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A Survey on Soft Computing Techniques Methods in Agriculture Field

Muneshwara M S[1]
Asst. Professor, Department of ISE
BMS Institute of Technology & Managemen
Yelahanka, Bangalore -560064,
Karnataka – India

Binod Neupane[2]
Student, Department of ISE
BMS Institute of Technology & Managemen
Yelahanka, Bangalore -560064,
Karnataka – India

Swetha M S[3]
Asst. Professor, Department of ISE
BMS Institute of Technology & Managemen
Yelahanka, Bangalore -560064,
Karnataka – India

Abhisek Oli[4]
Student, Department of ISE
BMS Institute of Technology & Managemen
Yelahanka, Bangalore -560064,
Karnataka – India

Abstract: ***Agriculture plays vital role in the development of agricultural country. In India, about 70% of population depends upon farming and 1/3 of the nation's capital comes from farming. Issues concerning agriculture have been always hindering the development of the country. The only solution to this problem is smart agriculture by modernizing the current traditional methods of agriculture. The aim is to make agriculture smart using automation and IOT technologies. The highlighting features of this project includes smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance, etc. It includes smart irrigation with smart control and intelligent decision making based on accurate real time field data. Finally, smart warehouse management which includes temperature maintenance, humidity maintenance and theft detection in the warehouse. Controlling of all these operations will be through any remote smart device or computer connected to Internet and the operations will be performed by interfacing sensors, Wi -Fi or Zig Bee modules, camera and actuators with micro-controller and raspberry pi.***

Keywords: Modern Agriculture, Automation and IoT in agriculture, Smart agriculture, Raspberry Pi, Zig Bee.

I. INTRODUCTION

Agriculture is considered as the basis of life for the human species as it is the main source of food grains and other raw materials. It will play vital role in the growth of country's economy. For the development of economic condition of the country, growth in agricultural sector is mostly necessary. Unfortunately, many farmers still use the traditional or normal methods of farming which is resulting in low yielding of crops and fruits. But wherever technology had been implemented and human beings had been replaced by automatic machineries, the yield has been improved highly in every country. Hence it is need to implement modern science and technology in the agriculture sector for improving and increasing the yield. Most of the papers shows the use of wireless sensor network that collects the data from different types of sensors and then send it to main server using wireless protocol. The collected data provides the information about different environmental factors, which in turns helps to monitor the system. Monitoring environmental factors is not enough and complete solution to improve the yield of the crops. My aim is making agriculture smart using automation and IOT technologies. The highlighting features of this paper includes smart GPS based remote controlled robot to perform tasks like; weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance, etc. Secondly, it includes smart irrigation with smart control based on real time field

data. Thirdly, smart warehouse management which includes; temperature maintenance, humidity maintenance and theft detection in the warehouse. Controlling of all these operations will be through any remote smart device or computer connected to Internet and the operations will be performed by interfacing sensors, Wi-Fi or Zig Bee modules, camera and actuators with micro-controller and raspberry pi.

II. LITERATURE SURVEY

Talking about the related work. I have been collecting some of the papers, with the methodology the authors have used as follows:

[1] "Design and implementation of WSN for precision agriculture in white cabbage crops".

In this research it present the design and implementation of a quality agriculture system using sensors network as the basis in precision agriculture for farmers of white cabbage in china with the aim of transferring knowledge and mitigating the effect of the climate and soil changes on crops of white cabbage. Finally, we found the highest ranges to improve productivity and avoid losses due to uncontrolled agriculture climatic variables such as soil temperature, luminosity, soil moisture, relative humidity, and relative temperature.

[2]" Smart Micro needle Sensing Systems for Security in Agriculture, Food and the Environment (SAFE)"

In this paper, it explain the development of the smart sensing system for (SAFE) security in agriculture, food and the environment which is based on wireless communication system, smart micro needles as well as low power consumptions.

[3] "A uW Backscatter-Morse-Leaf Sensor for Low-Power Agricultural Wireless Sensor Networks"

Nowadays, observing of plant water stress is of high importance in smart agriculture. Instead of using the ground soil moisture measurement, in this paper the leaf sensing is a new technology, which is proposed for the detection of plant needing water. Low cost and power system for leaf sensing using a new plant backscatter sensor tag is presented. Mostly, the sensors measure the temperature between the leaf and the air, which is directly related to the plant water stress. After, the tag collects the information from the leaf sensor through an analog-to-digital converter, and then, communicates remotely with a low-cost. All tag consists of the micro-controller, timer, sensor board and an RF front-end for communication. The timer produces a subcarrier frequency for simultaneous access of multiple tags.

[4] "Plants Growth Sensing using Beat Sensors" The paper proposes Beat Sensors as suitable IOT sensor that provides needed information for smart agriculture. By counting the number of ID signals from temperature beat sensors we demonstrate that the growth of mustard plants can be measured. This is because the total number of ID signals that includes an integral function that corresponds to plant growth.

[5] Smart Farming –IoT in Agriculture.

IOT is a revolutionary technology which is present for the future of communication and computing. Nowadays IOT has been used in every field like smart traffic control, smart home, smart cities and so on. It can be implemented in every field, so this paper is about the implementation of IOT in agriculture. IOT helps in different things like better resource management, better crop management, low cost and improve in quality and quantity.

III. PROPOSED SYSTEM

In the proposed system collecting all the data from various sensors like temperature, humidity, lux, moisture and other environmental factors and will do the analysis on the same. During analysis if gets better result of the combination of the data gathered from the various sensor then those data to the entire volunteer for further use. The system will contain many modules at various geographical position and all these modules will send the data to this platform, which will give some idea to focus on the environmental factor, which are good for the crop or farm.

