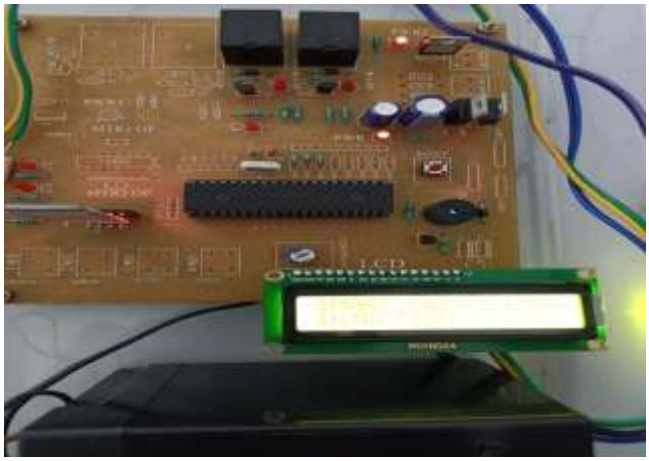
5. PROPOSED METHOD

The NPK fertilizer and water are in the tank with its a Segment It consist of three mode from which the user can select among these mode In manual mode the ratio of fertilizers and water is given by the user. In Auto mode the ratio of fertilizer and water is selected automatically by knowing the name of plant. In Smart mode the name of the plant ,ratio of fertilizer and water is automatically and it is given by atmosphere temperature, moisture and crop data.

A pump is a device that movements fluids (drinks or gases), or every now and then slurries, by means of mechanical action. Pumps can be categorised into 3 primary groups in step with the approach they use to move the fluid: direct carry, displacement, and gravity pumps. Pumps function by using some mechanism (typically reciprocating or rotary), and consume electricity to carry out mechanical paintings by way of moving the fluid. Pumps function through many strength assets, including manual operation, strength, engines, or wind energy, are available many sizes, from microscopic to be used in clinical programs to massive

commercial pumps. Mechanical pumps serve in a huge variety of programs which includes pumping water from wells, aquarium filtering, pond filtering and aeration, in the car industry for water- cooling and fuel injection, inside the energy enterprise for pumping oil and natural gasoline or for running cooling towers. In the clinical enterprise, pumps are used for biochemical methods in growing and manufacturing medicine, and as artificial replacements for body elements, specifically the artificial heart and penile prosthesis.

6. RESULT



Npk fertilizer ratio is obtained by interfacing Pic microcontroller with temperature, humidity and moisture sensor using MpLab IDE software. The program is burned in microcontroller using pic kit3.

7. CONCLUSION

In existing system, only Prediction of the crop yield by using the efficient method (black propagation and random forest algorithm) and recommend the quantity of fertilizer should be used to obtain the proper crop yield production . It monitors only atmosphere data on mobile network and the pump On/Off action is done. The aim of this project is to collect NPK fertilizer and water in the tank with segment. It consist of three mode from which the user can select among these mode. In manual mode the ratio of fertilizers and water is given by which the plant and fertilizer is well known by the user . In Auto mode the ratio of fertilizer and water is selected automatically by knowing only the name of plant by the user . In Smart mode ,the user cannot identify the name of the plant, ratio of fertilizer and water so the name of the plant, ratio of fertilizer and water will be suggested automatically to the user. By sensing the temperature and the moisture ratio in the soil and that data will be collected continuously in the IoT module The collected data will be stored in the IoT cloud. If there is any change in the predetermined data ,it will be indicated in the mobile phone and the required amount of fertilizer ratio will be displayed in the Liquid Crystal Display

7. DATA ANALYSIS

Data analysis for several has done for example for one plant sunflower amount of nitrogen is 4 percent, amount of phosphorous is 5 percent, amount of potassium is 6 percent, amount of water level is 15ml,range of temperature is 32 and range of humidity is 43.

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