IV. DESIGN AND METHODS

It consists of four section: node1, node2, node3 and PC or mobile app to control the every system. In the present system, all node is process with different device and sensors as well as they are interconnected to one central server through wireless communication modules. The server receives and sends information from user end using internet connectivity. There are two modes of operation of the system; auto mode and manual mode. In this auto mode system it takes its own decisions and controls the installed devices whereas in manual mode user can control the operations of system using application and computer commands.

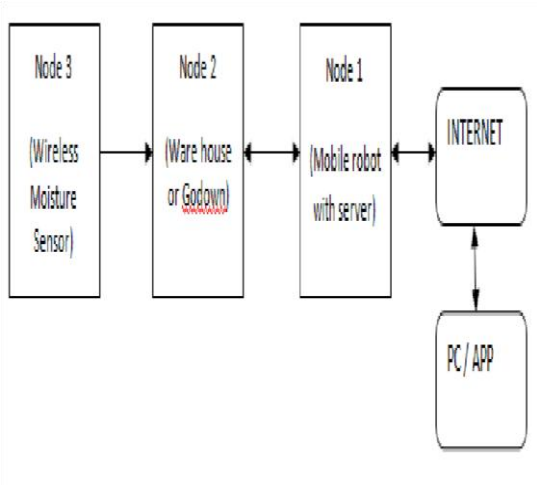

Fig 2: System overview

Applications of the Model:

1. Disease Detection and Diagnosis

Smartphone applications under this subcategory are dedicated to disease detection/diagnosis in farms when utilizing sensors on smartphones. From the data received from various sensors the microprocessor analyses the physical condition of the plant/crops. Initial data are feed into the system, which is compared to the data received from sensor. This helps in the detection of any diseases or disorder in the plant/crops, like dried or extremely yellow leafs, etc… And accordingly respective diagnosis can be done.

2. Fertilizer Calculator

Applying fertilizer is an important farming activity with a potential to greatly affect farm productivity. It is similar to the process of detection and diagnosis of disease. This time data from the soil is analyzed to measure the fertilizer present in the soil and accordingly the addition or subtraction of fertilizer is recommended for the better yield of the crops.

3. Soil Study

Soil is another major component in farming which has a great impact on the success of agriculture. While soil is frequently refers as “fertile substrate”, not every soil are suitable for the growing crops. Ideal soil for every agriculture are balanced in contribution from mineral components, soil organic matter, air and water.

4. Water Study

Water quality affects farming and agriculture in nearby regions. Water is a critical for agricultural and production. The use of water in agriculture which makes it possible to grow fruits and vegetables which is the main part of our diet.

V. Result and Discussion

As shown in above diagram/figure it is setup for node which consists of mobile robot with global positioning system modules (GPS), central server and other sensors. All sensors are successfully connected with microcontroller and the microcontroller is interfaced with the raspberry pi. GPS and camera are also connected to raspberry pi. As a result shows that the robot can be controlled remotely using wireless transmission of PC commands to R-Pi. R-Pi forwards the commands to microcontroller and microcontroller will gives signals to motor driver in order to run the Robot. GPS module provides the co-ordinates for the location of the robot.

Fig 3: Experimental system

VI. Conclusion

In all three nodes the sensors and microcontrollers are fully interfaced with raspberry pi and wireless communication between various nodes. All the above experimental tests and observation proves that project is a complete solution to field activities, irrigation problems, and storage problems using remote controlled robot, smart irrigation system and a smart warehouse management system respectively. By implementation such type of system in the field which can be definitely help to improve the yield of the crops and overall production.

References

1. Juan M. Núñez V. and Faruk Fonthal R and Yasmín M. Quezada L.“Design and implementation of WSN for precision agriculture in white cabbage crops” IEEE Cloud ComputingYear:2017 , Pages: 975– 979 Cited by: IEEE Journals & Magazines
2. Brendan O’Flynn, Marco De Donno, Colm Barrett, Caoimhe Robinson, Alan O Riordan“Smart Microneedle Sensing Systems for Security in Agriculture, Food and the Environment (SAFE”(Computer Year: 2017 , Page s: 463– 467 IEEE Journals & Magazines Hongmei He, Tim Watson, Carsten Maple, Jörn Mehnen and Ashutosh Tiwari
3. Spyridon Nektarios Daskalakis, Stylianos D. Assimonis, Manos M. Tentzeris, “A uW Backscatter-Morse-Leaf Sensor for Low-Power Agricultural Wireless Sensor Networks” IEEE SENSORS JOURNAL, VOL. 18, NO. 19, OCTOBER 1, 2018
4. Koichiro Ishibashi, Yuu Oota, Kosuke Suzuki, and Ryohei Takitoge “Plants Growth Sensing using Beat Sensors” Year: 2017 , Page s: 1 – 7 Cited by: Papers (4) IEEE Journals & Magazines
5. Rahul Dagar, Subhranil Som, Sunil Kumar Khatri, “Smart Farming –IoT in Agriculture” IEEE Communications Standards Magazine Year: 2018 , Pages: 1-6 IEEE Journals & Magazines
6. Vikas Kumar, MS Swetha, MS Muneshwara, S Prakash, “Cloud computing: towards case study of data security mechanism,” vol-2 issue-4 page no-1-8 2011
7. MS Muneshwara, MS Swetha, M Thungamani, GN Anil, “Digital genomics to build a smart franchise in real time applications,” IEEE International Conference on Circuit, Power and Computing Technologies (ICCPCT),IEEE page no 1-4 2017 .
8. MS Muneshwara, A Lokesh, MS Swetha, M Thungamani, “Ultrasonic and image mapped path finder for the blind people in the real time system,” IEEE International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI) IEEE, page no 964-969 2017.

